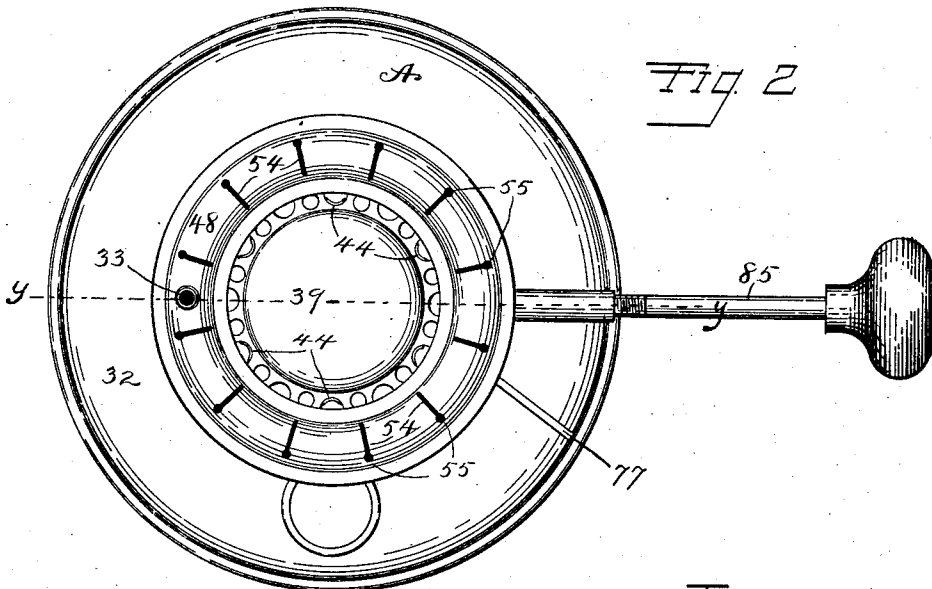
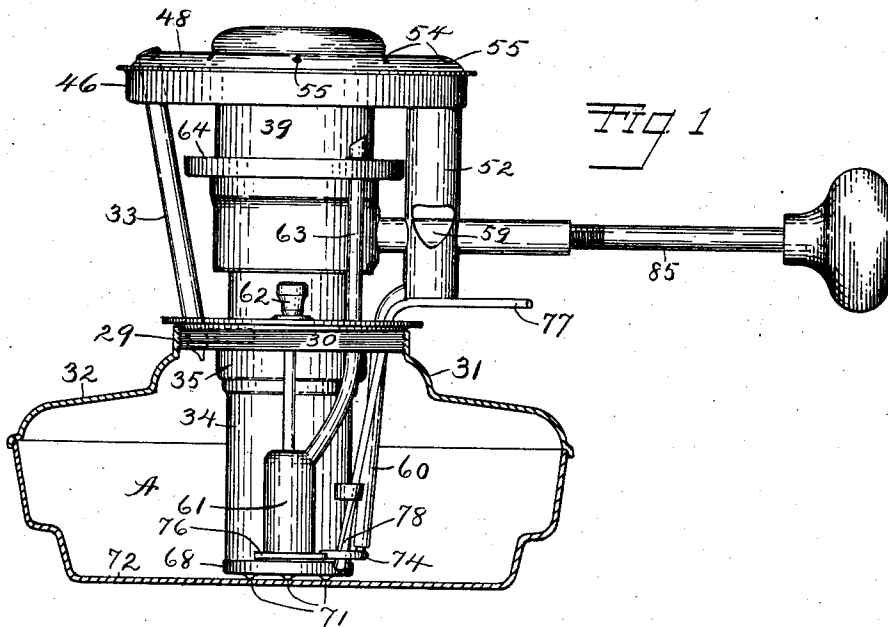


F. E. CARLSON.  
ALCOHOL LAMP.  
APPLICATION FILED JUNE 29, 1912.

1,062,886.

Patented May 27, 1913.  
3 SHEETS—SHEET 1.



WITNESSES  
J. H. Clarke.  
Roger Edwards.

