

No. 771,018.

PATENTED SEPT. 27, 1904.

J. F. W. JOST.

LAMP.

APPLICATION FILED AUG. 31, 1897.

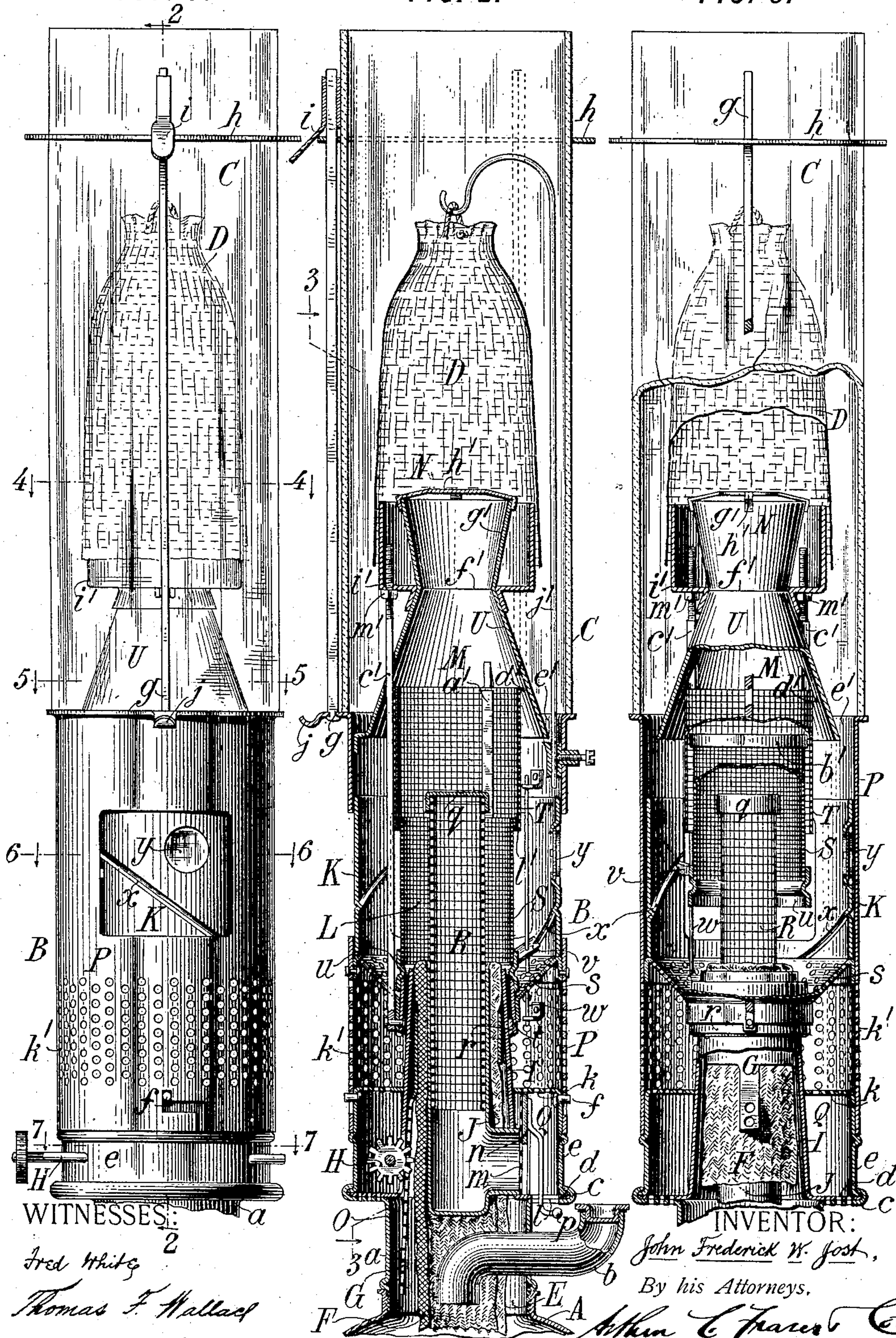
NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.

FIG. 2.

FIG. 3.



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2 SHEETS—SHEET 2.

FIG. 4.

