

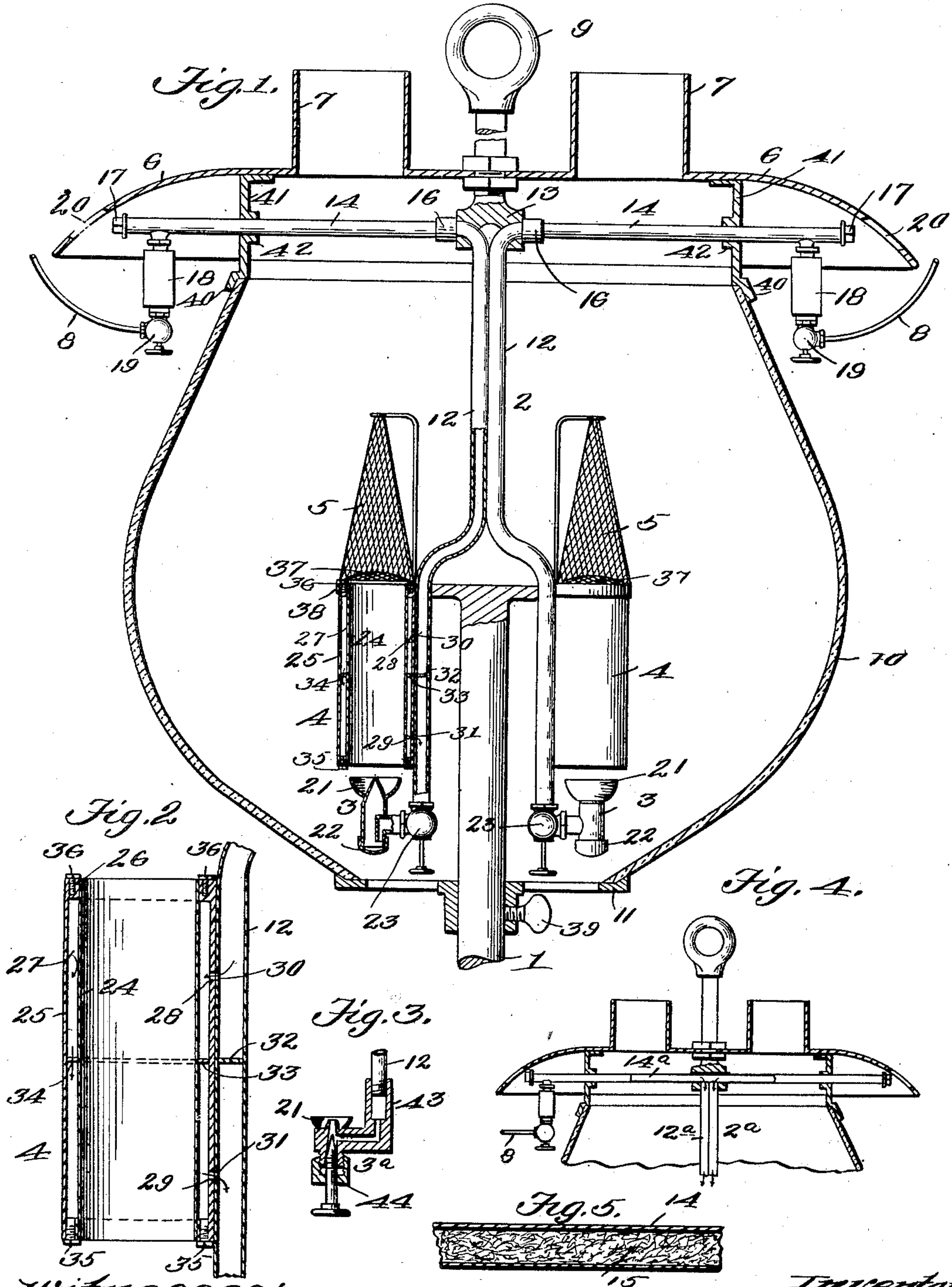
No. 703,231.

Patented June 24, 1902.