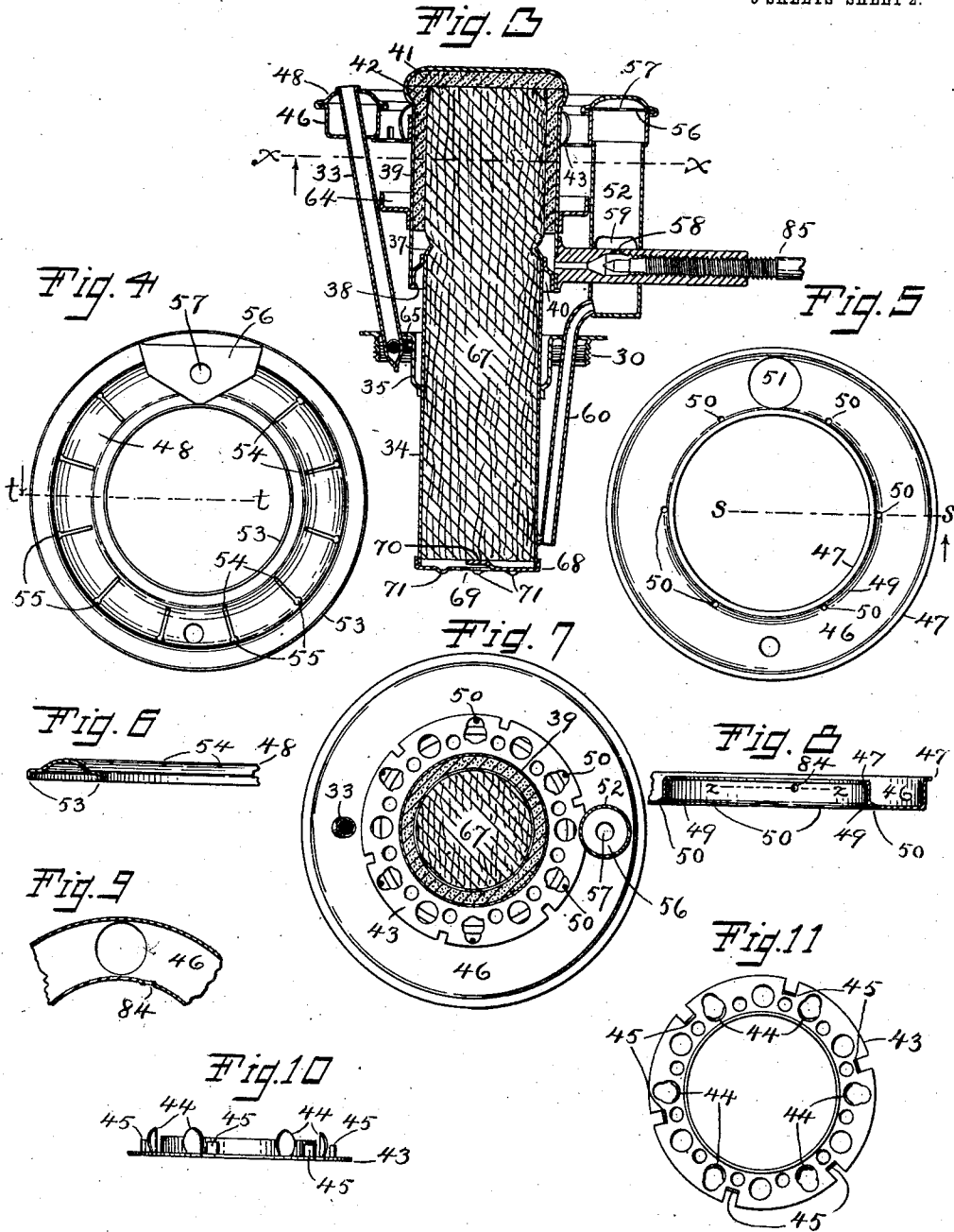
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3 SHEETS—SHEET 2.