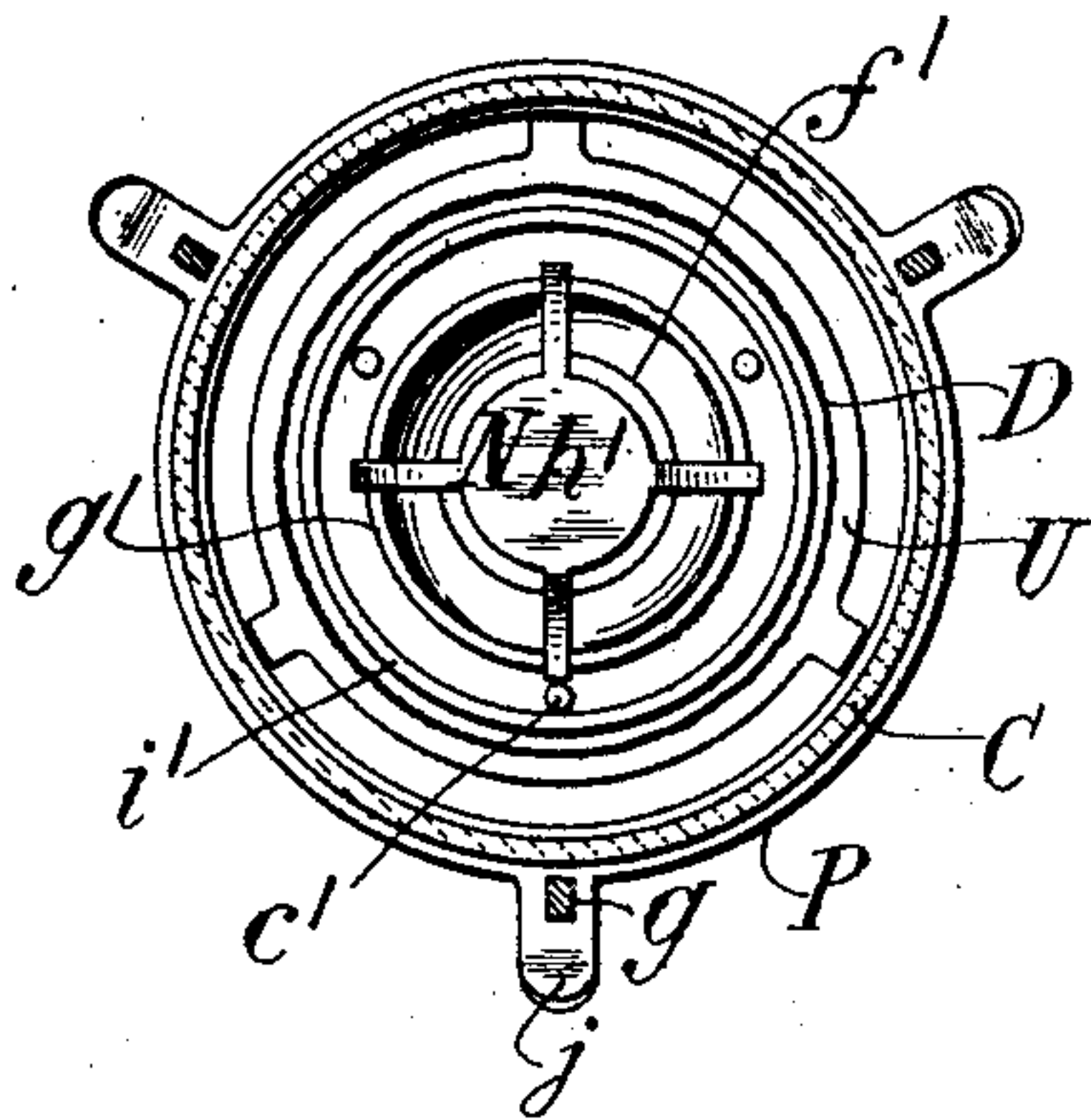


FIG. 5.

