(No Model.) 3 Sheets—Sheet 1.

I. E. BLAKE, G. E. SMITH & E. M. DOIG.

LAMP.

No. 482,290. Patented Sept. 6, 1892.

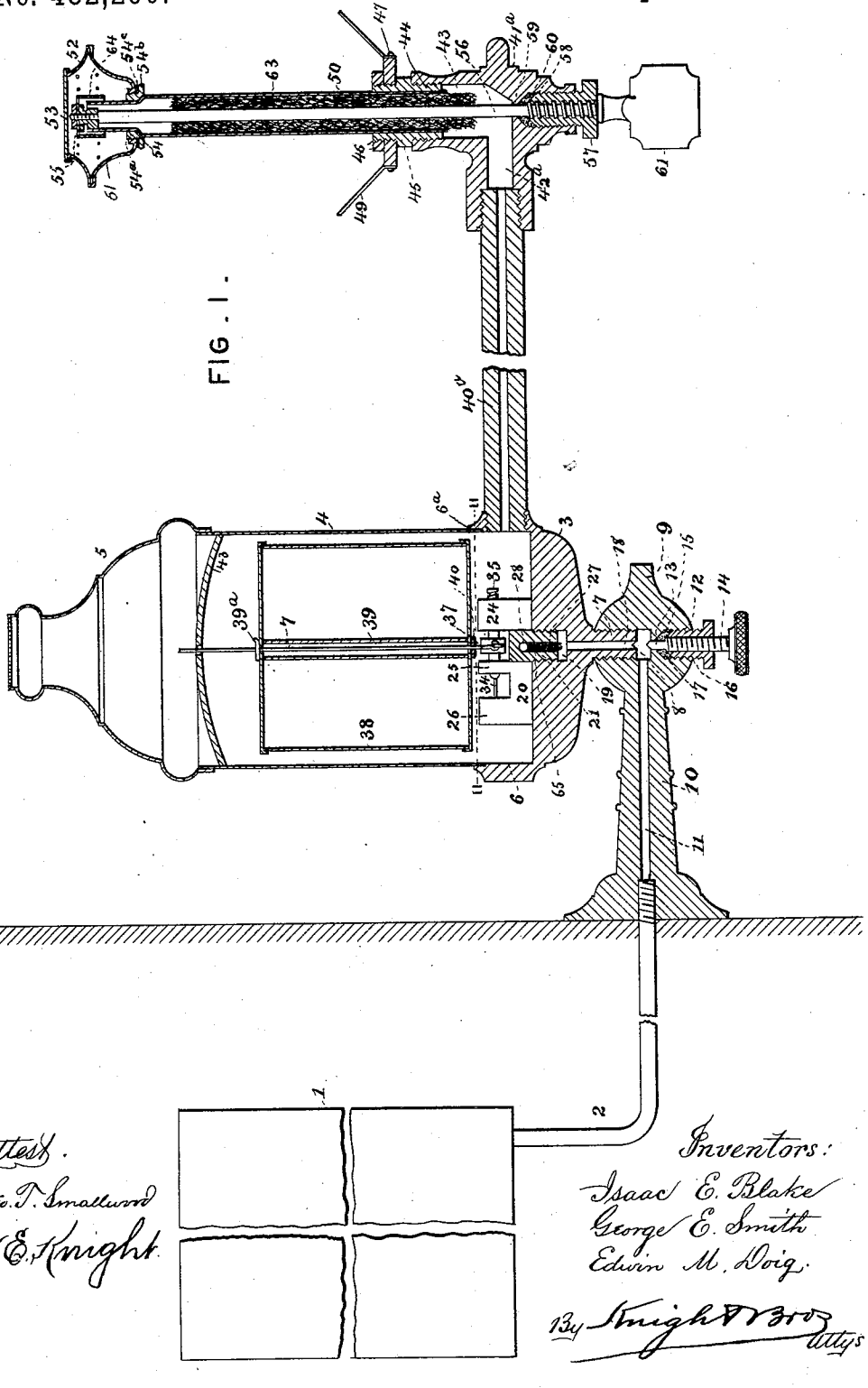


FIG. 1.

Attest.
Geo. T. Smallwood
W. E. Knight

Inventors:
Isaac E. Blake
George E. Smith
Edwin M. Doig.
By Knight Bros Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

I. E. BLAKE, G. E. SMITH & E. M. DOIG.

LAMP.

No. 482,290. Patented Sept. 6, 1892.