Witnesses  
S. H. Clarke  
Rosa E. Schwabe

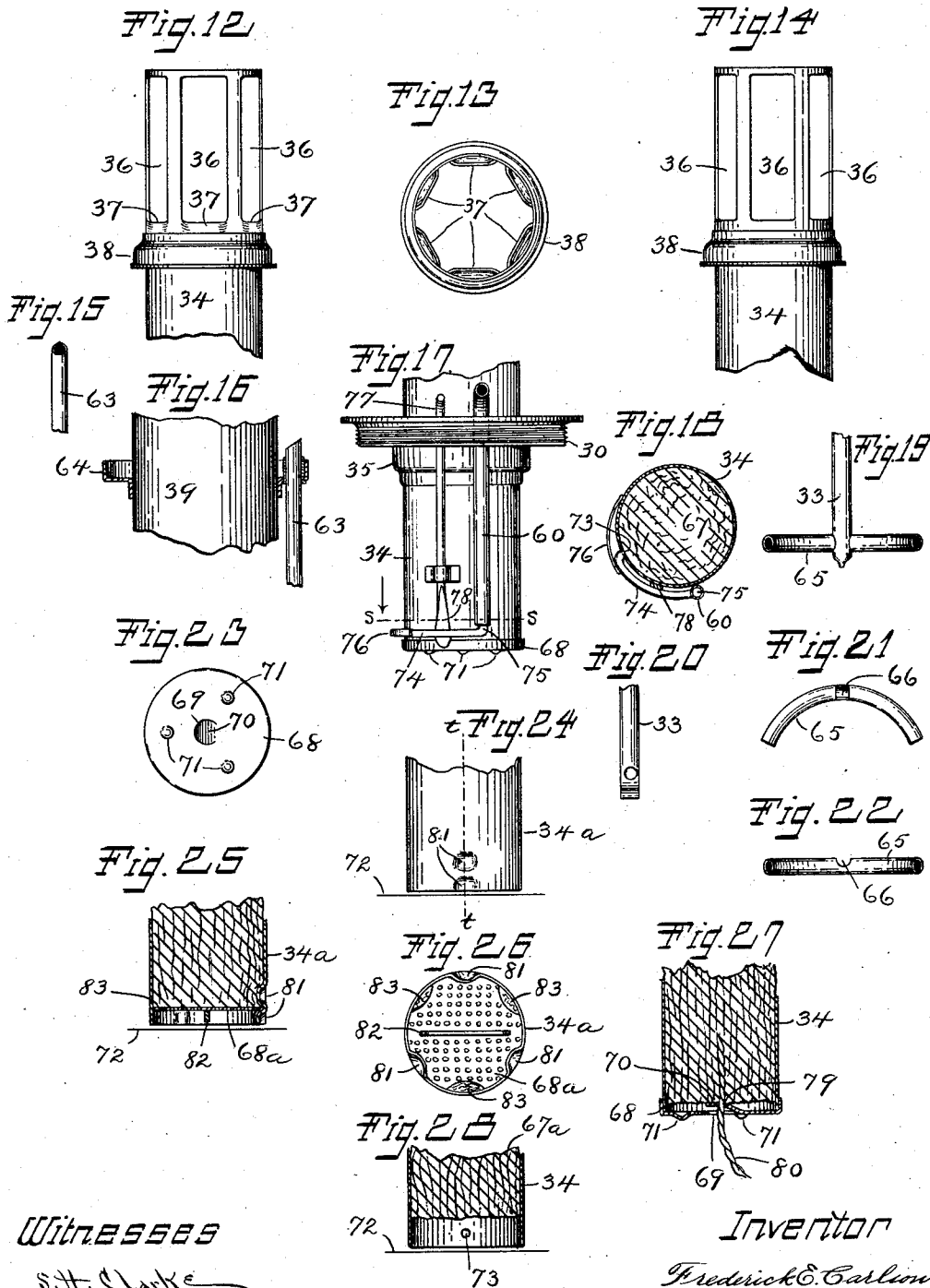
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3 SHEETS—SHEET 3.



Witnesses

S. H. Clarke  
Rosa Edwards

Inventor

Frederick E. Carlson.  
By Louis M. Schmidt  
Atty.

# UNITED STATES PATENT OFFICE.

FREDERICK E. CARLSON, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO LANDERS, FRARY & CLARK, OF NEW BRITAIN, CONNECTICUT, A CORPORATION.

## ALCOHOL-LAMP.

1,062,886.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed June 29, 1912. Serial No. 706,584.

*To all whom it may concern:*

Be it known that I, FREDERICK E. CARLSON, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Alcohol-Lamps, of which the following is a specification.