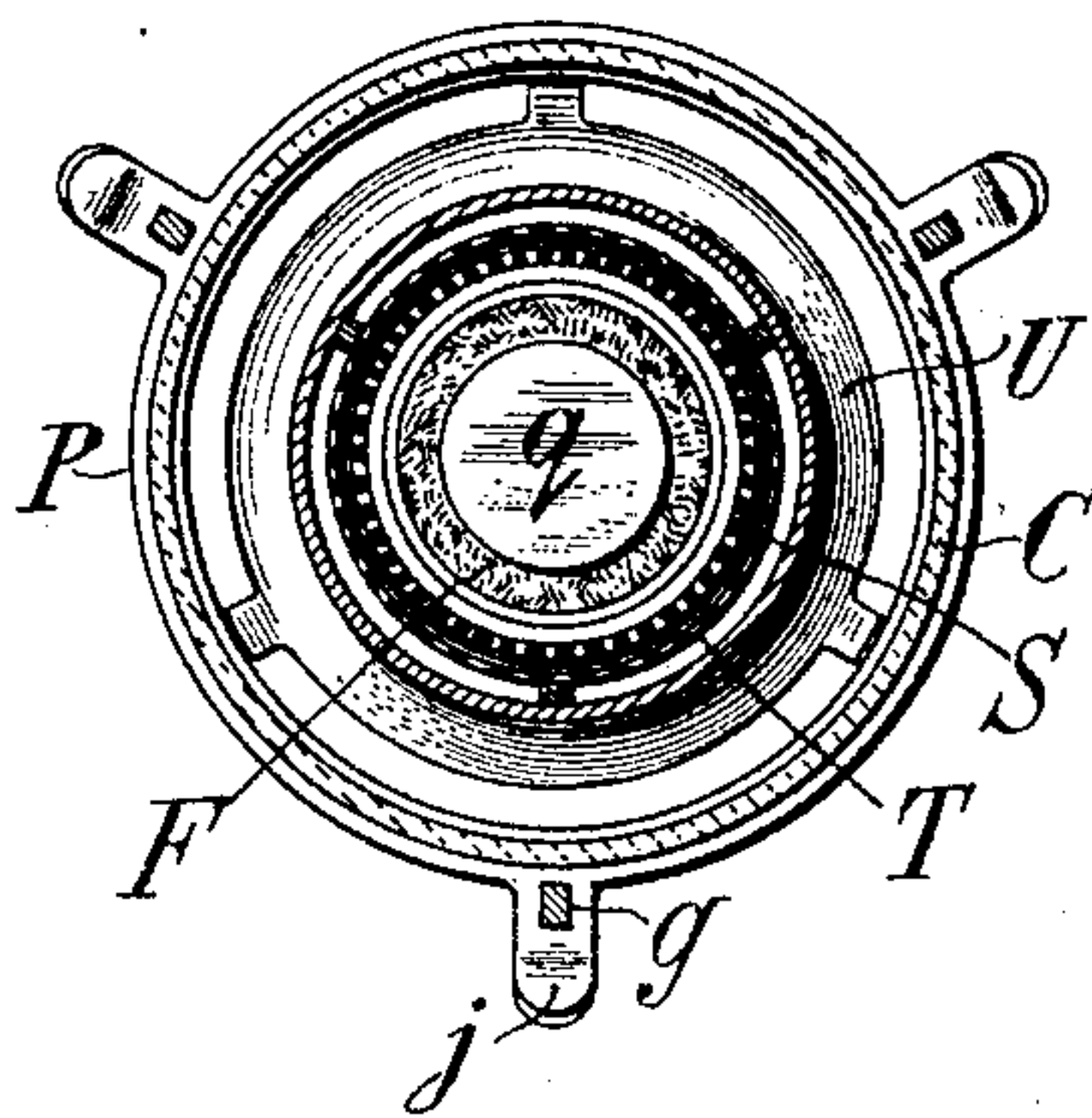


FIG. 7.

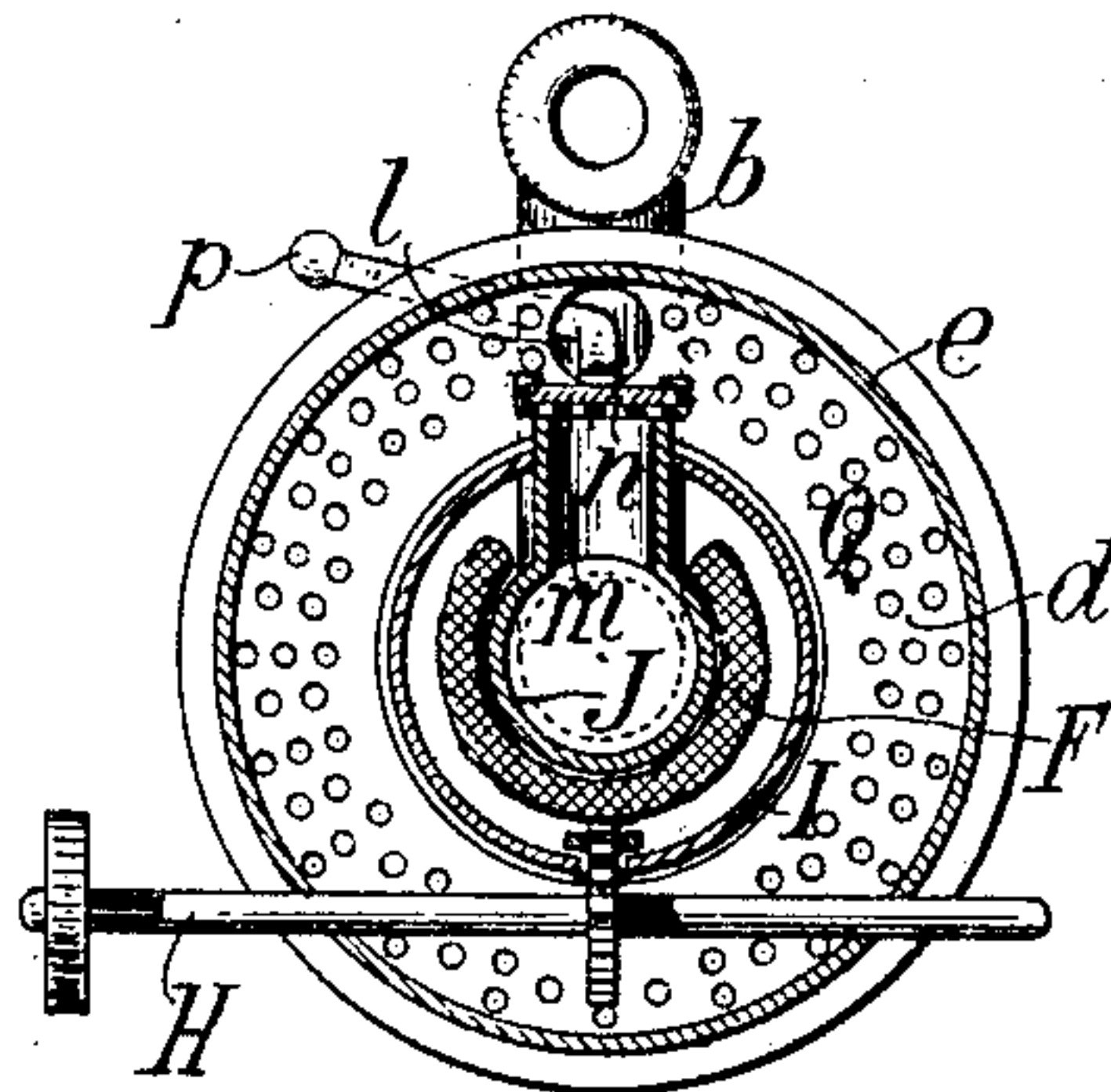


FIG. 6.

