

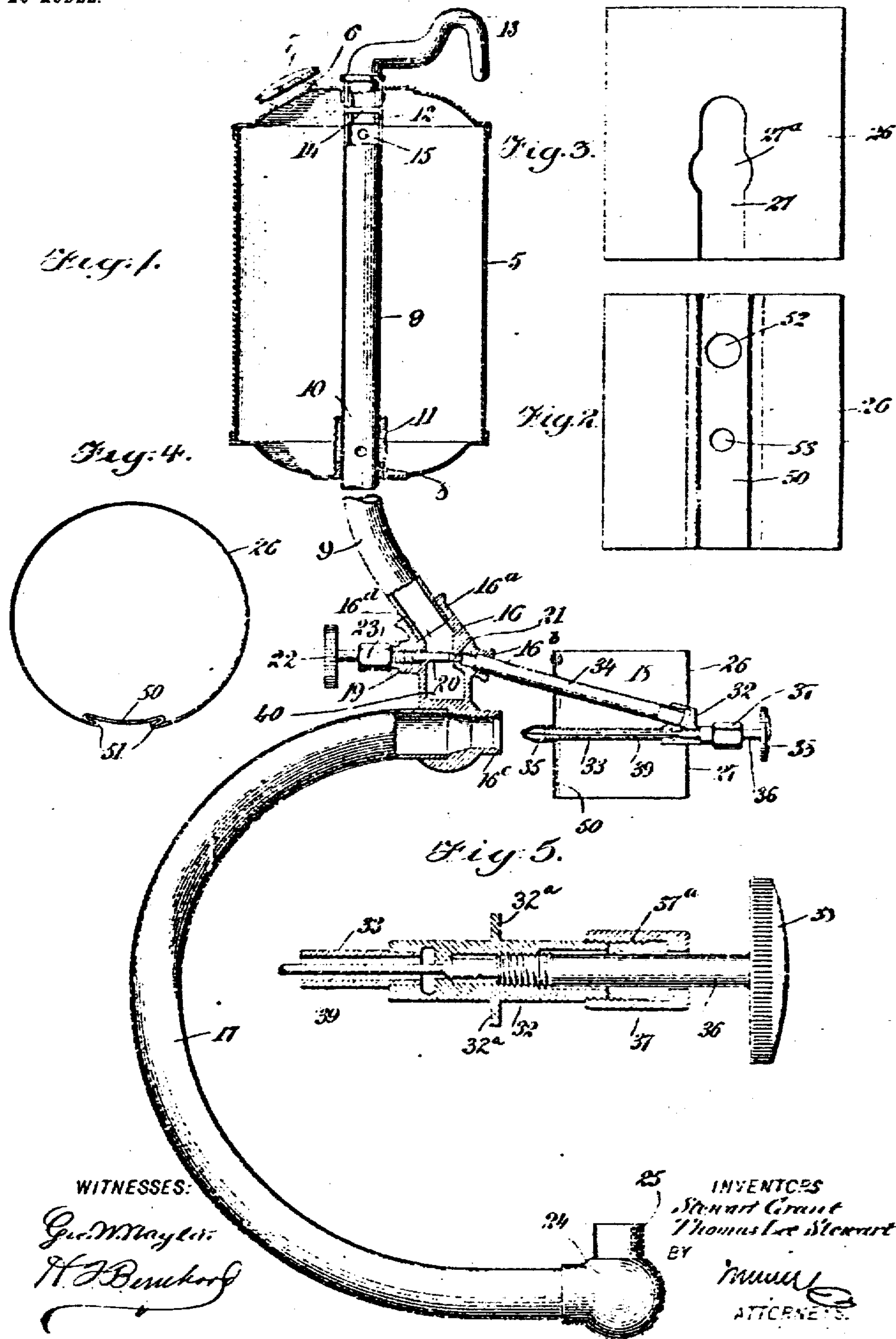
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PATENTED AUG. 30, 1904.

S. GRANT & T. L. STEWART.  
INCANDESCENT HYDROCARBON LAMP.

APPLICATION FILED OCT. 11, 1902.

NO MODEL.