My invention relates to improvements in alcohol lamps and the main object of my improvement is to improve the efficiency of the lamp in various ways, and especially with reference to certain features hereinafter mentioned as producing certain advantages or results.

In the accompanying drawing: Figure 1 is mainly a side elevation of my lamp, the front thereof being shown in central vertical section. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section of the same on the line *y y* of Fig. 2. Fig. 4 is a reverse plan view of the upper part of the burner ring together with a baffle plate placed therein. Fig. 5 is a plan view of the lower part of the burner ring. Fig. 6 is a broken sectional view of the part of the burner ring that is shown in Fig. 4 on the line *t t* of said figure. Fig. 7 is a reversed sectional plan of the upper part of the burner taken on the line *x x* of Fig. 3. Fig. 8 is a broken sectional view of the lower part of the burner ring on the line *s s* of Fig. 5. Fig. 9 is a broken sectional view of the lower part of the burner ring on the line *z z* of Fig. 8. Fig. 10 is a side elevation of the burner ring plate or support. Fig. 11 is a plan view of the same. Fig. 12 is a side elevation of the upper part of the wick tube and attached collar. Fig. 13 is a plan view of the same. Fig. 14 is a side elevation of the wick tube and attached collar as it appeared before the aprons at the lower ends of the slots thereof were turned inwardly. Fig. 15 is a side elevation of the upper end of the delivery pipe of the priming pump. Fig. 16 is a vertical section of the priming pan together with a broken side elevation of the generator and the delivery pipe of the pump. Fig. 17 is a side elevation of the lower part of the wick tube and valve for the same. Fig. 18 is a sectional view of the same on the line *s s* of Fig. 17. Fig. 19 is a side elevation of the lower part of the vent tube and its branches. Fig. 20 is an eleva-

tion of the lower end of the vent before the branch portion is connected thereto. Fig. 21 is a plan view of the branch portion of the vent. Fig. 22 is a side elevation thereof. Fig. 23 is a reverse plan view of the governor cap for the lower end of the wick tube. Fig. 24 is a side elevation of the lower end of the wick tube in a modified form. Fig. 25 is a vertical section thereof on the line *t t* of Fig. 24 together with the wick and governor plate or cap. Fig. 26 is a reverse plan view of the same. Fig. 27 is a central vertical section of the lower end of the wick tube and connected parts showing another modification. Fig. 28 is another modification of the said lower end.

A designates the font which in the main may be of any ordinary form but which I prefer to make in a special form at its junction with the collar 29 that receives the neck 30 of the burner. The said collar 29 is formed on the upper part of the junction 31 and the said junction inclines downwardly and outwardly from the lower end of the neck to the top 32 of the font A as shown in Fig. 1. The screw threaded neck 30 that carries the burner is no deeper, preferably not quite so deep, as the collar into which it fits. By this construction the vapor in the font which may arise from the liquid fuel therein will pass upwardly into the inner side of the neck where it may escape through the vent 33. The neck 30 is attached to the body of the wick tube 34 by means of an inner collar 35 as shown in Fig. 3 leaving a dead air space between the said wick tube and neck that extends down into the font below the said neck. The upper end of the wick tube is left open and the sides perforated as shown in Figs. 12, 13 and 14. The metal of the wick tube at the lower ends of the perforations 36 is bent inwardly in order to form the outwardly and downwardly inclined aprons 37 whose function will hereinafter be described. At a distance above the neck the wick tube is provided with a special collar 38 that fits the wick tube at its upper end while its larger lower end fits and fills the lower end of the generator 39 which covers the upper end of the wick tube down as far as the lower edge of the collar 38, leaving a dead air space surrounding the wick at the lower end of the generator. An asbestos disk 41 is placed

in the upper end of the generator above the upper end of the wick tube and a sheet of asbestos 42 surrounds the upper end of the wick tube and lines the interior of the generator from its upper end to a point near its lower end. A burner ring plate or support 43 is secured to the generator a little below the upper end thereof, the said plate being perforated, six of the perforations having the slugs which are cut therefrom turned upwardly to form shields 44 to prevent certain jets of flame hereinafter described from striking the side of the generator. The said plate has cut therefrom six lugs 45 which are turned upwardly as shown in Figs. 10 and 11 for the purpose of centering the said plate within the burner ring preparatory to securing the said ring thereon.

