(No Model.)

2 Sheets—Sheet 1.

# A. W. PAULL.

## LAMP.

No. 467,194. Patented Jan. 19, 1892.

*Fig. 1.*

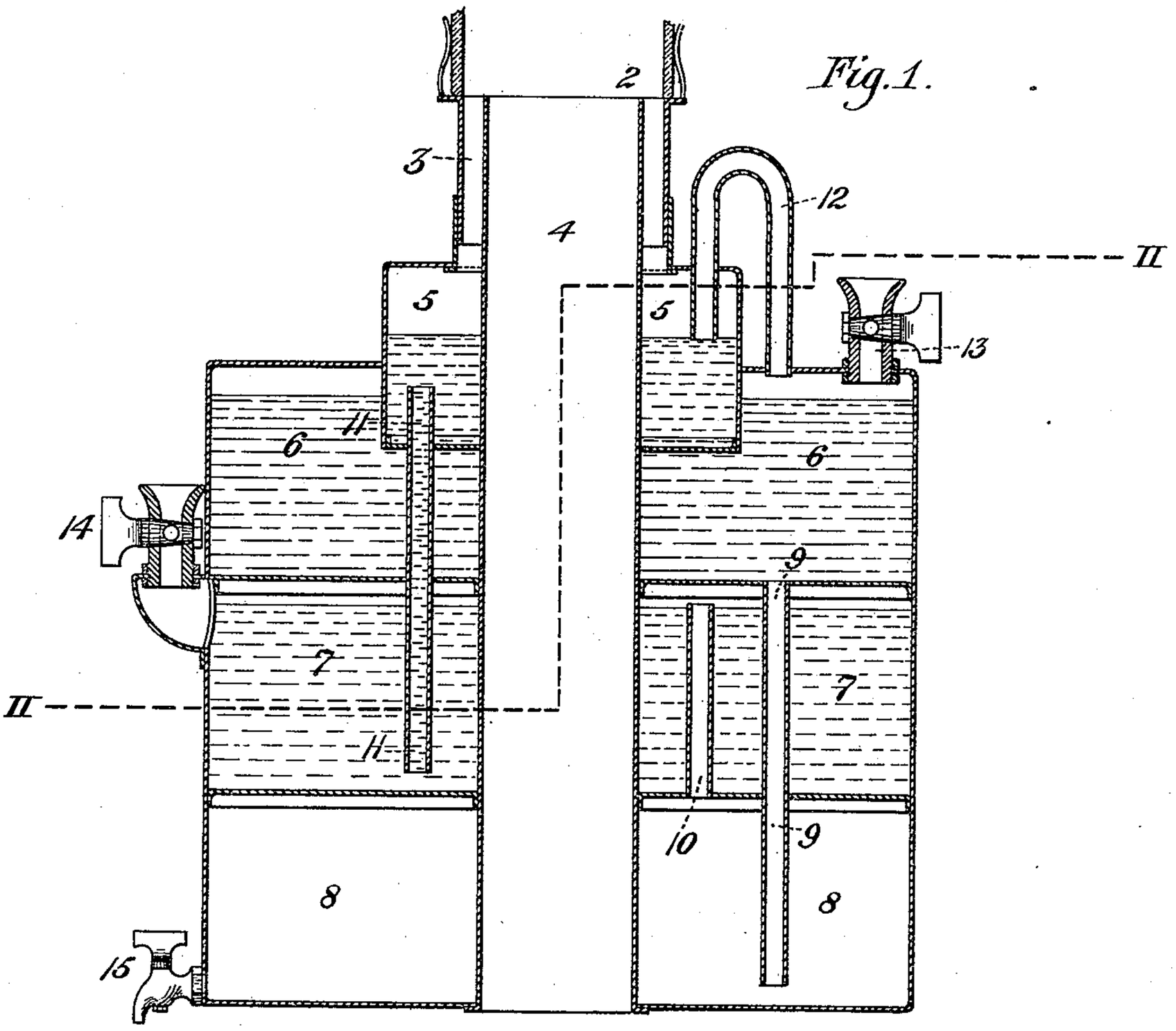
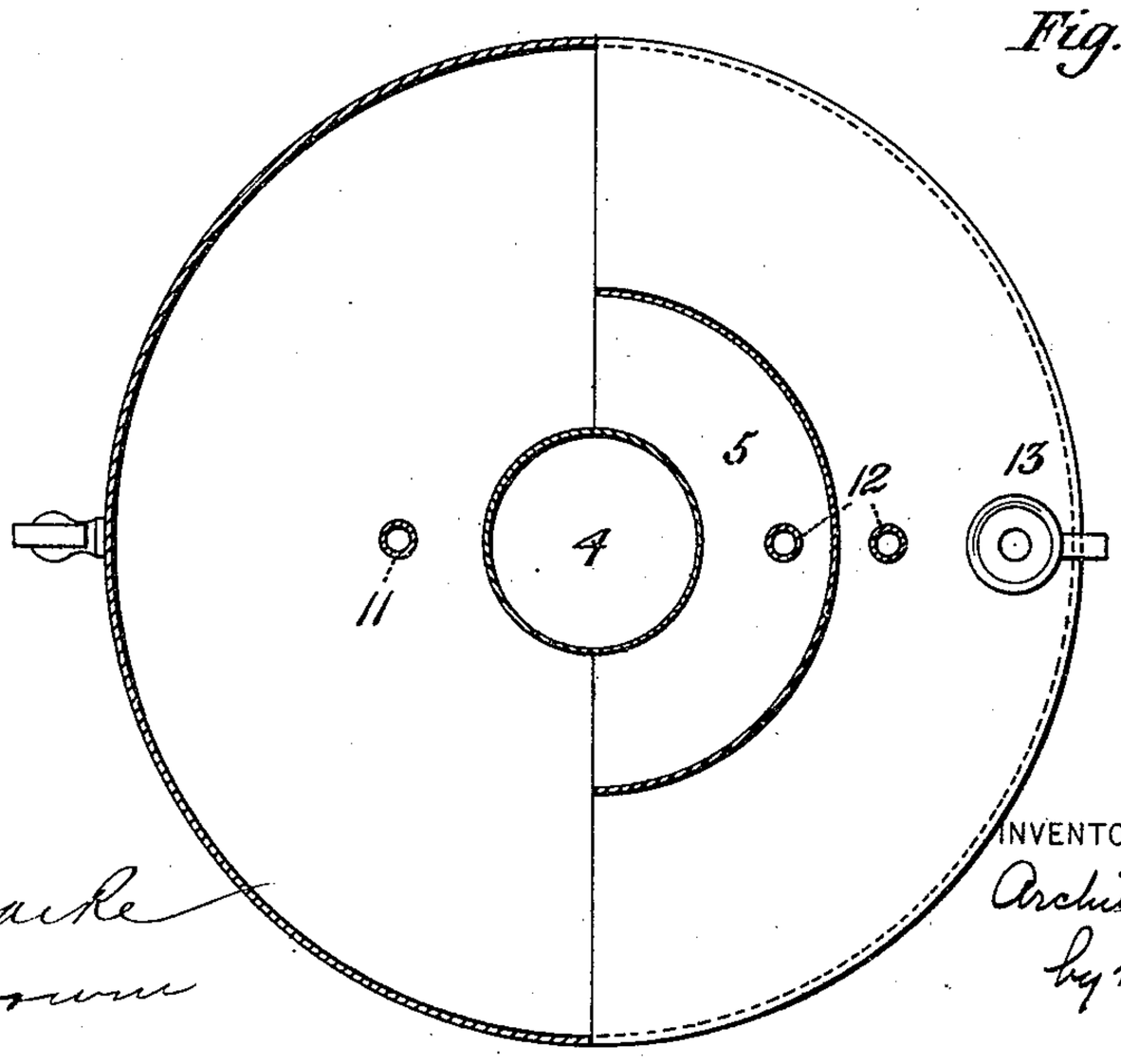