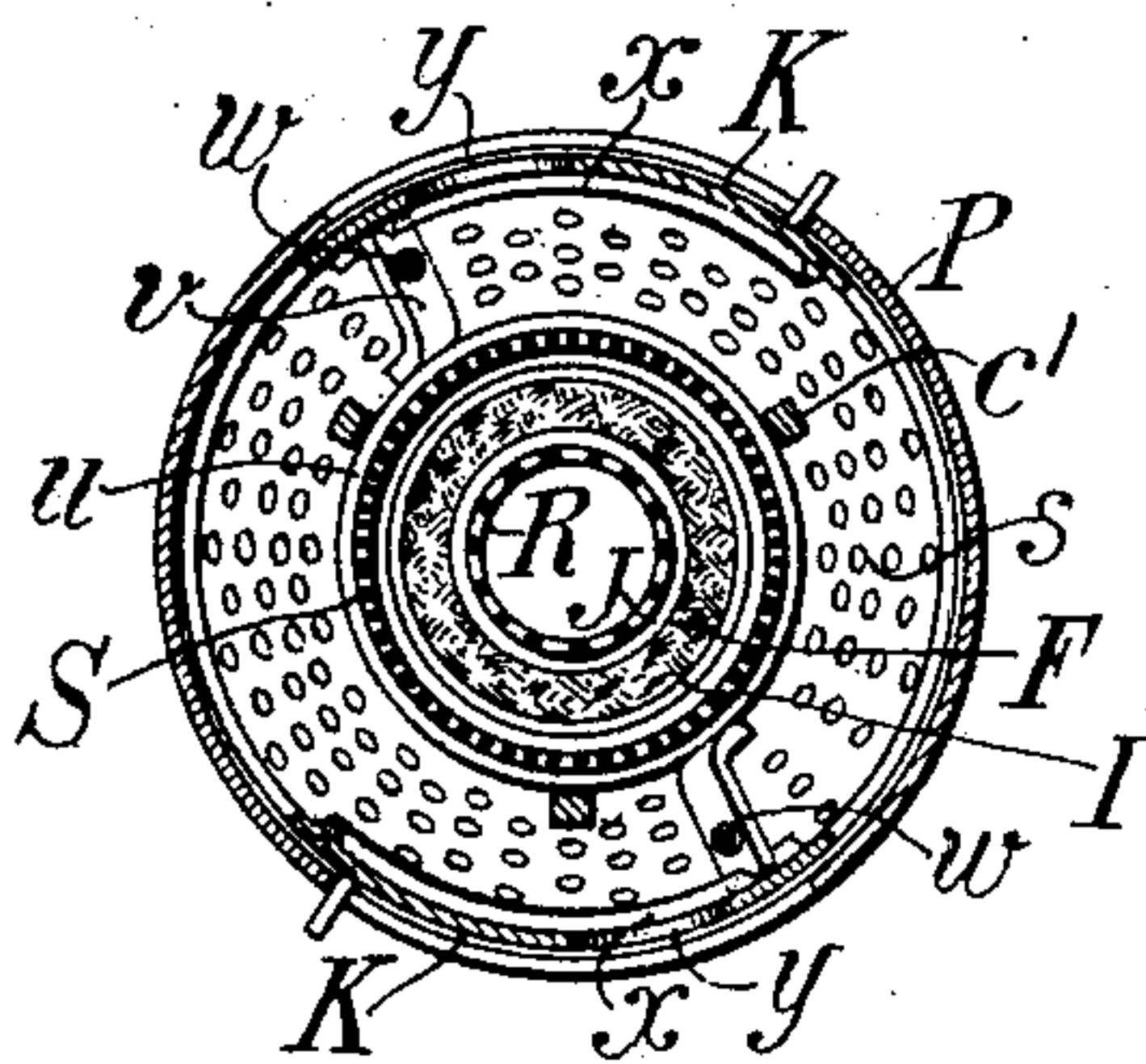


FIG. 8.