FIG _ VI _

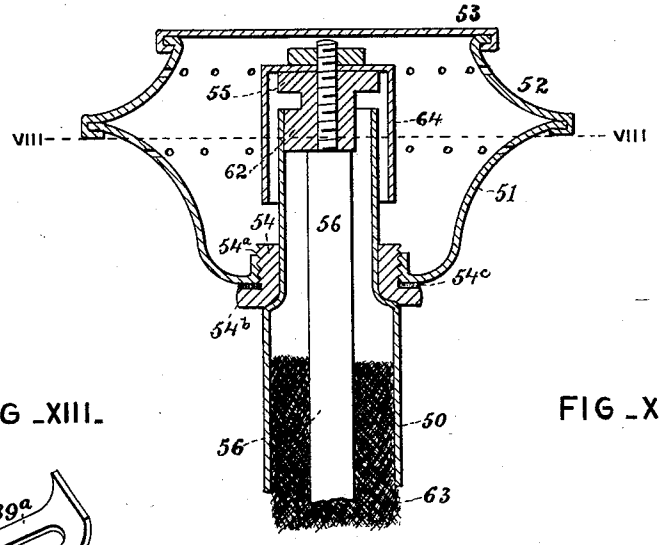


FIG _XIII_

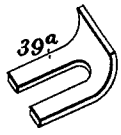


FIG _XIV_

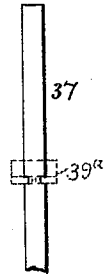


FIG _II_

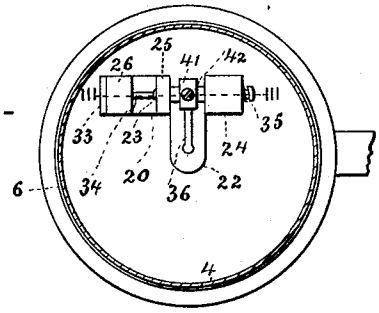


FIG _ III _

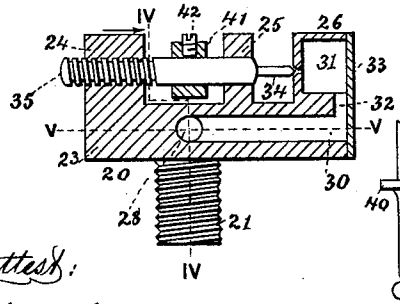
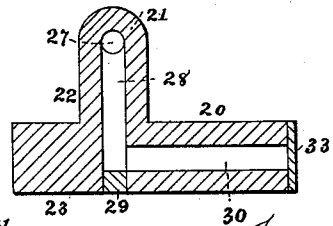


FIG _ V _



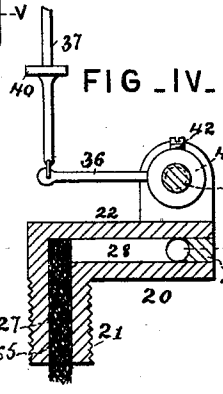


FIG _IV_

Attest:

Geo. T. Smallwood

W. E. Knight

Inventors:

Isaac E. Blake

George E. Smith

Edwin M. Doig

By Knight Bros

attys

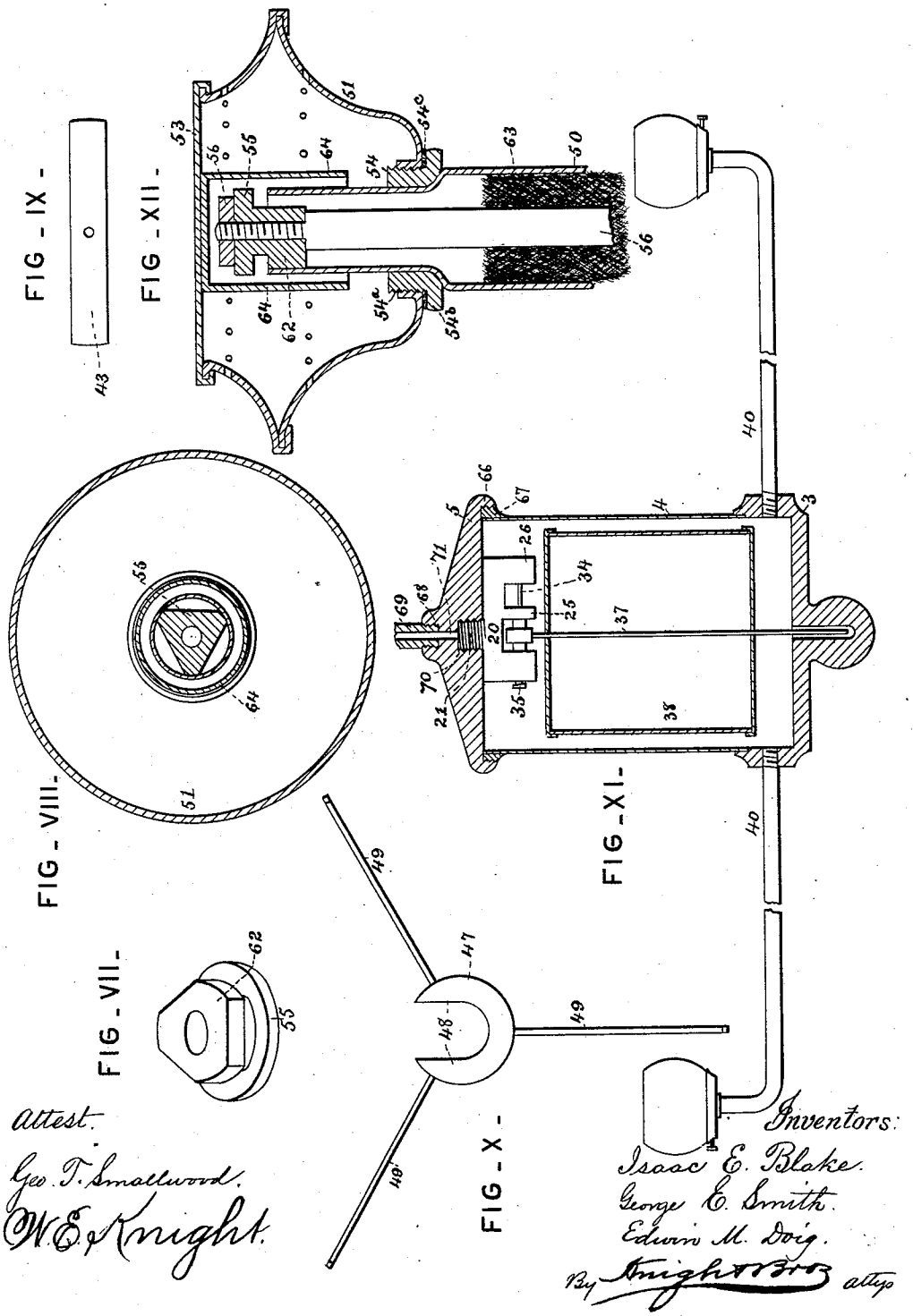
THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