J. G. BRANCH.
HYDROCARBON LAMP.
(Application filed Jan. 9, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 6

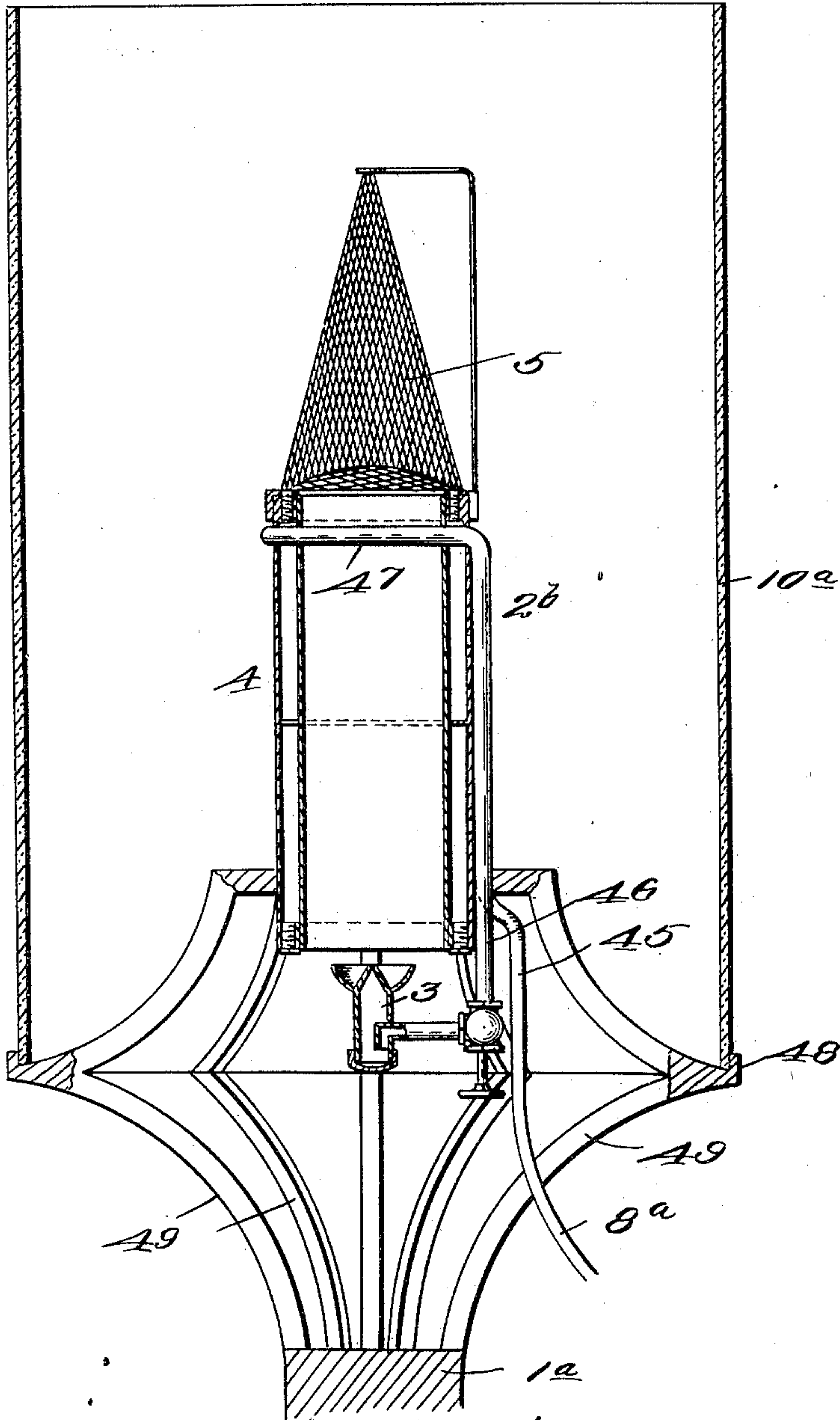
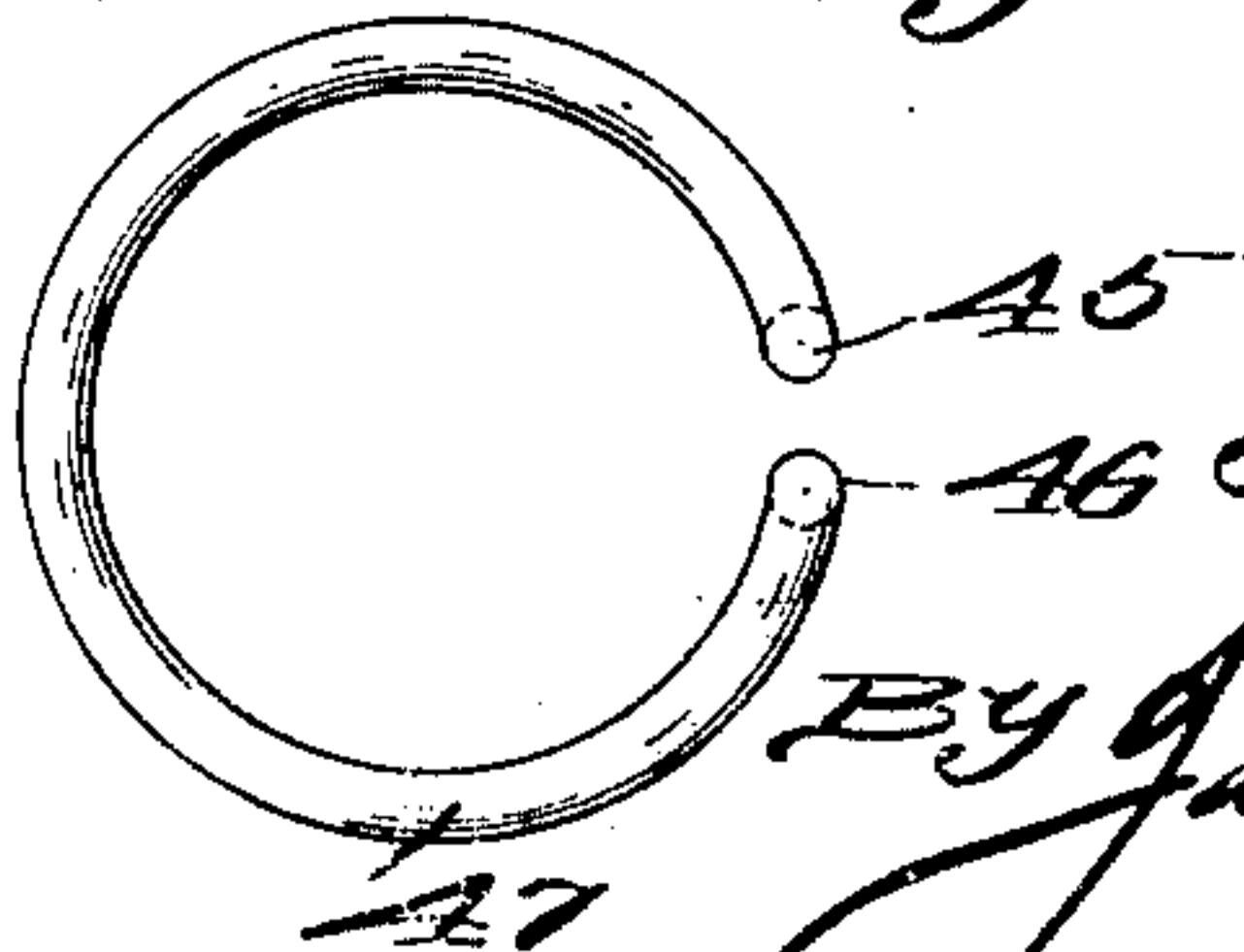