*Fig. 2.*




WITNESSES

D. M. Clarke

H. M. Cousins

INVENTOR.

Archibald W. Paull

by W. Baxewell & Sons

his Attorneys

(No Model.) 2 Sheets—Sheet 2.

# A. W. PAULL.

## LAMP.

No. 467,194. Patented Jan. 19, 1892.

Fig. 3

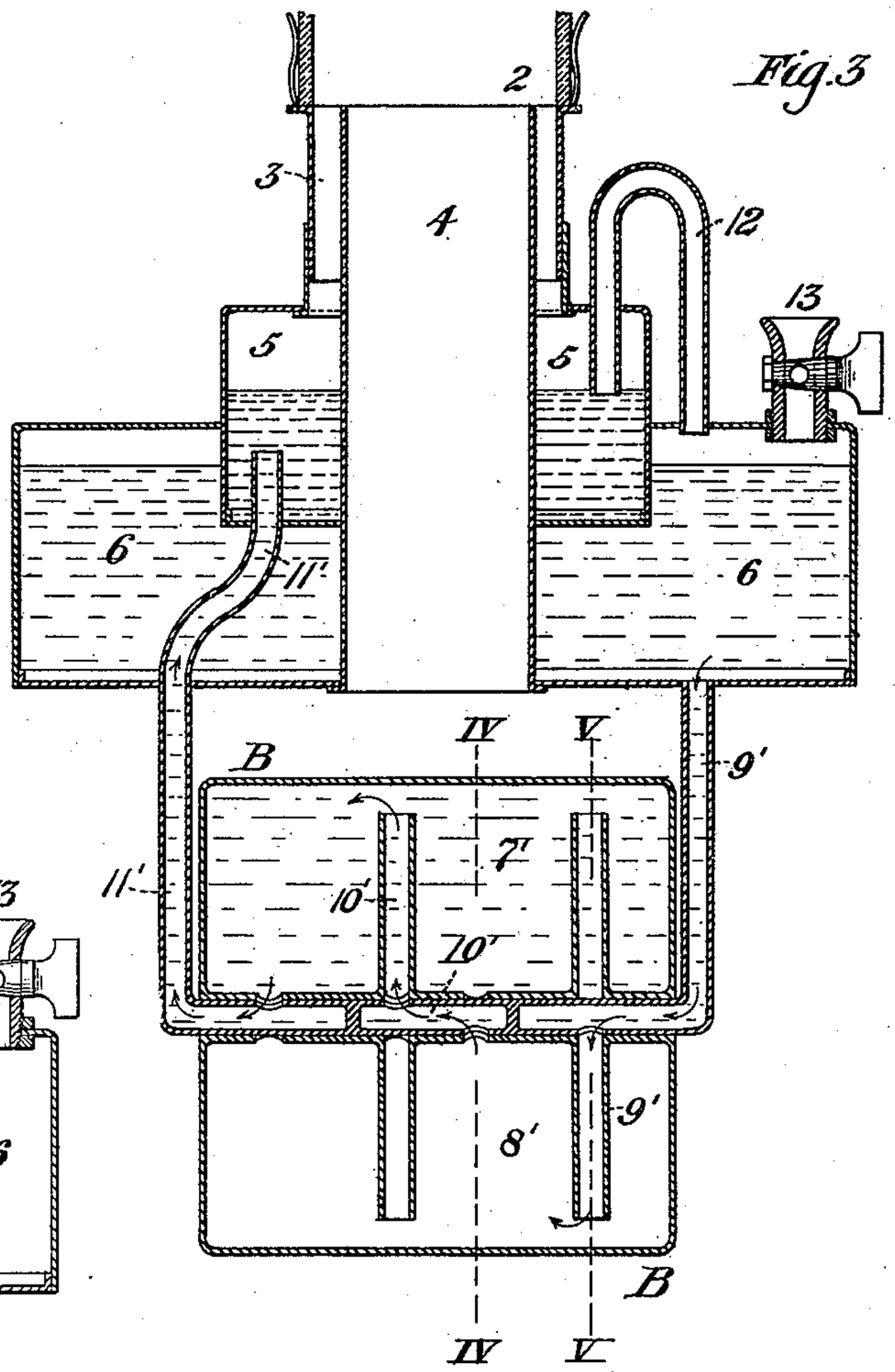



Fig. 6.

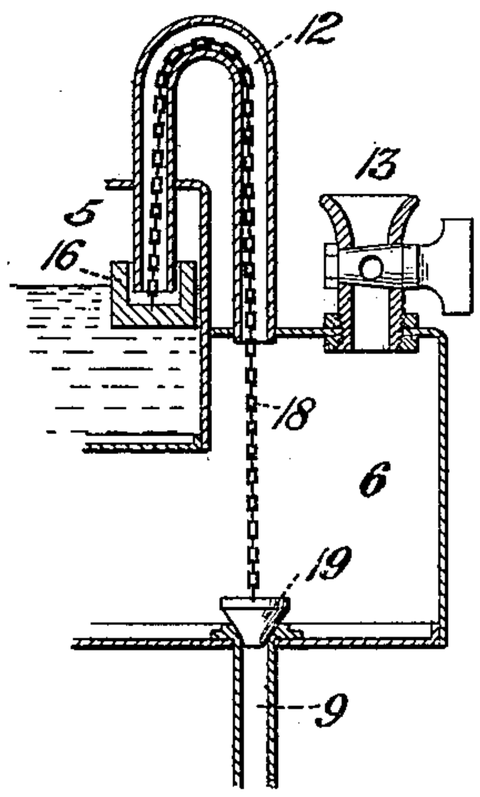



Fig. 4.