I. E. BLAKE, G. E. SMITH & E. M. DOIG.

LAMP.

No. 482,290. Patented Sept. 6, 1892.



Attest.
Geo. T. Smallwood.
W. E. Knight.

Inventors:
Isaac E. Blake.
George E. Smith.
Edwin M. Doig.
By Knight Bros attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ISAAC E. BLAKE, GEORGE E. SMITH, AND EDWIN M. DOIG, OF DENVER, COLORADO.

LAMP.

SPECIFICATION forming part of Letters Patent No. 482,290, dated September 6, 1892.

Application filed November 14, 1887. Serial No. 255,138. (No model.)

To all whom it may concern:

Be it known that we, ISAAC E. BLAKE, GEORGE E. SMITH, and EDWIN M. DOIG, citizens of the United States, and residents of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Lamps, of which the following is a full, clear, and exact description.

The invention which forms the subject-matter of this application involves no new principle, but relates exclusively to details in the construction of certain parts of lamps of the character referred to.

The invention consists in certain features of novel construction, which are hereinafter particularly pointed out in the claims, and which are first fully described with reference to the accompanying drawings, in which—

Figure I illustrates one of the improved lamps in vertical section, the main reservoir being shown broken and in elevation. Fig. II is a horizontal section of the supplemental reservoir on the line II II, Fig. I. Fig. III is a section on the line III III, Fig. II, showing in detail a valve and its accessories for controlling the admission of the fluid to the supplemental reservoir. Figs. IV and V, respectively, are sections on the lines IV IV and V V, Fig. III. Fig. VI is an enlarged vertical section of the burner. Fig. VII is an enlarged perspective view in inverted position of the valve for regulating the supply of the vapor to the burner and its guide. Fig. VIII is a horizontal section of the burner on the line VIII VIII, Fig. VI. Fig. IX is an elevation of the perforated plate for guiding the float in its vertical movement. Fig. X is a plan view of the shade straddle or support. Fig. XI is a vertical central section of a chandelier, showing the improvements applied thereto. In this form of the device the supplemental reservoir receives its supply of fluid from a pipe opening into it at top, while in the form of the device in the other figures it receives its supply from a pipe communicating with it at bottom. Fig. XII is a section showing a slight modification in the construction of the burner. Fig. XIII is a perspective view of the split key for securing the float to the rod secured to the valve operated by said float. Fig. XIV is a detail view, on a larger scale, of the central operating-rod and the key which affords a bearing between it and the top of the float.

In this application we claim the improvements which relate to the construction of the supplemental reservoir.

1 represents the main reservoir, which may be of any desired size and is in practice usually situated on the outside of the building near the roof, at least above the level of the highest burner which it is intended to supply. One of such reservoirs may be made to supply any number of burners through one or more supply-pipes 2, having the required number of branches. For these supply-pipes it is preferred to employ seamless lead tubing from one-quarter ($\frac{1}{4}$) to three-eighths ($\frac{3}{8}$) of an inch in diameter, having a bore about one thirty-second ($\frac{1}{32}$) of an inch in diameter, the advantage being that such tubing may be bent with great facility to any required shape and needs no joints at the angles. It is desirable to dispense with a joint wherever it is possible, because fluid of the nature employed will penetrate the smallest crevice. Lead tubing has, however, been employed for this purpose before and is not herein claimed.

The supplemental reservoir is formed of a base-piece 3, a body portion 4, and a cap or cover 5. The base 3 consists of a heavy casting (preferably brass) having in its top side a circular chamber 6 and on its under side a stem 7, screw-threaded externally for engaging a corresponding threaded socket 8, formed in the enlarged end 9 of a bracket 10, by which the lamp is supported and affixed to the wall. Said chamber 6 has formed in its wall a rabbet 6^a, within which is seated the body portion 4. This bracket is also provided with a horizontal bore 11, which communicates at one extremity with the socket 8, and with the other extremity of which bore communicates the supply-pipe 2.