# UNITED STATES PATENT OFFICE.

STEWART GRANT AND THOMAS LEE STEWART, OF PORTLAND, OREGON;  
SAID GRANT ASSIGNOR TO SAID STEWART.

## INCANDESCENT HYDROCARBON-LAMP.

SPECIFICATION forming part of Letters Patent No. 768,988, dated August 30, 1904.

Application filed October 11, 1902. Serial No. 126,932. (No model.)

*To all whom it may concern:*

Be it known that we, STEWART GRANT and THOMAS LEE STEWART, both citizens of the United States, and residents of Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Incandescent Hydrocarbon-Lamp, of which the following is a full, clear, and exact description.

Our invention relates to improvements in incandescent hydrocarbon-lamps with a retort-vaporizer constructed to return the hydrocarbon-vapor to a point below fuel-inlet and on same side of lamp on which fuel-inlet is located, the feed-tube leading into a canopy or hood and the feed-tube and the jet-tube being in the shape of a V, and both of said tubes being straight, or nearly so, so as to enable one to easily clean both of said tubes and to insert and renew the wire-gauze or other packing whenever same is needed.

One object that we have in view is to provide an improved form of retort-vaporizer which is of small compact construction adapted to be initially heated by the application of a match or small torch, which is constructed of a material that is non-oxidizable, so as to overcome disintegration under the action of heat and the formation of scale either inside or outside to the end that the tendency to clog up is minimized, and which is capable of being easily cleaned from accumulation of sediment and readily packed with a suitable material.

A further object of the invention is to provide an improved form of valve hanger or coupling arranged to insure a direct feed of the hydrocarbon to the retort-vaporizer and in which provision is made for the collection of any water and sediment that may be present in the hydrocarbon.

A further object that we have in view is the provision of a simple form of canopy adapted to fit the retort-vaporizer closely, so as to avoid ignition of vapor issuing from the jet-tube from the torch or match when being lighted and to close the space between the members thereof, said canopy being capable of easy adjustment relative to the vaporizer

to permit easy access to the chimney or incandescent mantle of the lamp.

The further objects and advantages of the invention will appear from the subjoined description, and the novelty may be defined in the annexed claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical sectional elevation through a hydrocarbon incandescent-lamp constructed in accordance with our invention, the gallery, mantle, and chimney being omitted. Fig. 2 is a detail view, on an enlarged scale, of the improved canopy. Fig. 3 is an elevation looking at the rear side of the adjustable canopy. Fig. 4 is a plan view of the adjustable canopy, illustrating the interlocking slidable engagement of the removable piece with said canopy; and Fig. 5 is an enlarged horizontal section through the lower portion of the vaporizer in order to more clearly show the construction of the valve, the needle, and the packing for said valve.

5 designates a tank or reservoir which is provided in its upper head with a filling-nozzle 6, adapted to be closed by a removable cap 7, which is screwed into the nozzle. The lower head of the tank or reservoir is provided with a central flange 8, through which passes the upper portion of a vertical supply-tube 9, the latter being of any suitable length and extending for a suitable distance below the tank or reservoir. This upper part of the supply-tube is extended or carried through the tank or reservoir, and at a point just above the lower head of said tank the supply-tube is provided with one or more inlet-ports 10, said perforated pipe of the tube being surrounded by a metallic packing 11 of wire-gauze or any other suitable material. The hydrocarbon or other combustible liquid is charged into the tank through the filling-nozzle 6 thereof, after which the cap 7 is replaced, and the liquid is free to enter this supply-tube by passing through the metallic packing 11 and the perforations or ports 10. The upper extremity of the tube 9 is extend-



ed through the upper head of the tank, and in this end of said tube is secured the shank 12 of a suspension hook or hanger 13, the latter being of any suitable construction. 5 The upper extremity of the tube 9 may be soldered in the heads of the tank, but we prefer to rivet the shank of the hanger in the tube, as indicated at 14. The tube 9 is furthermore provided with one or more vent- 10 openings 15 at a point just below the lower extremity of the hanger-shank 12, thus allowing air or vapor to enter the tube and insuring a free flow of liquid through said tube and to the retort-vaporizer, to be presently 15 described. The vent-openings 15 also serve as an outlet for any water or sediment which may accumulate in a well or chamber of the coupling or hanger 16, which serves to unite the combining-tube 17 and retort-vaporizer 20 18 to the supply-tube 9.