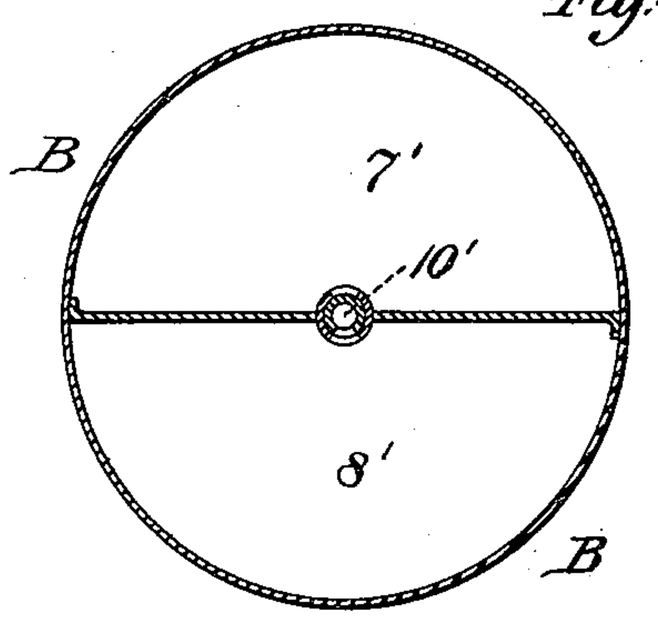
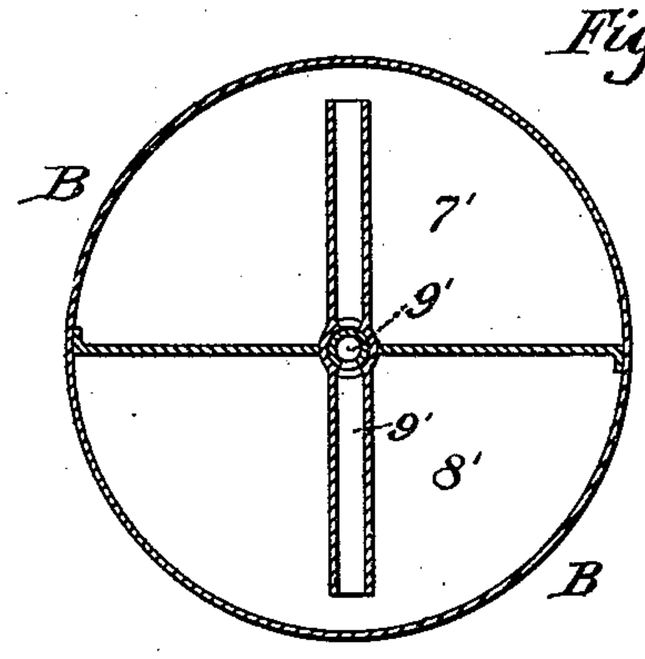



Fig. 5.




WITNESSES

C. M. Clarke

H. M. Lawrence

INVENTOR.

Archibald W. Paull

by W. Baxewell & Sons

his Attorneys.

# UNITED STATES PATENT OFFICE.

ARCHIBALD W. PAULL, OF WHEELING, WEST VIRGINIA.

## LAMP.

SPECIFICATION forming part of Letters Patent No. 467,194, dated January 19, 1892.

Application filed March 27, 1891. Serial No. 386,647. (No model.)

*To all whom it may concern:*

Be it known that I, ARCHIBALD W. PAULL, of Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Improvement in Lamps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view of my improved lamp. Fig. 2 is a horizontal sectional plan on two different planes, represented by the irregular line II II in Fig. 1. Fig. 3 is a vertical sectional view showing a modified construction of the lamp. Figs. 4 and 5 are vertical sections on lines IV IV and V V, respectively, of Fig. 3. Fig. 6 is a vertical sectional view showing a modified construction of part of the lamp.