Formed in the under side of the enlarged end 9 of the bracket at right angles to the bore 11 and in line with the socket 8 is a second internally-screw-threaded socket 12, which sockets 8 and 12 communicate with each other through the medium of a contracted duct 13, located centrally with respect to

their axes, which are coincident. This duct is just large enough in diameter to permit the passage of the cylindrical portion of the stem 14 of a conical valve 15, whose screw-threaded portion fits a correspondingly-threaded perforation formed centrally through a follower 16, which is provided on its exterior with screw-threads engaging the internal threads of the socket 12. This follower when screwed home squeezes between its inner end and the end of the socket 12 a mass of fibrous asbestus 17, causing it to form a perfectly-tight joint around the cylindrical portion of the valve-stem. The conical seat for this valve is formed on the extremity of the stem 7 of the base-piece and concentrically with a bore 18, formed through the axis of the said stem and terminating in an enlarged screw-threaded socket 19, which socket is concentric with the circular chamber of the base-piece.

Many of the bad results from the use of lamps of the present character—such, for example, as the overflowing of the supplemental reservoir, the too copious supply of oil to the burner, &c.—have been due to the fact that the means heretofore employed for regulating the supply of oil to the supplemental reservoir have been to a greater or less degree ineffectual. Valves of various constructions operated by floats have been employed; but extensive experiments have demonstrated beyond a doubt that where the valve is of such a nature as to be affected by the pressure of the fluid, which is continually varying, floats made of the utmost capacity which the dimensions of the supplemental reservoirs will permit are ineffectual in maintaining perfect uniformity in the supply of fluid to the burner.

20 represents a part (which for the purposes of this description we will designate the "valve-piece") consisting of an integral casting of double-elbow shape—that is to say, it comprises a stem 21, screw-threaded on its exterior for engaging the corresponding threads in the socket 19, whereby the valve-piece is held in place in the supplementel reservoir, a branch 22, extending laterally from one extremity of the stem 21, forming therewith an L, a branch 23 at the extremity of the branch 22 and forming therewith a T, and three lugs 24, 25, and 26, projecting from one side of the branch 23 and in line with each other. The "casting" comprises these parts when taken from the mold and afterward worked to convert it into our valve-piece, which is constructed as follows: As already mentioned, the stem 21 is externally screw-threaded, and is, furthermore, provided with a central duct 27, whose inner end terminates about the axis of the branch 22, where it communicates with a duct 28, which is formed by boring or drilling from either end of said branch 22, the extremity of said bore being afterward closed by a plug 29. The duct 28 communicates also with a duct 30, which is formed by boring from that extremity of the branch 23 from which projects the lug 26, the latter being provided with an enlarged chamber 31, formed either by a core during the process of casting or by drilling. The duct 30 communicates with the chamber 31 through a duct 32, which is formed by cutting a groove in the extremity of the branch 23, a plate 33 being soldered, brazed, or otherwise secured to the extremity of said branch 23, so as to close the extremity of the bore 30, cover the groove 32, and close the chamber 31. That wall of the chamber 31 which lies next the stem end of the valve-piece is provided with the perforation from which the fluid escapes into the supplemental reservoir, having passed through the ducts 27 28 30 32 and chamber 31. This opening flares outward—*i. e.*, is of conical shape—its inner extremity being in practice only large enough in diameter to admit the point of a needle. There are two reasons for making it flare outward: The first is to prevent its becoming choked or clogged either by small particles of foreign substances or by the accumulation of heavy gummy fluid. This result is produced by reason of the fact that the sides of the opening flare or slope all the way to the inner surface of the wall through which it is formed, so that its minimum diameter is where the substance first enters. Hence if the substance can enter the opening at all it can pass all the way through. If it cannot enter, it will be precipitated within the chamber 31 by gravity when there is no pressure upon the fluid. The second reason for making the opening of this shape is to provide a seat for the valve 34, which is to control the admission of fluid to the supplemental reservoir. This valve has a conical needle-point which enters the opening and enables the flow to be regulated to a nicety. The stem 35 of this valve is provided with steep screw-threads and fits in a correspondingly-threaded perforation formed through the lug, projection, or boss 24, the lug, projection, or boss 25 being provided with a smooth perforation which fits snugly the said stem and firmly holds it against lateral movement. The interior dimensions of the supplemental reservoir are so small (it being only two inches in diameter in actual practice) that in order to enable the employment of a valve-piece of the proper size it is essential that the socket 19, into which its stem 21 is screwed, should be situated at or very near the center of the reservoir, so as to permit the extremity of the said piece to move clear of the sides as it is being screwed home. The valve-stem is turned in order to open and close the valve by means of a lever 36, projecting laterally from it, the free extremity of said lever being in turn connected loosely with the lower extremity of a small rod or wire 37, to which an up-and-down movement is imparted by a float 38 as the latter rises and falls. This float consists of a closed air-chamber, whose shape in cross-section preferably corresponds with that of the reservoir and whose size is such that it nearly fills the