The general form of the burner ring is old. The lower part 46 of the burner ring is shown separately in Figs. 5, 8 and 9. It is provided with flanges 47 at its outer and inner upper edge by means of which the upper part 48 is secured thereto. At the junction of its bottom and inner vertical walls there is a beveled face 49 having small perforations 50 from which jets of flame extend downwardly and inwardly striking the priming pan when under full pressure. The inner vertical wall of the burner ring is also provided with a small perforation 84 just under the flange 47 and the metal at the said perforation is deflected slightly as shown in Fig. 9, so as to make the jet that issues therefrom extend tangentially against the side of the generator 39. The said lower part 46 of the burner ring is also provided with an opening 51, Fig. 5, for connection with the mixing tube 52. The upper part 48 of the burner ring is of the form shown in Figs. 4 and 6, the flanges 53 being formed to shut over the flanges 47 of the lower part and be clenched underneath the same.

The upper rounded wall of the part 48 is provided with radial slits 54 for flame jets and the outer ends of these slits terminate in a rounded enlargement 55, thereby forming key hole openings for feeding the main jets of flame. A baffle plate 56 is placed in the upper part of the burner ring preferably when the said part is bottom side up as shown in Fig. 4. This plate is of the form shown and its three corners rest on the flat portions just outside of the rounded top in which the key hole slots are formed. The lower part of the burner ring is then placed in position for securing, taking care to have the baffle plate directly above the opening 51 for the mixing tube. I prefer to form a small opening 57 in the baffle plate as shown in Fig. 4, so as to let some vapor from the mixing tube pass therethrough to the jet holes immediately above the baffle plate, the said opening being much less than the diameter of the mixing

tube. The burner ring is seated upon and secured to the burner ring plate 43, with the smaller jet holes in position to register with the six perforations from which the shields 44 extend so that the downwardly and inwardly inclined jets of flame will pass through the said perforations to the priming pan. An ordinary needle valve extends through the lower portion of the mixing tube 52 and communicates with the generator toward its lower end as shown in Fig. 3. The said valve 85 is provided with a port 58 at its upper side for communication with the mixing tube. The inlet openings 59 in the mixing tube are made triangular or heart shaped instead of the ordinary round form, one side of the triangle extending horizontally at the top. The lower end of the mixing tube is closed except for the drip pipe 60 that extends therefrom down through the neck 30 and into the font A. A priming pump 61, of any ordinary construction is attached to one side of the wick tube with its handle 62 extended upwardly through the neck 30 and with its delivery pipe 63 extended through the neck 30 and also through the priming pan 64 on the generator 39. The upper end of the delivery pipe 63 is beveled as best shown in Fig. 16, the lowest or shortest part being the nearest the generator so that the entire opening in the said end is open toward the generator. A vent 33 extends from a point within the neck 30 up through the burner ring as shown in Figs. 1 and 3. The lower end of the said vent is closed and just above the closed end the body of the vent is perforated as shown in Fig. 20 to receive the lateral branches 65. The said branches are formed of a tube curved as shown in Fig. 21 and provided with an opening 66 on its upper side as shown in Figs. 21 and 22, the said opening being about equal in area to the area of the body portion of the vent. The body and branches are secured together as shown and when mounted on the burner the branches lie within the neck as shown in Fig. 3. The wick tube 34 is filled by a wick 67 that preferably extends from end to end of the said tube. The lower end of the tube is provided with a cap 68 having a central perforation 69 and an inset bridge 70 above the said perforation. The said cap is also provided with projections 71 on its under side to insure a space for the liquid to flow under the cap to the central opening. The wick tube preferably extends down closely to the bottom 72 of the font A. If desired a valve port 73 may be made in one side of the wick tube at its base and a valve 74 provided for closing and opening the said port. As shown the said valve swings on a pintle 75 that is centered within the drip pipe for the mixing tube. It is held in its closed position by means of a spring 76 and may be