Like symbols of reference indicate like parts in each.

In oil-lamps as heretofore commonly made there is a practical limit to the depth of the lamp-bowl or reservoir. If the bowl exceeds a certain depth, the capillary action of the wick is not sufficient to raise the oil freely to the flame when the oil-level sinks to the bottom of the bowl, and the consequence is that the lamp does not burn so as to emit the proper degree of light. The consequence of this is that a lamp with a large and powerful burner consuming oil rapidly must be refilled with oil at frequent intervals.

The object of my invention is to enable lamps to be made with bowls of large capacity by providing them with a device of simple construction and automatic action which operates to elevate the oil and to supply it to the wick at a place within proper distance from the burner. Mechanically-acting means of various sorts have been suggested for this purpose, but they have been complicated and unreliable.

My invention consists in a lamp having a supplemental oil-reservoir into which the wick dips and having a main reservoir for the oil connected with the supplemental reservoir and acted upon by a body of air which is compressed by the displacing action of a liquid contained in a suitable reservoir or chamber, in combination with means for regulating the flow of fluid from the liquid-chamber.

Referring now to Figs. 1 and 2, 2 represents the lamp-burner, 3 the wick-tube, and 4 a central air-draft tube, which, however, is not an essential part of my invention, which may be applied to lamps without such tubes.

5 is an oil-reservoir of limited capacity, situated conveniently near the level of the burner, so that the wick shall dip thereinto and shall receive its supply of oil therefrom. This I call in the claims the "wick-chamber."

The lamp-bowl is divided into several compartments, of which the chamber 5 forms one, though it should be understood that instead of comprising them all within a single shell they may be arranged separately and connected by pipes. Such an arrangement is illustrated in a manner in Fig. 3, hereinafter described.

6 is a chamber situated partly or entirely below the level of the chamber 5.

7 is a chamber below the chamber 6, and 8 is a chamber below the chamber 7. The lower part of the chamber 6 is connected with the chamber 8 by a pipe or passage 9. A pipe or passage 10 leads from the upper part of the chamber 8 into the upper part of the chamber 7, and a pipe or passage 11 leads from the lower part of the chamber 7 into the chamber 5.

12 is a curved pipe or passage connecting the chambers 5 and 6, extending from the middle or upper part of the chamber 5 upwardly, and thence into the upper part of the chamber 6.

13 and 14 are valve-controlled or stopper-controlled openings, which afford means for supplying fluid to the chambers 6 and 7, respectively, and which are constructed so that they can be shut air-tight.

15 is a spigot by which the liquid may be drained from the chamber 8.

In using the lamp oil is introduced into the chamber 7 through the opening 14, as shown in Fig. 1, and a suitable liquid, which may be oil or water, but is preferably water, is introduced into the chamber 6 through the opening 13. The valves of these openings having been closed, the water flows slowly into the chamber 8 through the pipe 9, which is made

of small cross-section, so as to restrict the rapidity of the flow. As it descends into said chamber it compresses and displaces the air contained therein, which, acting through the pipe 10 on the surface of the oil in the chamber 7, forces it up through the pipe 11 into the chamber 5. The only air-opening in the chamber 6 is through the pipe 12, and when the oil reaches the lower end of this pipe and cuts off the passage of air into the chamber 6 the flow of water from this chamber into the chamber 8 is checked and the oil ceases to rise into the chamber 5. When, however, the oil in the chamber 5 is consumed, so as to fall below the level of the end of the pipe 12, an additional supply of oil is forced up into the chamber in the manner explained above. The feeding of the oil to the chamber 5 is thus maintained, so as to keep the level therein at a substantially constant point until the water has been drained from the chamber 6 into the chamber 8. If the chamber 6 needs to be replenished with water, the water may be drawn from the chamber 8 by opening the spigot 15 and the chamber 6 again filled. When the oil is exhausted from the chamber 7, it is replenished by an additional supply through the opening 14.

By means of the construction above specified I am enabled to use a lamp with a large oil-reservoir, which can be burned for a long time without need of refilling.