said reservoir, leaving only the requisite space to permit its movement and accommodate the requisite amount of fluid. This float is preferably air-tight and has passing centrally through it from top to bottom an open-end tube 39, whose ends are soldered water-tight to the said top and bottom. The rod or wire 37 passes upward through this tube, it being provided at such distance from the bottom as will permit the necessary vertical movement of the float with a lateral enlargement, projection, or flange 40, which bears against the under side of the float, and thereby causes a depression of the rod, and consequently the lever 36, as the float descends. The upper extremity of the wire rod 37 extends above the top of the float and is notched for the reception of the tines of a split key 39ª, which when in place rests upon the top of the float 38. Consequently when the float rises the rod 37 must rise also, carrying with it the free end of the lever 36, whose opposite end is fixed to or formed with a ring 41, through which the valve-stem 35 passes, the two being adjustably secured together by a set-screw 42. This means for connecting the lever 36 with the valve-stem is very desirable for several reasons, chief among which are that it enables the valve-stem to be accurately adjusted with relation to the float, so that the valve will be brought to its seat by a greater or less movement of the float, as may be desired. Suppose, for example, it is desired to work the lamp with a minimum quantity of fluid in the supplemental reservoir. Before tightening the screw 42 the valve-stem 35 is turned until the valve 34 is just off of its seat. The lever 36 is then moved to its lowermost position and the set-screw 42 tightened. It is manifest that the slightest movement of the float will bring the valve to its seat, and thus completely cut off the supply of fluid until the float again falls. If, on the other hand, it is desired to work the lamp with a maximum quantity of fluid in the supplemental reservoir, the parts are so adjusted in the manner already set forth that the valve 34 will not come to its seat until the float is about to reach the limit of its upward movement. It will be understood that the up-and-down movement of the float is due to the admission of the fluid to or the egress of fluid from the reservoir. In actual practice the valve responds so promptly to the slightest movement of the float that its up-and-down movement is not perceptible. The fluid will find a level which will support the float at such an elevation as to hold the valve just far enough from its seat to admit a supply of fluid equal to the consumption. This nicety of operation is due to the nature and construction of the valve and its operating mechanism. The opening through which the fluid is admitted is so minute that whatever may be the amount of pressure per square inch which the oil in the supply-pipe may have the pressure on the end of the valve will be insignificant. Furthermore, a screw and a lever are both employed for transmitting the movement of the float to the valve. We are aware that conical or "needle" valves have been provided with threaded stems and thumb-pieces whereby to operate them—such as the valve 14 15—and do not claim such as our invention. We are not aware, however, that a needle-valve has ever been used in a device for regulating the flow of light oils in combination with a screw for advancing and retracting it and a float for operating the screw.

Attention is directed to the peculiar shape of the valve-piece for which there are several important objects. In order to enable the rod 37 to pass centrally through a float of maximum size, it is necessary for the free end of the lever 36, to which said rod is secured, to be situated in the center of the supplemental reservoir. This necessitates the placing of the valve-stem some distance from the center of said reservoir and at right angles to a line drawn radially therethrough. The rod 37 extends some distance above the split key 39ª and passes through a perforation in a plate 43, made of springy or ductile metal of a length slightly greater than the interior diameter of the reservoir, so that when it is sprung or bent and placed horizontally across the reservoir its resilience will cause its ends to bear against the walls of the reservoir with sufficient force to hold it in the position shown in Fig. I. This forms a guide for maintaining the rod 37 in a vertical position and preventing the float from touching the sides of the reservoir. The float may be removed and replaced as often as necessary without injury to the parts. If the cap 5 of the reservoir fits air-tight, a minute perforation should be made through its top for permitting the escape of air. If, however, the sides 4 are made of sheet brass ornamented on its exterior by hammering or otherwise, whereby it is made rough, sufficient air can enter between it and the cap to permit the proper operation of the device.

It now only remains to describe the burner, any desired number of which may be supplied from one supplemental reservoir through the medium of as many pipes 40ª, each screwed at one end into screw-threaded perforations extending through the annular sides of the base-piece 3 and at the other into a casting 41ª, which for the purpose of this description will be called the "chamber-piece." This piece has a horizontal duct 42ª (with which the pipe 40ª communicates) and a vertical duct 43, which meet and form a chamber. The duct 43 is internally screw-threaded and large enough in diameter to receive the lower end of an externally-screw-threaded sleeve 44, formed at an intermediate point with a flange 45 of square or polygonal shape for the reception of a wrench for screwing it home. Upon the upper extremity of this externally-screw-threaded sleeve 44 is turned a nut 46, designed to clamp between it and the flange

45 the yoke 47 of the shade-straddle, which is of the peculiar shape shown in Fig. X. Instead of having a perforation, as is usual, it is formed with a slot 48, extending inward from its periphery and terminating in a curved portion, which fits snugly around the sleeve, the object being to provide a straddle which may be slipped on sidewise, avoiding the necessity which has heretofore existed of slipping off the various parts of the burner. The straddle-arms 49 radiate from this yoke and may be provided at their extremities with any desired means for holding the shade or globe.