opened by the lever 77 and cam like blade 78, the said lever being pivoted in the neck 30 while the blade 78 lies between the valve and the wick tube. By moving the said lever the blade may be moved from the position shown in Figs. 17 and 18 to a position at a right angle thereto for forcing the swinging valve outwardly against the tension of its spring. The particular form of the valve and the means for opening and closing the same are not essential. If desired the port 73 and valve 74 may be omitted and a perforation 79 made in the inset bridge of the cap 68 and a small auxiliary wick 80 inserted therethrough the same extending below the cap on the outside and up into the main wick on the inner side of the said cap as shown in Fig. 27. Other modified forms and construction for the lower end of the wick tube and its appurtenances are shown in Figs. 24, 25, 26 and 28. In some of these figures the horizontal line at the lower part thereof indicates the bottom 72 of the font A. In Fig. 28 the wick 67<sup>a</sup> is made shorter than the wick tube so that no portion of the wick can reach the extreme lower end of the said tube. This will provide a gas collecting chamber for regulating or governing the supply as hereinafter explained. The wick tube may also be provided with a port 73 for a valve as in the construction first described. In Figs. 24, 25 and 26, I hold the wick up above the extreme lower end of the wick tube 34<sup>a</sup> by means of an internal cap 68<sup>a</sup>. Indentations 81 are made in the sides of the wick tube to form inward projections on the inner side for holding the cap 68<sup>a</sup>. This cap is perforated for the passage of liquid, provided with a handle 82 and notches 83 in its edge for passing the said projections inside of the indentations 81, for insertion and removal.

Upon filling the font the alcohol or liquid fuel passes up within the wick tube from under the cap 68. For starting the burner the priming pan is charged by means of the pump 61. The beveled upper end of the pump delivery tube permits the liquid to fall inwardly against the side of the generator and down into the priming pan while the highest point on the outer side of the said delivery tube prevents the liquid from falling outwardly beyond the said pan. The valve 85 is opened and the alcohol in the priming pan ignited to heat the generator. As vapor is generated therein it passes through the valve into the mixing tube and the combined gas and air passes from the mixing tube into the burner ring, and thence out through the several jet holes. That from the smaller jet holes in the beveled part of the burner ring is directed into the priming pan and on being ignited heats the generator for producing more gas. The jet

hole 84 discharges tangentially, tending to fill the space between the burner ring and the generator with gas above the burner ring plate which upon being ignited ignites the gas that issues from the jet slots in the top of the burner whereby the said burner is more readily ignited than it would be without the said jet hole 84. After the burner has been lighted the flame from the jet hole 84 mingles with that from the other jets so as to be hardly noticeable. The jets of flame from the holes 50 pass through the perforations in the burner ring plate from which the shields or guards 44 are bent. These and the other perforations in the said plate permit air to pass upwardly between the generator and the burner ring. The key hole shaped openings in the top of the burner ring provide for more flame at the outer part of the burner ring and tend to spread the flame outwardly in a better form and to a greater extent than does the ordinary form of straight slots without the circular enlargements. The baffle plate within the burner ring over the mixing tube tends to even up the flow from the said tube and distribute it so that the jet flames are substantially alike throughout the entire circle of the burner ring. The asbestos disk and lining within the generator serves as a heat insulator for the wick and prevents charring the wick while at the same time it permits both liquid and gas to circulate to a greater or less extent within the generator above and outside of the wick tube. The perforations in the upper part of the wick tube provide free communication between the wick tube and generator while the ring at the upper end of the wick tube and the bars between the perforations serve to separate slightly the wick and the surrounding asbestos. They also facilitate the insertion of the wick within the lining of the generator. While that portion of the wick tube which extends above the aprons 37 is desirable it is not essential. The aprons 37 have an important office. The cooler liquid passes upwardly at the central portion of the wick while the hotter portion is driven downwardly by the heat at the periphery of the wick. These inwardly extended aprons catch most of the down flowing liquid at the periphery of the wick and direct it outwardly and down into the narrow space at the bottom of the generator outside of the special collar 38 where it is vaporized. This enables the generator to be carried well down on the wick tube while the dead air space on the inner side of the special collar tends to insulate the heat from the wick tube and the upper part of the font. The heart shaped inlets of the mixing tube enable me to place them lower down so that there is less danger of fire within the said tube, and the air passes in a stronger current inwardly over the opening