The advantages of the construction in respect of its simplicity and efficiency are clear. There are no complicated mechanical parts to get out of order, and the construction of the lamp is easy and is not unduly expensive. The tube 12 constitutes an efficient regulating device to check the flow of oil at proper intervals. Such regulating device may, however, be modified in construction. One such modification I show in Fig. 6, in which I use a float 16, situated in the chamber 5 and connected with a stopper 19 at the mouth of the pipe 9 by a flexible connection 18. As the oil-level in the chamber 5 rises it will lift the float and allow the stopper to descend to its seat, so as to close the pipe 9 and to stop the passage of liquid therethrough. Practically this regulating device maintains itself substantially in balance, so as to keep up a constant flow of oil just sufficient to supply the chamber 5. The float and stopper may be combined in regulating action with the regulating-tube 12 by using an annular float encircling the end of the tube. In this way I get a double protection against the overflow of the oil in the chamber 5. I consider it best to use the float or stopper or equivalent device, because if by reason of wear or of inaccurate closing air should leak in through the opening 13 the tube 12 would not act to check the flow of oil which might rise in the chamber 5 and overflow.

It will be understood that my improvement, which acts on the principle of the Hero fountain, may be modified in various ways without variance from the essential principles thereof. In Figs. 3, 4, and 5 I show one of such modifications, in which, instead of using two fluids, oil alone is employed. In these figures the chambers 5 and 6 are constructed substantially in the manner shown in Fig. 1. Below the chamber 6 is a drum or shell B, (shown in Figs. 4 and 5,) and having two compartments 7′ 8′. The pipe 9′ extends from the chamber 6 into said shell, and is provided with radial branches leading into the chambers 7′ and 8′. The pipe 10′ has also radial branches leading into said chambers. The upper one of the branches 10′ and the lower one of the branches 9′ only communicate with the upper and lower chambers, respectively. The pipe 11′ extends from the chamber 5 and communicates with the lower part of the chamber 7′. This construction is effected by fixing the pipes 9′ and 11′ together end to end without communicating with intermediate partition, and by providing the shell B with a central hollow axis mounted axially thereon, so that it may be rotated, and having the radial arms and openings adapted to register with the openings in the central axis, as shown. There is but one filling-opening 13, which opens into the chamber 6.

The operation is as follows: The chamber 6 is filled with oil through the opening 13, and the oil descends into the chamber 8′, so as to fill the latter. The shell B may then be upturned by semi-rotation on its axis, so that the full chamber will take the position of the upper chamber 7′. (Shown in Fig. 3.) The opening 13 being closed, the oil will flow gradually from the chamber 6 through the pipe 9′ and by creating air-pressure in the chamber 7′ will lift the oil into the chamber 5, as before explained. When the chamber 6 is exhausted, the lamp stops burning, the shell B is inverted, and, the chamber 6 being filled again, the action of the lamp proceeds, as described above.

Other modifications will be suggested to those skilled in the art.

I claim—

1. A lamp having an oil reservoir or chamber, a wick-chamber connected therewith, situated at convenient distance from the burner and adapted to receive the wick, an air-chamber communicating with the oil-reservoir, a liquid-chamber communicating with the air-chamber and adapted to deliver liquid thereto to displace the air and to force the oil from the reservoir into the wick-chamber, and an air-passage connecting the wick-chamber with the liquid-chamber and adapted to be closed by rise of the oil-level and by cutting off the air-supply to check the flow of liquid from said liquid-chamber, substantially as and for the purposes described.

2. A lamp having an oil reservoir or chamber, a wick-chamber connected therewith, situated at convenient distance from the burner and adapted to receive the wick, an air-chamber communicating with the oil-reservoir, a liquid-chamber communicating with the air-

chamber and adapted to deliver liquid thereto to displace the air and to force the oil from the reservoir into the wick-chamber, and a stopper controlling the flow of liquid from the liquid-chamber, said stopper being moved and regulated by the liquid-level in the wick-chamber, substantially as and for the purposes described.

3. A lamp having an oil reservoir or chamber, a wick-chamber connected therewith, situated at convenient distance from the burner and adapted to receive the wick, an air-chamber communicating with the oil-reservoir, a liquid-chamber communicating with the air-chamber and adapted to deliver liquid thereto to displace the air and to force the oil from the reservoir into the wick-chamber, and a regulating device operated by the liquid-level in the wick-chamber.

In testimony whereof I have hereunto set my hand this 4th day of March, A. D. 1891.

ARCHIBALD W. PAULL.

Witnesses:
W. B. CORWIN,
H. L. GILL.