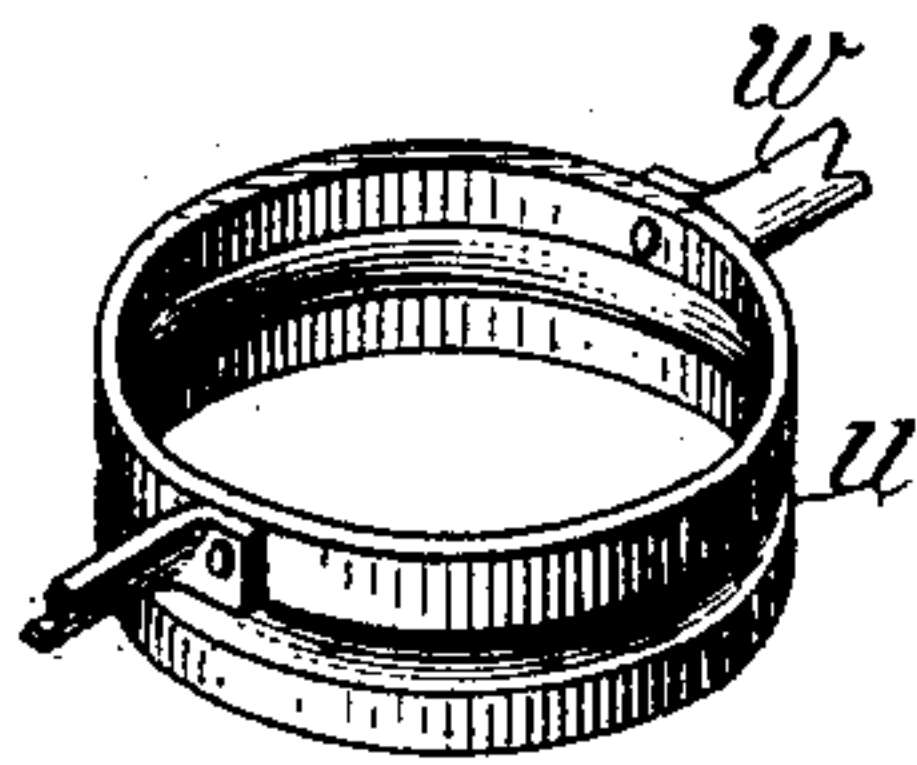
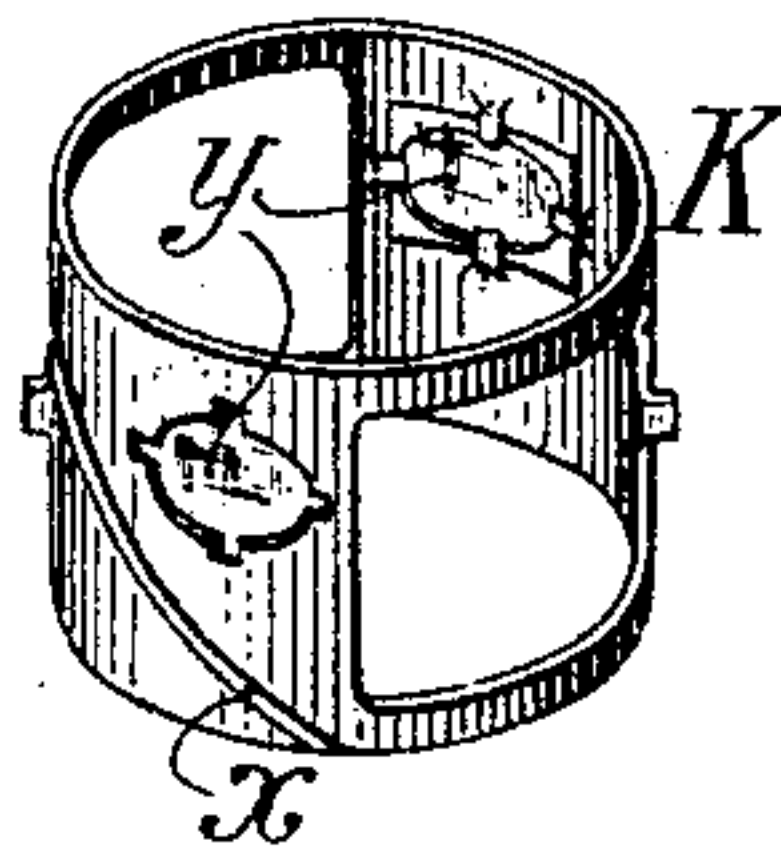


FIG. 9.



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UNITED STATES PATENT OFFICE.

JOHN FREDERICK W. JOST, OF JERSEY CITY, NEW JERSEY.

LAMP.

SPECIFICATION forming part of Letters Patent No. 771,018, dated September 27, 1904.

Application filed August 31, 1897. Serial No. 650,090. (No model.)

To all whom it may concern:

Be it known that I, JOHN FREDERICK W. JOST, a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Lamps, of which the following is a specification.

This invention relates to illuminating-lamps of the class in which an incandescing mantle or body is employed, and aims to provide an oil-burning lamp of this character.

Heretofore the commercial use of incandescent mantles has been confined to gas-burners or to alcohol-burners where the expense has been of no moment, thus precluding the use of such bodies where gas was not obtainable or where a readily transportable and economical lamp was desired.

My invention provides an oil-lamp in which ordinary illuminating-oil or any other suitable oil can be used to incandesce a mantle and give a light corresponding to that of the ordinary Welsbach burner. To this end in carrying out the preferred form of my invention I employ, in addition to the oil-reservoir, wick-chamber, and tubes of an oil-lamp, a gasifying or vaporizing device for the oil, a mixing-chamber for combining the gasified oil with air, and a burner for the mixed gas and air, over which burner the mantle is sustained in such manner that the combustion of the mixture incandesces the mantle, and I provide certain other features of improvement in lamps and their burners and certain improvements in the construction, arrangement, and operation of the lamp, all of which will be fully hereinafter set forth.

In the accompanying drawings, which show the preferred form of my invention, Figure 1 is a fragmentary side elevation of my improved lamp. Fig. 2 is a vertical mid-section thereof on the line 2 2 of Fig. 1 looking in the direction of the arrow. Fig. 3 is a similar view, the parts being shown partly in elevation and cut on the line 3 3 in Fig. 2 and looking in the direction of the arrow, showing the lamp in the position for lighting. Fig. 4 is a cross-section cut on the line 4 4 in Fig. 1. Fig. 5 is a cross-section cut on the line 5 5 in Fig. 1. Fig. 6 is a cross-section cut on the

line 6 6 in Fig. 1. Fig. 7 is a cross-section cut on the line 7 7 of Fig. 1. Fig. 8 is a perspective view of the lifting-ring, and Fig. 9 is a perspective view of the door.