Fig. 7



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HYDROCARBON-LAMP.

SPECIFICATION forming part of Letters Patent No. 703,231, dated June 24, 1902.

Application filed January 9, 1901. Serial No. 42,691. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH G. BRANCH, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented
5 new and useful Improvements in Hydrocarbon-Lamps, of which the following is a specification.

My invention relates to hydrocarbon-lamps, the object of the same being to provide novel
10 means whereby coal-oil, gasolene, or other liquid hydrocarbons may be vaporized fed to a vapor-jet, supplied with the requisite air, and burned, the combustion thereof being utilized for heating an incandescent mantle.

15 A further object of the invention is to provide in a lamp of this kind a generator which is located to the greatest possible extent within the heat zone of the burner and which may be readily disconnected and removed for the
20 purpose of cleaning or renewing.

A further object of the invention is to provide novel means whereby the lamp may supply its own initial heat for raising the hydrocarbon liquid to the vaporizing-point.

25 A further object of the invention is to provide a novel construction of vaporizer and means for cleaning the same.

Other objects and advantages of the invention will hereinafter appear and the novel
30 features thereof will be set forth in the claims.

In the drawings forming part of this specification, Figure 1 is a sectional elevation of a hydrocarbon-lamp constructed in accordance with my invention. Fig. 2 is a detail
35 sectional view, on an enlarged scale, of the vaporizer. Fig. 3 is a sectional view illustrative of a modified form of vapor-jet. Fig. 4 is a detail sectional view of the upper part of the lamp, showing a modified construction
40 of generator. Fig. 5 is a detail sectional view through a portion of the pipe or tube constituting the generator, showing the filling therein. Fig. 6 is a sectional elevation of a modified form of lamp, and Fig. 7 is a detail
45 plan view of the upper end of the generator.

Like reference-numerals indicate like parts in the different views.

My improved lamp comprises a cylinder 1 constituting the main support, the generators
50 2, secured thereto, the vapor-jets 3, connected with the lower ends of the generators 2, the vaporizers 4, and incandescent mantles 5, the

hood 6, having the chimneys or escape-flues 7 therein, and the supply-pipes 8 for hydrocarbon liquid communicating with the generators 2. I have shown in the drawings duplicate sets of generators, vapor-jets, vaporizers, mantles, and supply-pipes; but it is obvious that one set alone may be used or a greater number may be employed. As the members
55 of each set are identical a detail description of the members of one set only will be sufficient. The lamp may be supported at its upper end by a ring 9, secured to the hood 6, and said lamp is supplied with a globe 10, mounted
60 upon a support 11, adjustable on the cylindrical support 1. Each of the generators 2 consists of a vertical pipe 12, secured to the support 1 near its lower end and to a stationary block 13 at its upper end, and of a horizontal
65 pipe 14, removably secured to the upper end of the pipe 12 and filled with steel or mineral wool 15, as clearly shown in Fig. 5 of the drawings. The means of connection between the pipes
70 12 and 14 consists of an internally-screw-threaded enlargement 16 on the end of the pipe 12, which receives the internal screw-threads on the inner end of the pipe 14. The
75 outer end of the pipe 14 is provided with a removable cap 17, having a polygonal extension thereon, by means of which a wrench or key may be applied for the purpose of removing the same. The supply-pipe 8 communicates with the pipe 14, a filter 18, filled
80 with any fibrous material, being interposed between the pipes 8 and 14. At the point of juncture of the pipe 8 with the filter 18 is a cut-off valve 19, and in the hood 6, directly opposite the end of the pipe 14, is an opening
85 20, by means of which access may be had to said pipe for the purpose of removing and cleaning the same.

The lower end of each of the pipes 12 of the generators 2 has connected with it the vapor-jet 3, the same extending outwardly there-
90 from and provided with an annular cup 21, surrounding the discharge-orifice thereof. Said vapor-jet is also provided on its under side with a removable cup 22, by means of which said vapor-jet may be cleaned. A
95 valve 23 controls the flow of hydrocarbon from the pipe 12 to the vapor-jet 3. The vaporizer 4 is also secured to the pipe 12; but, as shown, the same is located above the va-
100

por-jet 3, with the lower end thereof separated slightly from said vapor-jet, so as to permit the mixture of air with the vaporized hydrocarbon prior to the ignition of the same adjacent to the mantle 5. The said vaporizer consists of an inner imperforate tube 24, forming a mixing-chamber, and an outer tube 25, surrounding the same and formed with inwardly-extending flanges 26 at its upper and lower ends, which flanges are of the same internal diameter as the external diameter of the inner tube 24 and serve to hold the tubes 24 and 25 properly spaced apart. They also serve to close the upper and lower ends of the annular chamber 27 between the tubes 24 and 25. The outer tube 25 is formed with perforations 28 and 29 in the sides thereof, which register with corresponding perforations 30 31 in the pipe 12. Between the perforations 30 and 31 the pipe 12 is provided with a diaphragm or plug 32, and directly opposite said diaphragm, in the annular chamber 27, is a plate or partition 33, which has an opening 34 therein on the side of the chamber 27 opposite the pipe 12. By this construction it will be observed that the hydrocarbon supplied by the pipe 12 is forced into and completely around the annular chamber 27 in the vaporizer 4 before it can reach the vapor-jet 3. The inner tube 24 is thinner than the outer tube 25 for the obvious purpose of enabling the heat from the burning hydrocarbon to be the better conducted to the hydrocarbon in the annular chamber 27.