50 is a brass tube whose lower end passes quite through the sleeve 44, which it fits snugly and within which it is secured by soldering. Upon the upper end of this tube is mounted a cap formed of three parts 51, 52, and 53, of sheet metal, shaped and secured together substantially as shown. The bottom part has its lower edge turned or spun up inside of itself and screw-threaded for engaging corresponding threads 54^a on a collar 54, fitting tightly around a contracted portion of the tube and resting upon the shoulder formed between the contracted portion of the tube and the tube proper. This collar is provided at bottom with an outer annular flange 54^b, upon which is placed a ring or washer 54^c of asbestus, which latter, when the cup is screwed home, prevents the escape of vapor at the joint. The collar, being separate from the burner-tube, insures great strength and durability. The upper edge of bottom part 51 is turned outward horizontally, forming a flange which is embraced by the lower edge of the intermediate part 52, which is spun over it, so as to make a tight joint. The upper edge of the part 52 is likewise turned outward horizontally, forming a flange which is embraced by the edge of the top part 53, which latter is perfectly flat. It will be seen that these parts thus united form a cap having two horizontal flanges, beneath each of which is a row of minute perforations, through which the superheated vapor issues. The top of the tube 50 is cut off at a right angle to its length and forms the seat for a valve 55, consisting of a flat disk secured near the upper extremity of a stem 56, which extends downward through the tube 50, the bore 43, and a follower 57, the latter being externally screw-threaded for engaging corresponding threads formed on the interior of a socket 58, formed in the under side of the chamber-piece 41^a and in line with the duct 43. The socket 58 communicates with the duct 43 through a central duct 59 only sufficient in diameter to permit the passage of the valve-stem 56. The valve-stem is packed at this point by asbestus or other substance 60, which is compressed between the end of the socket 58 and the follower 57 when the latter is screwed home. The portion of the stem which passes through the follower 57 is screw-threaded and engages corresponding threads in said follower, which serve to impart a longitudinal movement to the stem for raising or lowering the valve as the said stem is turned by the handpiece 61. The valve 55 is slipped onto a reduced screw-threaded portion of the stem and is held in place by a nut 56, turned on after it, or the threads may be dispensed with and the parts held in place by riveting or upsetting the end of the rod.

A guide is provided for holding the valve-stem 56 central with respect to the tube 50, and thereby causing the valve to bear upon its seat all around. This guide is preferably formed on the under side of the valve itself, in which case it consists of a circular projection 62 of such diameter as to fit simply the interior of the tube 50, two, three, or more flat surfaces or notches being formed in said projection for permitting the passage of vapor. In order to cause the vapor to issue in a continuous sheet from beneath the valve, a groove is cut around the projection 62 just beneath the under side of the valve, as shown.

63 is a wick which is placed around the valve-stem 56 in the tube 50 and extends from a point near the top of the tube to a point where its lower end dips in the fluid. This wick is for the purpose of conveying the fluid up within the tube by capillary attraction to a point which is sufficiently heated by the flame from the burner to cause vaporization. The vapor then rises and passes through the notches between the wall of the tube and the projection 62 into the annular groove beneath the valve and thence out, its escape being regulated by the position of the valve. The vapor might be ignited at the point where it issues from this tube, if desired, (and this is the usual arrangement;) but we prefer to superheat it before ignition, because by so doing the consumption is more perfect and the quality of the light greatly enhanced. It is for this reason that the cap 51 52 53 is placed over the end of the tube. For this reason, also, the tube is carried as near the top of the cap as possible and a deflector 64, of inverted-cup shape, is placed over the end of the tube, so as to catch the vapor as it issues therefrom and cause it to flow downward to the bottom of the superheating-chamber. It issues from beneath the lower edge and is compelled to rise again in the superheating-chamber in order to reach the perforations through which it escapes into the atmosphere for ignition. This cup may be secured to the valve, to the valve-stem, or to the top 53 of the cap, the method shown in Fig. I being preferred. With the arrangement shown in this figure the threaded opening in the lower part 51 of the cap must be of sufficient size to permit it to be put on over the cup and again taken off at will. This necessitates the making of that portion of the collar 54 which bears the screw-threads 54^a of greater diameter than the cup 64.

65 is a filter consisting of a piece of fine-wire gauze rolled tightly and placed in the duct 25 of the valve-piece 20.