Referring to the drawings, let A indicate the oil-reservoir, B the burner as a whole, C the chimney, D the mantle, E the wick-chamber, F the wick, G the wick-clamp, H the wick-adjuster, I the outer wick-tube, J the inner wick-tube and central draft-tube, K the doors, L the vaporizing or gasifying chamber, M the mixing-chamber, and N the gas-burner, of my improved lamp. These parts may be of any suitable or desired construction and arrangement, it being only essential to the main features of my invention that the oil fed from the wick should be vaporized or gasified by heat at or before leaving the latter, that this gas should be sufficiently mixed with air to form a combustible mixture at or upon receiving additional air from the gas-burner, and that the combustion of the gases at the latter shall generate sufficient heat to properly incandesce the mantle.

In the preferred form of my invention I construct the burner B with a tubular base O, consisting of a neck *a*, screwing into the reservoir A, carrying a filling-tube *b* for supplying oil to the latter and having an outturned flange *c*, on which is fixed the outer wick-tube I by its flange *d*, and a cylindrical carrier *e* for the casing P of the burner. The casing P fits over the upper end of the carrier *e* and is separably coupled thereto, as by a bayonet-joint *f*, and incloses the gasifying and mixing chambers and carries on its upper end the chimney C, of which it constitutes, essentially, a lower extension. For holding the chimney the casing is provided with a chimney-holder *g*, consisting of rods rising from its flanged outer end, which rods are connected at top by a band *h*, surrounding the chimney, and above this band may carry shade-holders *i*, below which the casing is shown as having globe-carriers *j*, the parts *g*, *h*, *i*, and *j* being of usual construction.

The outer wick-tube I, the outer wall of the wick-chamber, is tapered or conical and is, as usual, fixed to the parts within the carrier *e*. It carries the inner tube J concentrically,

which tube opens through the tube I into an annular air-chamber Q, formed within the carrier, the flange d of the wick-tube constituting the lower wall of this chamber and the flange k of the carrier constituting the upper wall thereof. Both of these flanges are perforated, and a large hole l , immediately below the open end of the tube J, is provided through the flanges c and d of the neck a and tube I for permitting sufficient ingress of air to the center draft through tube J, which latter receives all its air from the chamber Q, the flow of air thereto being moderated by a screen or foraminous partition m and graduated by a damper n , the handle p of which extends outwardly to permit of ready adjustment of the center draft.

Within the wick-tube and extending beyond the upper end of the inner tube J is a foraminous wall R, formed in a separate tube of perforated or woven material, open at its lower end and there receiving air through the center draft, closed at its upper end, as by a cap q , and vertically adjustable in the center draft-tube, being preferably frictionally held therein in such manner that it can be adjusted by a slight force, but will not be accidentally displaced. This tube feeds a graduated or predetermined amount of air outwardly to the vaporizing or gasifying chamber L immediately above the wick F and is designed to maintain along its surface a combustion of the lighter hydrocarbons in the gases produced from the oil sufficient to maintain a temperature for the tube itself or for the adjacent parts high enough to vaporize or gasify the oil in the wick. A bright incandescence of the tube R is generally sufficient for this purpose. The tube or its air-supply should be such that it will not feed more air than is necessary for the purpose of generating a gasifying heat. Surrounding the wick is a second and preferably also a foraminous wall S, which constitutes the outer wall of the gasifying-chamber L and which rises from a point near the top of the wick to a suitable point, where it is continued by another wall, T, preferably also foraminous, which constitutes the outer wall of the mixing-chamber. The wall S is shown as consisting of wire netting or cloth of relatively fine mesh and of slightly greater diameter than the upper end of the wick-tube I, from which it is guided by a ring r , having three or more fingers bearing against the outer wick-tube and supported by a perforated cone s , fixed to the casing P. The ring r leaves a substantially annular inlet t around the wick-tube into the chamber L near the wall S, through which inlet air may flow from the casing to the chamber, this air being designed to mix with the gases at the outer side of the chamber, but not being sufficient to form with the gases an ignitable mixture at this point during normal operation. Additional inflow

of air to the vaporizing or gasifying chamber occurs to a slight extent through the perforations in the wall S throughout the length thereof; but as this flow is also insufficient to produce an igniting mixture normally there is no combustion in this chamber except that around the wall R. The lower end of the wall S is shown as consisting of a ring u , which rests loosely on the ring r and has projecting fingers v , by which the wall S can be lifted for convenience in getting access to the wick, as for lighting the lamp. These fingers are slidingly engaged by vertical guide-rods w , carried by the casing P, and engage inclines x on the doors K, up which they ride as the doors are turned to the open position. The doors for this purpose are made to slide around the casing axially about ninety degrees in moving from the closed to the open position, in which movement they will raise the wall S, as shown in Fig. 3. The doors are shown as having peep-windows y , through which the operation of the burner can be seen. Wall S preferably slides within the wall T, to facilitate which the latter is provided with sliding strips a' , which receive a top band b' of the wall S.

The wall T is shown as cylindrical and of relatively coarse perforations or mesh. It is supported from rods c' , carried by the ring r , and extends upwardly from the wall S, forming the lower part of the mixing-chamber M. Above this wall is another wall, U, shown as conical and imperforate, which at its lower flaring ends surrounds without quite touching the upper part of the wall T and approaches near to the casing P, leaving an annular air-inlet d' to the chamber M above the wall T and an annular air-passage e' between its lower edge and the casing. The wall U carries on its upper end the burner N, with which it communicates through a contracted throat f' , as shown. The burner N is shown as an outwardly-flaring wall g' , surmounted by a deflecting-plate h' , between which and the wall the gaseous mixture escapes and beyond which it ignites. As shown, the burner and the wall U are supported from the ring r adjustably on the posts c' by a mantle-guard i' , which consists of a metal cylinder fixed to the wall U and fitting loosely within the mantle D, but leaving an air-inlet between itself and the mantle, through which sufficient air can pass to insure that all the gases within the mantle shall be consumed.