To provide for cleaning the vaporizer 4, or rather the annular chamber 27 in said vaporizer, I provide openings in the flanges 26, which are normally closed by the screws 35 36. Four of these openings are preferably employed, two in the upper flange 26 and two in the lower flange. This number may, however, be increased or decreased without departing from the invention. When it is desired to clean the chamber 27, one or more of the screws 35 36 are removed and a needle or other pointed instrument introduced through the openings and the hydrocarbon therein permitted to flow out.

It is of course essential that ready access be had to the stems of the valves 23 and to the cups 22. To provide for this, the globe-support 11 is made in the form of a spider, or is provided with openings through which the hand may be readily passed.

The mantles 5 are supported in any suitable manner above the vaporizers 4. Secured to the upper end of each vaporizer, however, below the mantle 5 thereon, is a disk 37, of wire-gauze, the same constituting a burner and being retained in place by means of a ring or collar 38.

When it is desired to renew the mantles 5, access may be had thereto by simply lowering the globe 10 and the holder 11, upon which said globe is supported. For this purpose I provide the hub of the holder 11, which embraces the cylindrical support 1, with a set-

screw 39. The upper end of the globe when the parts of the lamp are in place fits within an annular flange 40 on the lower end of a ring or bracket 41, secured to the hood 6, lateral displacement of the globe 10 being thereby prevented. This bracket 41 also serves as a bearing or support for the pipe 14 of each of the generators 2. Said pipe passes loosely through a boss 42 on said bracket and is capable of withdrawal through said boss.

From the foregoing description it will be observed that each of the generators 2 comprises a vertical member located between the burners and a horizontal member located above the same. In this way the generators are disposed to the greatest possible extent within the heat zone of the lamp. The horizontal member 14 of each of the generators is the one which receives the more direct rays of heat from the lamp, and consequently it is the one in which the paraffin and other impurities in the hydrocarbon liquid will condense. This condensation and accumulation of paraffin in the generator of the hydrocarbon-lamp is one of the most serious objections to those forms of hydrocarbon-lamps which have preceded mine, as it results in the clogging up of the passage to the burners, and thereby renders the lamps either entirely useless or very inefficient. By making this portion of my generator removable I am enabled to disconnect the same at any time for the purpose of cleaning it or for the purpose of introducing an entirely new pipe in its place. This is an important feature of my invention. The filters 18 may be dispensed with, if desired, as the steel, wool, or fiber 15 in the pipes 14 serves as a strainer for the hydrocarbon liquid passing therethrough. However, the filters 18 are desirable in that they produce a more even and steady flow of the liquid hydrocarbon, and consequently a steadier light at the point of ignition of the hydrocarbon.

The operation of my device is as follows: The valves 19 and 23 are first opened and hydrocarbon liquid from the supply-pipe 8 is conducted to the vapor-jet 3 and allowed to drip over into and fill the annular cup 21. The same is then ignited, the valve 23 is cut off, and the heat of the burning oil is utilized to heat the vaporizer 4 and the liquid contained within the annular chamber 27 thereof. When the oil in the cup 21 has been consumed, the valve 23 is again opened and then the hydrocarbon is discharged into the lower end of the mixing-chamber 24 of the vaporizer 4 and ignited at the upper end thereof outside the mantle 5. The same is now consumed at the burner 37 in the form of vapor mixed with air, the air being drawn into the inside of the tube or mixing-chamber 24 by the vapor discharged from the vapor-jet 3. The mantle is raised to incandescence by this combustion of the hydrocarbon-vapor and air, and the heat of the vaporizer 4 is continued for the obvious purpose of vaporizing the hydrocarbon liquid in the annular chamber 27. It will

thus be seen that the initial heating of the hydrocarbon liquid is performed by the lamp itself.

In Fig. 3 of the drawings I have shown a modified form of vapor-jet to be used as a substitute for the vapor-jet 3 when gasoline or any of the other light hydrocarbon liquids are employed. This vapor-jet 3^a is provided with an internally-screw-threaded extension 43, into which the lower end of the pipe 12 screws, and with a needle-valve 44. The valve 44 is located directly beneath the discharge-orifice of the vapor-jet and controls the flow of hydrocarbon thereto. When said valve is employed, the valve 23 is not used.