The coupling or hanger 16 is preferably cast in a single piece of metal, and it consists of a suitable body having the nipples 16<sup>a</sup> 16<sup>b</sup> and the flanged mouth 16<sup>c</sup>. The 25 supply-tube 8 is fitted in and secured to the nipple 16<sup>a</sup> of the coupling by a thread-joint, thus detachably uniting the coupling and the supply-tube. The nipple 16<sup>b</sup> of the coupling is disposed at an angle to and on the opposite 30 side of the coupling from the nipple 16<sup>a</sup>, to which the supply-tube is attached, and this nipple 16<sup>b</sup> communicates directly with the liquid-passage 16<sup>d</sup> in the body of the coupling. Said coupling is furthermore provided with 35 a valve-nozzle 19, the same being interiorly threaded to receive the threaded pipe of a stem-like valve 20, the extremity of the latter being tapered in order to snugly fit in the valve-seat 21, which is provided in the liquid- 40 passage 16<sup>d</sup> in line with the nipple 16<sup>b</sup>. This valve-stem 20 is equipped at its outer end with a thumb-piece 22, which may be of compressed fiber or any other suitable material, and said valve-stem is also equipped with 45 stuffing-nut 23, which is intended to prevent leakage around valve-stem. This valve-stem 20 extends across the passage 16<sup>d</sup> of the coupling, and it is adapted to close the communication between the coupling and the retort- 50 vaporizer, thus making provision for controlling the flow of liquid to said vaporizer. The coupling and the valve are compactly disposed, so that the tube 17 may be grasped by hand and the valve-wheel may be operated 55 with the thumb and forefinger.

The mixing or combining tube 17 is curved or arched, as shown in the drawings, and the upper end of said tube is secured in any suitable way to the lower part of the coupling 60 16, said combining-tube having direct communication with the flanged mouth 16<sup>c</sup> at the lower part of the coupling. The lower end of this combining or mixing tube is provided with a cast-metal foot-piece 24, from which 65 extends a nozzle 25, adapted to support a gal-

lery. (Not shown.) The gallery affords a seat for a lamp-chimney and the support for an incandescent mantle; but as these parts are well known to those skilled in the art we have not considered it necessary to illustrate 70 the same in the drawings nor to more fully describe them.

26 designates a canopy which is made from sheet metal that is bent to a cylindrical shape, the meeting edges of the canopy being seamed, 75 folded, or otherwise fastened together. The canopy is open at its upper and lower ends, and it is provided with a vertical longitudinal slot 27, the slotted construction of said canopy permitting it to be lifted with com- 80 parative ease and freedom in relation to the retort-vaporizer body 32.

50 is a strip of sheet metal with edges folded over, arranged to interlock with a similar fold 51 on the canopy 26 and having holes 85 52 53 for the large and small generator-tubes to pass through. The tip or nozzle 35 of the small generator-tube 33 is adapted to be placed thereon after such tube is passed through the hole 53, and the slot 27 in the 90 canopy permits the latter to pass down over the generator, said slot 27 having an enlarged opening 27<sup>a</sup> (see Fig. 3) to admit a match or torch. The canopy is secured in place by the body 32 and lugs 32<sup>a</sup> thereon. (See Fig. 95 5.) The canopy is raised by sliding the body 26 thereof upwardly on each side of the piece 50, the folded edges not being so tight as to prevent the sliding motion of the canopy. Said body of the canopy remains on the gen- 100 erator when the piece 50 is entirely removed.