59 of the valve. By supplying the closed end of the mixing tube with a drip pipe instead of an open trough there is no danger of igniting any of the fluid that may pass downwardly therethrough. A vent pipe extended from the top of the burner ring down into the font, is old and well known. The dividing of its lower end so as to afford two or more inlets smaller than the interior of the body is useful to guard against explosions. The gas that passes out of the vent when the burner is being used burns with the rest of the burner flame, and sometimes explodes and passes downwardly in the tube with more or less force. Without the branches it might or might not be forced downwardly into the font tending to explode the vapor therein. With the branches as herein shown, the vapor rises out of the font as readily as if the branches were not present. In case of an explosion within the body of the pipe its force is divided and reduced in volume so that there is no danger of igniting the vapor within the font as there would be were the force of the explosion not divided and broken up. In this connection it should be noted that the shape of the font, collar and neck is such that any ascending vapor within the font is directed to the branches of the vent within the said neck.

While the flames from the inwardly and downwardly directed jet holes in the burner ring impinge upon the priming pan and adjacent portion of the generator when operating under full pressure, if the valve is turned to partially shut off the supply for running the burner low, the flame from the said holes is drawn upwardly by the draft through the burner plate and would be liable to hit the generator at a point above the said plate thereby generating more gas when it is not wanted. In order to prevent such a result I employ the shields 44 to prevent the flame from striking the sides of the generator. These shields would serve exactly the same purpose if the smaller jet holes were directed squarely against the generator, instead of obliquely downward.

The cap 68 and its appurtenances at the lower end of the wick tube are designed for use when the burner is to be run low and constitute what I call a governor. There are a great variety of constructions that may be embodied in such a governor the main feature of which is a gas collecting space between the lower end of the wick and the entrance for the fluid into the lower end of the wick tube. Whenever the burner is in use with the valve fully open for burning high and the supply is partially cut off by partly closing the valve for burning low, there is necessarily an excess of gas within the generator which creates a back pressure in the wick tube, filling the lower part of the same

and expelling the liquid through the lower end of the wick tube into the font. In the main construction herein shown, when the liquid is thus forced out of the wick tube and is followed by gas passing into the font there will be no liquid beneath the bridge 70 and the under face of the font, hence the wick is separated or cut off from the liquid supply. As long as the said space is filled with gas no more liquid can be supplied to the wick. When the back pressure is removed or reduced sufficiently to let the liquid again flow into the wick tube through the perforation in the cap, the wick will be again supplied for burning as may be desired. When there is an excess of gas within the generator and wick tube, that supply is cut off by the governor so as not to generate more gas than is wanted for burning low. When the supply of gas is insufficient for burning low the gas will generally rise upwardly from the lower part of the wick tube and thereby let in a fresh supply of fuel. In order to get a quick supply for running the burner high, or in case a gas bubble should be caught in the lower end of the wick tube, the lever 77 may be operated to open the valve 74 and fill the wick tube with fuel. Instead of the valve the small auxiliary wick 71 may be employed to furnish a constant supply of fuel to the wick tube but in such a small quantity that it will not prevent the burner from being run low, neither will it generate so much gas as to over-heat the liquid in the font and thereby cause an explosion.

The operation of the governor shown in Figs. 24, 25 and 26 is substantially the same as that described for the first construction, independently of the valve 74, although the construction is different. In Fig. 28 the separation of the wick from the fuel supply or inlet is made by merely making the wick so short that no liquid can reach it when the lower end of the wick tube is filled with gas that expels the liquid therefrom. This form may be used either with or without the valve port and valve.

I claim as my invention:—

1. The combination of a wick tube, a generator mounted on the said wick tube and inclosing its upper end and side adjacent to the said upper end, a wick within the said tube having its side exposed to the interior of the generator, a valve communicating with the interior of the said wick tube and generator near the lower end of the latter, a mixing tube connected with the said valve, and a burner ring mounted on the said generator just below its upper end and connected with the said mixing tube.

2. The combination of a wick tube, a wick therein, a generator surrounding the said wick tube and wick and covering the upper ends thereof, and outwardly and downwardly inclined aprons on the wick tube and

resting against the periphery of the wick at a point above the lower end of the generator to direct the down flowing fuel from the wick into the generator.