In Fig. 4 of the drawings I have shown a modified construction in which a single generator 2^a is employed in lieu of the double one illustrated in Fig. 1 of the drawings. In this form of my invention the vertical pipe 12^a and the horizontal pipe 14^a of the generator are rigidly secured to one another, and the pipe 14^a is incapable of removal. A single supply-pipe 8 instead of two is employed in this form of my invention.

In the modified form of my invention illustrated in Figs. 6 and 7 the vapor-jet 3, vaporizer 4, and mantle 5 are all of the same form and construction as the corresponding parts in the preferred form of the invention. The generator 2^b, however, differs slightly from the generator 2, heretofore described. The same consists of the vertical pipes 45 and 46, connected together at their upper ends by an annular pipe 47, which constitutes in reality the generator proper and completely surrounds the vaporizer 4, adjacent to the mantle 5. The pipes 45 and 46 extend along one side of the vaporizer 4, the former being connected to a supply-pipe 8^a for hydrocarbon liquid and the latter having connected to it the vapor-jet 3. This form of my invention is intended for inside lighting, where the parts of the same and particularly the generator will not be subjected to intense cold. For this reason it is not important that the upper part of the generator be located above the mantle 5, as in the preferred form of my invention. The same is therefore extended around the vaporizer 4, as shown. A single burner is employed, and an ordinary tubular globe or chimney 10^a may be utilized, the same being supported upon a flange 48 at the outer end of a series of arms 49 on the upper end of the support 1^a.

While my invention has been shown and described as a hydrocarbon-lamp, it will be noted that the light is produced by the heat generated from the combustion of the hydrocarbon-vapor which raises the mantle 5 to incandescence. The heat generated in this manner may of course be utilized for any other purpose than that of raising the mantle to incandescence. My invention is not limited, therefore, to its application for use as a lamp, but may be used in any other connection where an intense heat is desired.

When the term "lamp" is used in the following claims, it is intended that the same shall comprehend any form of apparatus in which the combustion of hydrocarbon-vapor is desired for the generation of heat.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-lamp, the combination with a burner, of a generator comprising a pipe made up of a horizontal member and a vertical member, both within the heat zone of said burner and communicating with a source of supply for liquid hydrocarbon, a vapor-jet having a cup thereon, and a vaporizer located between said vapor-jet and said burner and comprising an inner and an outer tube secured together to form an annular chamber which communicates with said pipe and said vapor-jet, as and for the purpose set forth.

2. In a hydrocarbon-lamp, the combination with a burner, of a generator comprising a vertical member and a horizontal member, the latter member being removable without disturbing the relation of the other parts, located above said burner and within the heat zone thereof and communicating with a source of supply for liquid hydrocarbon, a vapor-jet having an annular cup thereon, and a vaporizer located above said vapor-jet and comprising an inner and an outer tube secured together to form an annular chamber which communicates with said vertical member and said vapor-jet, as and for the purpose set forth.

3. In a hydrocarbon-lamp, the combination with a burner, of a generator comprising a fixed vertical member and a horizontal member removable without disturbing the relation of the other parts located above said burner and within the heat zone thereof, a hydrocarbon-supply pipe communicating with said horizontal member, a vapor-jet, a valve controlling the flow of hydrocarbon to said vapor-jet, an annular cup secured to and surrounding said vapor-jet and located below the discharge-orifice therein, and a vaporizer located between said vapor-jet and said burner and comprising an inner and an outer tube secured together to form an annular chamber which communicates with said vertical member and said vapor-jet.

4. In a hydrocarbon-lamp, the combination with a burner, of a generator comprising a fixed vertical member having an enlarged, internally-threaded, outwardly-directed upper end and a horizontal member removable without disturbing the relation of the other parts screwing within the upper end of said vertical member and located above said burner and within the heat zone thereof, a hydrocarbon-supply pipe connected with said horizontal member, a vapor-jet, a valve controlling the flow of hydrocarbon to said vapor-jet, an annular cup secured to and surrounding said vapor-jet and located below the discharge-

orifice therein, and a vaporizer located between said vapor-jet and said burner and comprising an inner and an outer tube secured together to form an annular chamber which
5 communicates with said vertical member and said vapor-jet.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

JOSEPH G. BRANCH.

Witnesses:

WILLIAM D. TAYLOR,
CASDIE E. NORVELL.