A mantle-holder j' is shown as carried on the upper part of the casing P.

The casing P, with the vaporizing or gasifying chamber, mixing-chamber, and burner, may be sold as an attachment adapted to fit any lamp-burner or, together with the burner, as an attachment adapted to fit the reservoir of any lamp, or the vaporizing or gasifying and mixing chamber and burner above the latter can be sold as an attachment adapted

to fit on any oil-lamp burner. Any suitable connection between the outer and inner walls of the vaporizing or gasifying chamber permitting adjustment of the one relatively to the other and sufficing to retain them in proper relation may be employed instead of utilizing the outer and inner wick-tubes for this purpose, and especially when the parts are sold as separate attachments it will be advisable to provide some other connection, not only between these two walls, but between the walls T and U also.

In operation there is a continual upflow of air through the casing and chimney graduated in extent and force by the perforations in the casing at k' , by the perforated cone s , and the perforated flange k of the carrier e , and flanges c and d of the neck a , and outer wick-tube I, and a continual upflow of gas or vapor and air through the chambers L and M, generated by the flame or part R from the wick F. This upflow of air through the casing and chimney constitutes, essentially, a chimney-draft and can be graduated or regulated according to any well-known or suitable method for this purpose. It is from this upflow that the air is taken for admixture with the gas in the chambers L and M and for the flame at the burner, this air being fed to the gas at successive points in such quantities and manner as to best accomplish the mixing without producing combustion in the vaporizing or gasifying and mixing chambers in normal operation. This feed rises as an annular stream of air within the bottom of the wall S close to the wall and is added to in reduced quantities throughout the perforations of this wall and in a similar manner, but in greater quantities, throughout the perforations of the wall T. Between the bottom of the wall T and the top of the wall S there may be room for a slight annular feed around the latter wall, as shown at l' in Fig. 2. At the top of the wall T a relatively large annular air-feed is received through the openings d' , this feed having considerable current force and volume by reason of the flaring edge of the wall U catching a large portion of the updraft and diverting it into the chamber M. This in-feed is mixed with the rising gas and air, passes through the contracted neck f' , and delivers the mixture at the burner N in a condition adapted for complete combustion. The mixing may be so adjusted that a greater or less supply of air shall be accessible to the flame at the burner, or the admixture of air may be adjusted to suit different conditions or adapt the burner to different qualities of oil, one method of accomplishing this being shown as an example, in which the wall U is adjustably supported from the rods c' by nuts m' , screwing on the latter, which suffice for raising and lowering the wall U to increase or diminish the area of the inlet d' .

The only central feed for the lamp is that

through the center draft-tube J and gasifying-wall R, and this is preferably only sufficient to maintain the combustion necessary to maintaining the heat requisite for gasifying the oil. This inlet feeds sufficient air through the wall to maintain a thin film of blue or gasifying flame along the outer surface of the wall, which is the extent of the combustion at this point and, indeed, the only combustion in the tubes, the products of this combustion rising with the gases through the mixing-chamber. This combustion maintains the wall R at an incandescent heat of varying degree, according to the operation of the lamp, and is adjusted by the damper n , which controls the center-draft inflow, and also by changing the elevation or length of the wall R.

To light the lamp, a match is applied to the wick as for an ordinary oil-lamp, and the wick burns with an ordinary flame until it is confined in the annular gasifying-chamber between the walls R and S by lowering the latter to the position shown in Fig. 2. Thereupon the flame becomes more bluish and rapidly heats the wall R, the heat as it increases gasifying the oil more rapidly and finally producing an excess of gas over air at the wick, so that the flame leaves the wick and rises within the gasifying-chamber, seeking naturally the point of greatest air-supply, which is the upper part of the wall R, increasing the heat of the latter, and still further accelerating the gasification, which acceleration continues until the flame has risen, consequent upon the ever-increasing excess of gas, through the mixing-chamber and burner to within the mantle, leaving only the small gasifying-flame in the tube, the point of complete combustion of the gases being below the burner until the production of gas is in such proportion to the admixture of air as to make an ignitable mixture only at the burner. Raising or lowering the wick increases or diminishes the oil-supply, and consequently the extent of gas production. By this means the flame can be raised to increase the incandescence of the mantle, or it can be lowered until the combustion of gas is confined within the mixing-chamber or even until it is within the vaporizing or gasifying chamber, in which case the lamp will not appear to be lighted, but can at will be caused to illuminate by simply turning up the wick again. To put the lamp out, the wick may be turned down until all flame is extinguished.

In principle my invention uses the gasifying or blue portion of any ordinary flame to gasify the oil and removes the white or illuminating portion of the flame sufficiently from the blue portion to provide for a suitable admixture of air to insure complete combustion of the hydrocarbons with a blue flame at the gas-burner by interposing the mixing-chambers and providing throughout the transit of the gas from the gasifying to the combustion flames a graduated and increasing supply of

air of such quantity and distribution that it can mix with the rising gases at successive points without causing an ignitable mixture until the burner is reached.