5 3. The combination of a wick tube, a wick therein, a generator surrounding the said wick tube and wick and covering the upper ends thereof, and a heat insulator within the said generator and surrounding the said wick.

10 4. The combination of a wick tube, a wick therein, a generator inclosing the upper end and side of the said wick, an outwardly and downwardly inclined collar on the said wick tube and connecting it with the lower end of the generator whereby there is formed an insulating air space beneath the said collar and a narrow annular space at the bottom of the generator.

15 5. In a vapor lamp, the combination of a generator, a priming pan mounted on the said generator, and a burner ring mounted on the said generator above the said priming pan and having in addition to the flame openings at its top a series of flame openings at the junction of its inner and bottom walls above the said pan for directing the flames obliquely downward into the said pan.

20 6. The combination of a wick tube open at its upper end, a generator mounted on the said wick tube and inclosing its upper end and side adjacent to the said upper end, a priming pan mounted on the said generator, a valve communicating with the said generator near its lower end, a mixing tube connected with the said valve at a point below the said priming pan, a burner ring support mounted on the said generator just below its upper end, and a burner ring mounted on the said support and connected with the said mixing tube.

25 7. The combination of a wick tube and generator, a burner ring mounted on the same at its upper end, a mixing tube connecting the said generator and ring, and a drip pipe with its upper end in communication with the closed lower end of the said mixing tube and its lower end extended down through the neck of the burner for communication with a font.

30 8. In a vapor lamp, a burner ring having a beveled portion at the junction of its inner and bottom walls, flame openings in its top, and a series of downwardly and inwardly directed flame openings in said beveled portion for projecting the flame on the sides of the generator at a distance below the said ring while no flame is projected against the sides of the generator within said ring.

35 9. In a vapor lamp having in addition to the flame openings at the top a series of flame openings at its lower inner corner and a tangentially directed opening in its vertical wall and near the top for more read-

ily lighting the gas issuing from the flame openings at the top of the burner.

10. In a vapor lamp, a burner ring comprising two parts divided horizontally, the top wall of the upper part having flame openings and the bottom wall of the lower part having a hole for the end of a communicating mixing tube, and a substantially flat baffle plate placed between the said two parts of the said ring over the said hole and supported therein by portions of its edges entering the seam at the junction of the said two parts.

11. The combination of a font for liquid fuel, a burner therefor and a vent extended upwardly from within the said font, the vent within the said font having lateral branches smaller than the body of the said vent.

12. The combination of a generator, a perforated burner ring supporting plate, a burner ring mounted on the said plate and having inwardly directed jet holes and shields on the said plate that register with the said jet holes and shield the generator from the flame therefrom when the draft through the perforations in the supporting plate carries the flame upwardly by the sides of the generator.

13. In a vapor lamp, a priming pan, a pump, a delivery pipe for the pump extending vertically through the bottom of the pan, the upper end of the pipe having a bevel facing inwardly from the outer edge of the pan.

14. In a vapor lamp, the combination of a font, a wick tube mounted thereon and extended well down to the bottom of the font, a burner mounted on the said wick tube, a wick within the said tube for supplying the said burner with fuel, a cap on the lower end of the wick tube having a central fuel inlet and a bridge over the said inlet to hold the lower end of the said wick above the point where the fuel may flow into the wick tube.

15. In a vapor lamp, the combination of a font, a wick tube mounted thereon and extended well down to the bottom of the font, a generator, a burner mounted on the said wick tube, a valve for controlling the flow of gas from the said generator to the said burner, a wick within the said wick tube for supplying the said burner with fuel, and a fluid inlet at the base of the said wick tube, the lower end of the said wick tube having a separating chamber between the lower end of the wick and the said inlet within which chamber gas will collect and cut off the fuel supply when the valve is closed sufficiently to create back pressure in the said wick tube.

16. In a vapor lamp the combination of a font, a wick tube therefor extended well down to the bottom of the said font and

having a port in one side above the bottom, opening and closing the said port at the lower end of the wick tube.  
a burner mounted on the said wick tube, a wick for supplying fuel thereto, a fuel inlet at the base of the said wick tube below the said port therein, with the lower end of the said wick separated by a space between the said wick and inlet, and a valve for

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."