The vaporizer 18 is of small construction in order to fit the canopy 26, the inside diameter of which lays over and fits the chimney, and said vaporizer consists, essentially, of a body 105 32, a jet-tube 33, a feed-tube 34, and nipple 35. We have found that ordinary materials—such as brass, copper, and iron—are liable to disintegrate and form scale under the action of heat necessary to vaporize the hydrocar- 110 bon liquid, and the formation of this scale is very objectionable and detrimental to the operation of the vaporizer, particularly when the same is made of small dimensions and compact construction, because the scale is lia- 115 ble to clog the opening in nozzle tip or nipple of the vaporizer and to interfere with its successful operation. To overcome these defects and to produce a vaporizer which is capable of being easily heated by the application of a match 120 or small torch, we make the jet-tube 33, the feed-tube 34, and the nipple 35 of nickel-silver. We have found that this material is free from any tendency to oxidize under the influence of such a degree of heat as would be usual 125 while lamp is in operation and that it does not disintegrate or scale, so that the liquid and vapor passages in the operating parts of the vaporizer will be free from metallic accumulations, thus allowing the liquid and the 130



vapor to pass readily at all times. The body 32 of the vaporizer is provided with suitable nipples in which are secured the tubes 33 34, said tube 33 being arranged in horizontal position and in line with the flaring mouth 16<sup>c</sup> of the valved coupling 16. The feed-tube 34 is disposed in an inclined position between the body 32 and the coupling 16, the upper end of said tube 34 being secured in the nipple 16<sup>b</sup> by threading or any suitable way. The liquid hydrocarbon is free to flow by gravity from the supply-tube 9 and the passage 16<sup>d</sup> into the feed-tube 34, from whence the liquid passes through the jet-tube 33 into the nozzle 35. The body 32 is internally threaded for a part of its length to receive a threaded valve-stem 36, the latter having a tapered end to fit a suitable seat provided in said body. The valve 36 is thus adapted to control or regulate the passage of the hydrocarbon from the tube 34 into the tube 33, and this valve works through a packing provided in a suitable sleeve 37, which is attached to the body 32, said valve being also provided with a suitable hand-wheel 38. The nozzle 35 is attached to the end of the jet-tube 33 outside of the canopy 26 and is arranged directly opposite to the flared mouth 16<sup>c</sup> of the coupling. This nozzle is provided with a contracted orifice through which vapor is discharged under pressure, and in the jet-tube 33 is disposed a longitudinal needle 39, the shank of which is secured to the inner valve-stem 36, while the point of the needle is adapted to be thrust through the orifice in the nozzle 35. The feed-tube 34 passes into the canopy or cover 26 through a straight or nearly-straight tube to a juncture to body 32, and jet-tube 33 passes from said body 32 back out of said canopy 26 in a horizontal direction under said feed-tube 34, thus reversing the direction of the flow of the hydrocarbon and returning the hydrocarbon-vapor to same side of lamp from which the supply is received by means of straight tubes 33 and 34. The compact construction of the vaporizer enables it to be advantageously used in connection with the canopy, and this vaporizer is arranged to secure the maximum benefit of waste heat from the incandescent mantle of the burner, thus reducing the area of exposure of the vaporizer to the surrounding atmosphere. The nozzle 35 is of small dimensions, so that it may be readily heated at the beginning of the operation of lighting the lamp by a match or small torch. The construction of the valved coupling 16 and the relation of the supply-pipe 9 thereto is such that the parts may be used in a single or double lamp by turning the supply-pipe one-half of a revolution in the coupling 16.

The feed-tube 34 of the retort-vaporizer should be provided with a suitable metallic packing or filling. This packing may consist of a suitable quantity of wire-gauze placed in

said tube, and it will be noted that the tube 34 is detachably secured to the nipple 16<sup>b</sup> of the valved coupling 16, so that said tube may be removed from the coupling and the packing conveniently placed therein. Tube 34 being straight, or nearly so, permits the said tube being easily cleaned and repacked.