5 It will be understood that my invention provides improvements which can be readily and advantageously availed of and that by my invention the incandescent-mantle lamp can be employed for table, reading, and portable
10 lamps where gas is not accessible or convenient or where its expense renders the use of oil advantageous.

It will be understood that the invention is not limited in its application or uses to the particular details of construction, arrangement,
15 and combination set forth as constituting its preferred form, but that it can be employed according to such modifications and for such uses as circumstances or the judgment of those
20 skilled in the art may dictate without departing from the spirit of the invention.

Important features incident to my improvements are the making of one wall of the gasifying-chamber with differential apertures from
25 the opposite wall and the making of the wall of a gasifying or mixing chamber, or either, with air-inlets of different capacity at different points in its length and the controlling of the air-supply for the gasifying-chamber and
30 for the mixing-chambers and causing a gasification by means of the heat transmitted by the wall or other suitable conductor which is heated by the gasifying-flame instead of by direct heat of the flame at the wick, as heretofore. In operation suitable gasifying is secured without there being any contact of the
35 flame with the wick after the operation of the burner has started, so that in operation the wick is never consumed, and therefore does not require trimming. The control of the
40 air-supply at the inner side of the wall of the gasifying-chamber, which is to be the flame-wall thereof, (the wall R in the construction shown,) either by air dampers or checks or by
45 graduating the perforations in this wall relatively to those in the opposite wall, enables the confining of the flame to the wall desired for the flame-wall and the reduction of this flame to the minimum necessary for proper
50 gasification. Change of relative capacity of the air-inlets throughout the length of the mixing-wall of the vaporizing or gasifying and mixing chamber in the construction shown—the walls composed of cylinders S and T and
55 cone U—enables one to obtain the desired character of flame at the burner N and to maintain the flame at the desired distance from the gasifying-flame and from the wick. In my experiments with the walls S and T, I find
60 that increasing the air-inlets at the remoter points from the wick has importance in securing the distance between the outer and inner flames in operation and that the making of the perforations in the outer wall of less area
65 than those in the inner wall of the vaporizing

or gasifying chamber has the effect of throwing the flame to the inner wall, which wall it is most convenient to use for the flame-wall of the chamber.

The invention also meets the requirements
70 for a Welsbach burner, that the gas shall have sufficient force in its upflow to burn properly within the mantle. The heat evolved at different points within the casing and chimney,
75 a control of air-supply by the perforations or other gas-checks in the chimney and base, and the adjustment of the lower edge of the cone U are sufficient in the construction shown to insure that there shall be a suitable updraft
80 in the lamp and that a proper portion of this shall be caught by the cone and confined within the narrow throat f' , thus accelerating the speed of current of mixed gas and air to the desired point as it reaches the burner. The
85 smaller the neck in the cone the larger should be the apertures in the wall it surmounts, and vice versa.

What I claim is—

1. An oil-burner comprising a vaporizing-chamber, means for introducing oil into said
90 chamber, and means for maintaining a vaporizing-flame within said chamber and at a point remote from the point of introduction of oil into said chamber.

2. An oil-burner comprising a vaporizing-chamber, means for introducing oil into said
95 chamber, means for maintaining a vaporizing-flame within said chamber and at a point remote from the point of introduction of said oil into said chamber, and means for admitting
100 air between said point of introduction and said flame.

3. In oil-lamps and the like, a wick-chamber, another chamber, and means for supporting
105 combustion of a portion of the vapor arising from the end of the wick at a point beyond such end and within the last-mentioned chamber, said combustion serving to vaporize the oil at the end of the wick.

4. In oil-lamps and the like, a wick-chamber, another chamber, means for supporting
110 combustion of a portion of the vapor arising from the end of the wick at a point beyond such end and within the last-mentioned chamber, said combustion serving to vaporize the
115 oil at the end of the wick, and means for controlling said combustion whereby the quantity and character of the vapors formed are controlled.

5. In oil-lamps and the like, a wick-chamber, another chamber, means for vaporizing
120 the oil at the end of the wick, and means within the last-mentioned chamber for continuing said vaporization by the combustion of a portion of said vapor at a point beyond
125 the end of the wick.

6. An oil-burner comprising a vaporizing-chamber, means for introducing oil into said
130 chamber, and means for supporting combustion at a point beyond said oil and within said

chamber of a portion of the vapor arising from said oil, said combustion serving to vaporize the oil.

5 7. For oil lamps and burners, a casing, a door in said casing, a wick-chamber, a tube fitting thereover, and a connection between said tube and said door whereby access to the wick-chamber is controlled by the movement of the door.

10 8. The improved attachment for oil-lamps having wicks consisting of a gasifying-chamber having outer foraminous walls for fitting over the wick, and a foraminous inner wall for fitting inside of the wick, the perforations
15 in one wall exceeding in area the perforations in the other wall whereby combustion at the wick is precluded, a mixing-chamber above said walls and a burner above said mixing-chamber.

9. For oil-lamps and the like, a gasifying 20 and mixing device fitting over the wick of the oil-burner, said device having two foraminous walls, the apertures through one wall being unequal to those through the other, said walls inclosing between them an annular 25 chamber, whereby the draft through one wall of said chamber will be less than that through the other wall thereto, and the combustion within said chamber is remote from the wick and confined to the upper part of one of said 30 walls.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN FREDERICK W. JOST.

Witnesses:

GEORGE H. FRASER,
THOMAS F. WALLACE.