To recapitulate, the oil flows from the main reservoir 1 through pipes 2 to duct 11, and thence to the chamber 8 in the enlarged end 9 of the bracket 10. If now the valve 15 be closed against its seat on the end of the stem 7, the oil can go no farther. If, however, the valve is open, as shown, the fluid enters duct 18 and passes into chamber 19, whence it enters the duct 27, in which all foreign substances are arrested. It will be observed that the chamber 19, duct 18, chamber 8, duct 13, and socket 12 are in a direct vertical line with each other, which facilitates very greatly the removal of matter which is arrested by the filter 65. The filtered fluid passes from the duct 27 into duct 28, thence to duct 30, thence to duct 32, thence to chamber 31, and thence through the minute aperture in the wall of the chamber into the supplemental reservoir, provided, of course, the said aperture is not closed by the valve 34. Whether this aperture be closed or open depends upon the height of the fluid within the supplemental reservoir. If the reservoir is empty, the float 38, rod 37, and lever 36 will be in their lowermost position and the valve retracted. As the reservoir fills, the float gradually ascends, raising the lever 36, thereby turning the valve-stem, which is caused by its screw-threaded bearing in the projection 24 to advance toward its seat around the aperture through which the fluid is escaping. When the valve has come to its seat, no more fluid can enter and no overflow can therefor occur. The fluid in the chamber of the piece 41^a will be on a level with that in the supplemental reservoir by reason of the direct connecting-pipe 40^a. The wick 63 will dip into the fluid in this chamber and carry upward by capillary attraction a sufficient quantity to supply the burner, the fluid being vaporized in the upper part of the tube 50 by the heat generated by the flame. The escape of the vapor from the tube is regulated by the valve 55, by which it may be cut off entirely, if desired. The vapor escaping beneath the valve passes downward within the cup 64 and during its descent is more or less superheated. After issuing from beneath this cup it must again ascend within the cap 51 52 53 in order to reach the escape-holes, and during its travel upward within said cap is highly heated and expanded.

The form of the invention shown in Fig. XI differs from that shown in Fig. I only in certain details necessary to adapt the parts to a chandelier. Here the cap 5, as well as the base 3, is made of a brass casting and is provided on its under side with an internally-screw-threaded annular flange 66, for engaging an externally-screw-threaded ring 67, secured to the body 4. The cap 5 is here provided with a screw-threaded cavity 68 for the reception of the correspondingly-threaded lower end of a pipe 69, by which the chandelier is supported and with which the oil-supply pipe communicates. In the under side of this cap 5 is another screw-threaded socket 70, which communicates with the socket 68 through duct 71. Into this socket 70 the stem 21 of the valve-piece 20 is screwed in the manner already described with reference to the other form of the device. In this modification a slight change in the construction of the device is necessary. The water-tight tube 39 is dispensed with, and instead of employing a collar 40 and key 39^a for securing the float to the central rod 37 the latter is soldered to the top and bottom of the float. To prevent the rod and float from getting out of parallelism with the sides of the reservoir, the bottom piece 3 is bored axially and affords a guide for the extension of the rod 37, within which it may work freely up and down.

Having thus described our invention, the following is what we claim as new therein, and desire to secure by Letters Patent:

1. In a lamp, the combination of the main reservoir, a supplemental reservoir, a pipe communicating at one end with the main reservoir and at the other end with the supplemental reservoir, a valve in the bottom of the supplemental reservoir for closing the opening through which the fluid enters said supplemental reservoir, said valve having a screw-threaded stem, a suitable bearing for said stem, a float situated within the supplemental reservoir above the valve, connections between the float and the valve-stem, whereby the latter is rotated by the movement of the former, and a burner supplied with fluid from the supplemental reservoir, substantially as set forth.

2. In a lamp, the combination of the main reservoir, the supplemental reservoir, a pipe forming communication between them, a removable valve-piece having passages communicating with said pipe and terminating in a conical discharge-opening, a needle-valve placed opposite said opening and having a screw-threaded stem, a suitable bearing for said stem, a lever projecting from said stem, a float situated in the supplemental reservoir, connection between the float and lever, and a burner supplied with fuel from the supplemental reservoir, substantially as set forth.

3. In a lamp, the combination, with the main reservoir, the supplemental reservoir, pipe connecting them, and the burner supplied with fuel from the supplemental reservoir, of the valve for controlling the supply of fluid from the main reservoir, having a screw-threaded stem, a suitable bearing for said screw-threaded stem, a lever projecting from the stem, a float situated in said supplemental reservoir and having an open-end tube passing therethrough from top to bottom, and a rod fixed to the lever of the valve-stem, passing up through said tube and detachably affixed to the float, substantially as set forth.

4. In a lamp, the combination, with the main

reservoir, the supplemental reservoir, pipe connecting them, and the burner supplied from said supplemental reservoir, of a float situated in said supplemental reservoir, an open-end tube passing through the float from top to bottom and secured water-tight, a rod passed through said tube, having a lateral projection near one end resting against the end of the float, a key engaging the rod and resting against the other end of the float, a valve for controlling the supply of fluid, and connections between said rod and valve, whereby the latter is operated by the slightest movement of the float either up or down, substantially as set forth.

5. In a lamp, the combination of the main reservoir, the supplemental reservoir having a valve-piece in its base, provided with a screw-threaded stem fitting within a central screw-threaded opening in the base of the supplemental reservoir, said valve-piece and its stem having passages, a pipe connecting the passage in said stem with the main reservoir, a valve for controlling the supply of fluid to the supplemental reservoir, and a float situated in said reservoir for controlling the position of the valve, substantially as set forth.

6. In a lamp, the combination, with the main reservoir, the supplemental reservoir, the pipe connecting them, and the burner, of a valve for controlling the admission of fluid to the supplemental reservoir, a float in said reservoir having connection with the valve, the rod projecting from said float, and the removable spring-metal plate perforated for the passage of said rod and adapted to be supported by springing it between the sides of the supplemental reservoir, substantially as set forth.