In operation the tank or reservoir 5 is charged with a suitable quantity of hydrocarbon, which passes through the pipe 9 to the coupling 16, the latter being provided below the valve 20 with a well or chamber 40, in which may accumulate any sediment, water, or foreign matter present in the hydrocarbon. The valve 20 is opened when it is desired to use the apparatus, and the hydrocarbon passes from the pipe 9 and the passage 16<sup>b</sup> directly into the pipe 34. By opening the valve 36 the liquid is free to pass through the pipe 33 and to the jet-nozzle 35. This nozzle and tube 33 are heated by the application of a match or torch, and the vapor and liquid supplied to the nozzle is vaporized, the vapor issuing from the orifice of the nozzle and passing directly into the mouth 16<sup>c</sup>. The vapor is injected under gravity-pressure, and it induces a current or suction of atmospheric air into the mouth 16 and the pipe 17, and this air and vapor are commingled or combined during the passage through the pipe 17, so as to produce a combustible mixture. The mixture is supplied to the nozzle 25 of the foot-piece, which directs the vapor into the mantle, where the vapor is consumed for heating the mantle to a state of incandescence, and the waste heat arising from the mantle serves to raise the temperature of the parts comprising the vaporizer. The hydrocarbon passing through the vaporizer is converted into vapor, which is injected by the nozzle 35 into the flared mouth 16<sup>c</sup>, and the operation is thus rendered continuous. The volume of the liquid supplied to the nozzle may be regulated to a nicety by adjustment of the valve 36, and when this valve is closed the needle 39 is projected into the orifice of the jet-nozzle, so as to keep the latter in a clean condition.

The hydrocarbon-supply to the vaporizer is controlled by adjustment of the valve 20. When it is desired to remove any sediment or foreign matter that may accumulate in the well or chamber 40, the valves 20 and 36 are closed, and the apparatus is inverted or turned so that the contents of the chamber 40 will pass through the pipe 9 and be discharged from the vent-openings 15 into the tank 5, from which the foreign matter may be removed through the nozzle 6.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A hydrocarbon-lamp having a combining-tube, a valved coupling attached to the upper part of said combining-tube and provided with a flaring mouth in line with said tube, a



supply-pipe united to said coupling at a point above the combining-tube, and a vaporizer supported by said coupling and located at one side of said tubes, said vaporizer having one member attached to the coupling and its other member disposed in axial and spaced relation to the flaring mouth, said members of the vaporizer being disposed in divergent relation and said vaporizer being equipped with a valve which is operable independently of the valve in the coupling.

2. A hydrocarbon-lamp having a valved coupling, a supply-tube attached thereto, a combining-tube also attached to said coupling, a V-shaped vaporizer disposed at one side of the tubes and the coupling and having one member attached to the coupling and its other member provided with means for injecting a vapor into the containing-tube, and a canopy supported by the vaporizer to practically inclose the members thereof, said canopy being slidable vertically on the vaporizer.

3. In a hydrocarbon-lamp, a vaporizer having a feed-tube, an injector-tube and a nozzle, each of said parts being made of a metallic alloy consisting of nickel-silver which is of a non-flaking character under the conditions prevailing in the service of a hydrocarbon-lamp.

4. A hydrocarbon-lamp, comprising a feed-tube, a combining-tube, a double-tube vaporizer having one tube thereof connected with said feed-tube and its other tube disposed opposite to the combining-tube, and a canopy partially inclosing the parts of said vaporizer and adjustable vertically with relation thereto, said canopy having a vertical slot in one side and provided on its other side with a member that is secured to the vaporizer-tubes and

has slidable connection with the body of the canopy.

5. In a hydrocarbon-lamp, the combination with a retort-vaporizer having feed and injector tubes, of a slotted canopy having a non-adjustable member fitted to said retort-vaporizer, the body of said canopy enveloping the vaporizer and having slidable connection with said non-adjustable member for vertical movement with respect to the vaporizer.

6. In a hydrocarbon-lamp, the combination with a vaporizer, of a canopy enveloping the same, said canopy consisting of members connected slidably together, one member being attached to the vaporizer and the other being vertically adjustable with respect thereto.

7. In a hydrocarbon-lamp, a V-shaped vaporizer having a feed-tube and a jet-tube attached to a body, and a valve supported by said body and extending through the jet-tube thereof, the free end of said valve having a needle, combined with a valved coupling to which the feed-tube is united, a combining-tube opposite to the jet-tube, and a canopy having a non-sliding member fitted to said vaporizer; both tubes of the vaporizer passing through said members, and the body of the canopy being slidable vertically with respect to the member and the vaporizer.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

STEWART GRANT.  
THOMAS LEE STEWART.

Witnesses:

R. W. WILBUR,  
J. H. BANKS.