7. In a lamp, a supplemental reservoir consisting of a base portion formed of a solid casting having a chamber on its upper side and a rabbet formed in the wall of the chamber, sheet-metal sides fitting within said rabbet, and a cap fitted on the sides, substantially as shown and described.

8. In combination with the bracket 10, having an enlargement 9, provided with a screw-threaded socket 8, said bracket being provided with a duct 11, communicating with said socket, and a supplemental reservoir having a screw-threaded stem adapted to be screwed in said socket, substantially as set forth.

9. In a lamp, the combination of the main reservoir 1, the supply-pipe 2, leading therefrom, the bracket 9 10, having duct 11, sockets 8 and 12, situated directly in line with each other and connected by duct 13, the supplemental reservoir having the stem 7 secured in the socket 8, and the duct 18, located directly in line with the axis of the duct 13, the internally-screw-threaded follower 16, fitted in the socket 12, and the valve 15, having screw-threaded stem 14 engaging the thread of the follower, said valve being adapted to enter and close the duct 18, substantially as set forth.

10. In a lamp, the combination of the main reservoir 1, the supply-pipe 2, the bracket 9 10, having duct 11, sockets 8 12, formed vertically in opposite sides of the bracket, and duct 13, connecting said sockets, the removable follower fitted in and closing the socket 12, the valve 14, fitting in the follower, the supplemental reservoir having the duct 18 and socket 19, the stem 21, fitted in socket 19, the filter 65, placed in duct 27, and the burner, supplied with fluid from the supplemental reservoir, said socket 19, duct 18, socket 8, duct 13, and socket 12 being in direct vertical line, so that the sediment arrested by the filter may be removed by removing the follower, substantially as set forth.

11. The combination, with the main reservoir, the supplemental reservoir, and the pipe communicating at one end with said main reservoir and at the other end with a duct in the center of the bottom of the supplemental reservoir, of a valve-piece having a stem communicating with said duct and having a branch extending radially toward the side of the reservoir, a second branch at right angles thereto, lugs projecting from said second branch, one of said lugs being provided with the ingress-opening and the other with the bearing for the stem of the valve, the valve, a lever secured thereto and projecting to about the center of the reservoir, and a float having connection with said lever, substantially as and for the purposes set forth.

12. In a lamp, the combination, with the main reservoir, the burner, and suitable connecting-pipes, of the supplemental reservoir having the centrally-located screw-threaded socket with which one of the connecting-pipes communicates, the valve-piece 20, having the stem 21, adapted to be secured in said socket, the branches 22 23, the lug 26, projecting laterally therefrom, the fluid-duct extending through the stem 21, the branches 22 23, and the lug 26 and there communicating with the interior of the supplemental reservoir, the valve 34, having the screw-threaded stem, the lug 26, having the screw-threaded perforation forming a bearing for the screw-threaded valve-stem, the lever projecting laterally from the valve-stem, and the float having connection with said lever, substantially as set forth.

13. A valve-piece consisting of the stem 21, the branch 22, forming an L therewith, the branch 23, forming a T with the branch 22, and the projection 26, said parts having the ducts 27 28 30 32 and the chamber 31, with which the duct 32 communicates, the opening for the escape of fluid being formed through one of the walls of the said chamber, and the projection 24, having the screw-threaded perforation, in combination with a main reservoir, a supplemental reservoir, a pipe for connecting said reservoirs, a valve having a screw-stem fitting the threaded opening through the projection 24, a float situated in the supplemental reservoir, connections between the said

float and valve-stem, and a suitable burner, substantially as set forth.

14. The combination, with the herein-described valve-piece, consisting of the casting comprising the stem 21, the branch 22, the T branch 23, the projection 26, and the lugs 24 25, having the duct 27 extending through the stem 21, the duct 28, extending through the branch 22 and with which the duct 27 communicates, the duct 30, extending through the branch 23 and communicating with the duct 28, the groove 33 in the extremity of the branch 23, the chamber 31, with which the groove 32 communicates, the escape-aperture formed through one of the walls of the chamber, the screw-threaded perforation formed through the lug 24, and the smooth perforation through the lug 25, the plug 29, closing the extremity of the duct 28, the plate 33 for closing the end of the chamber 31 and duct 30 and covering the groove 32, of a reservoir within which said valve-piece is screwed and a screw-threaded valve fitting in the screw-threaded perforation in lug 24, and the smooth perforation in lug 25, adapted to regulate the size of the escape-aperture, substantially as set forth.

15. In a lamp, the combination, with a main reservoir, a supplemental reservoir, a pipe connecting them, and a burner, of a float situated in the supplemental reservoir, a valve having a screw-threaded stem, connection between the float and valve-stem, and a valve-piece having the opening for the egress of fluid surrounded by the seat for the valve, and a suitable bearing for the screw-threaded stem of the valve, the parts of said valve-piece being rigid one with another, substantially as set forth.

ISAAC E. BLAKE.
GEORGE E. SMITH.
EDWIN M. DOIG.

Witnesses:
H. W. HAMNUS,
W. R. RATHROK.