No. 885,263. PATENTED APR. 21, 1908.

H. G. LAYNG.

ALCOHOL GAS LAMP.

APPLICATION FILED FEB. 9, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

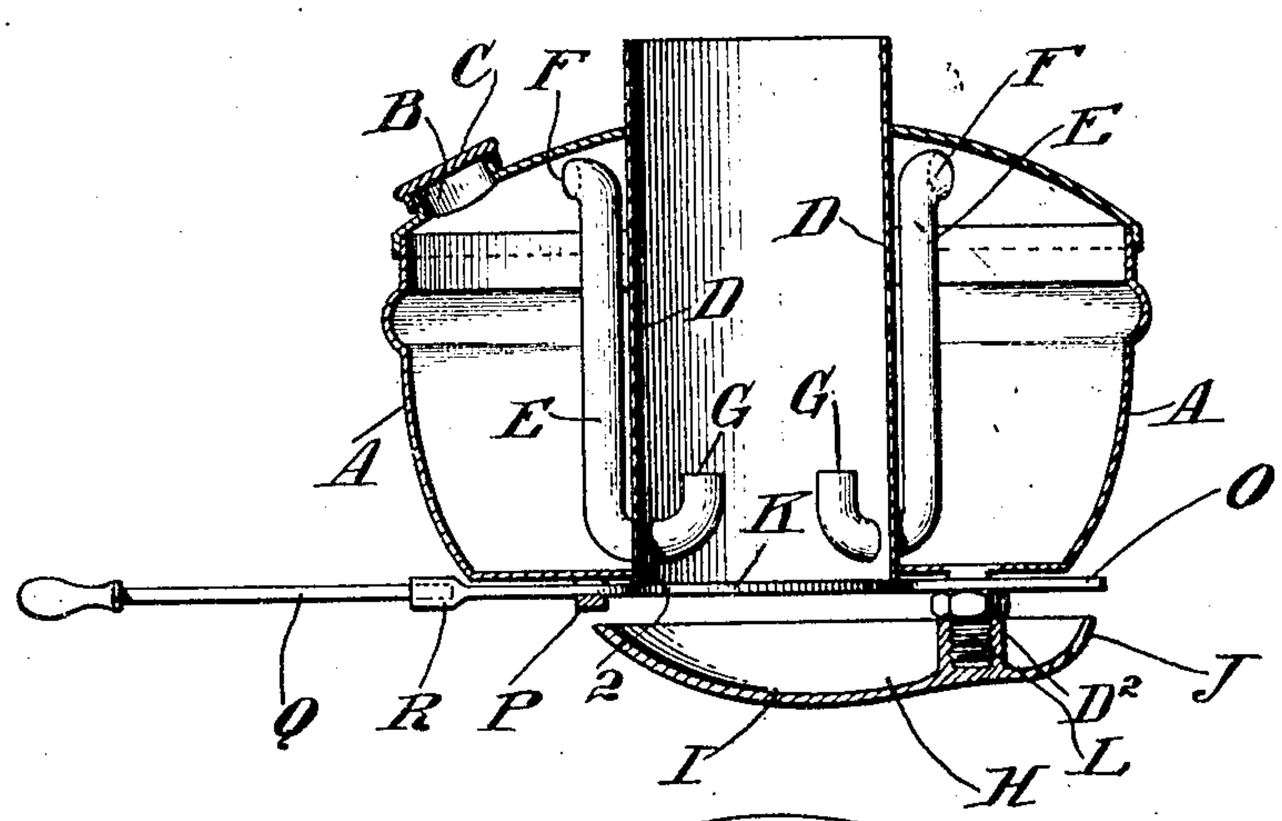
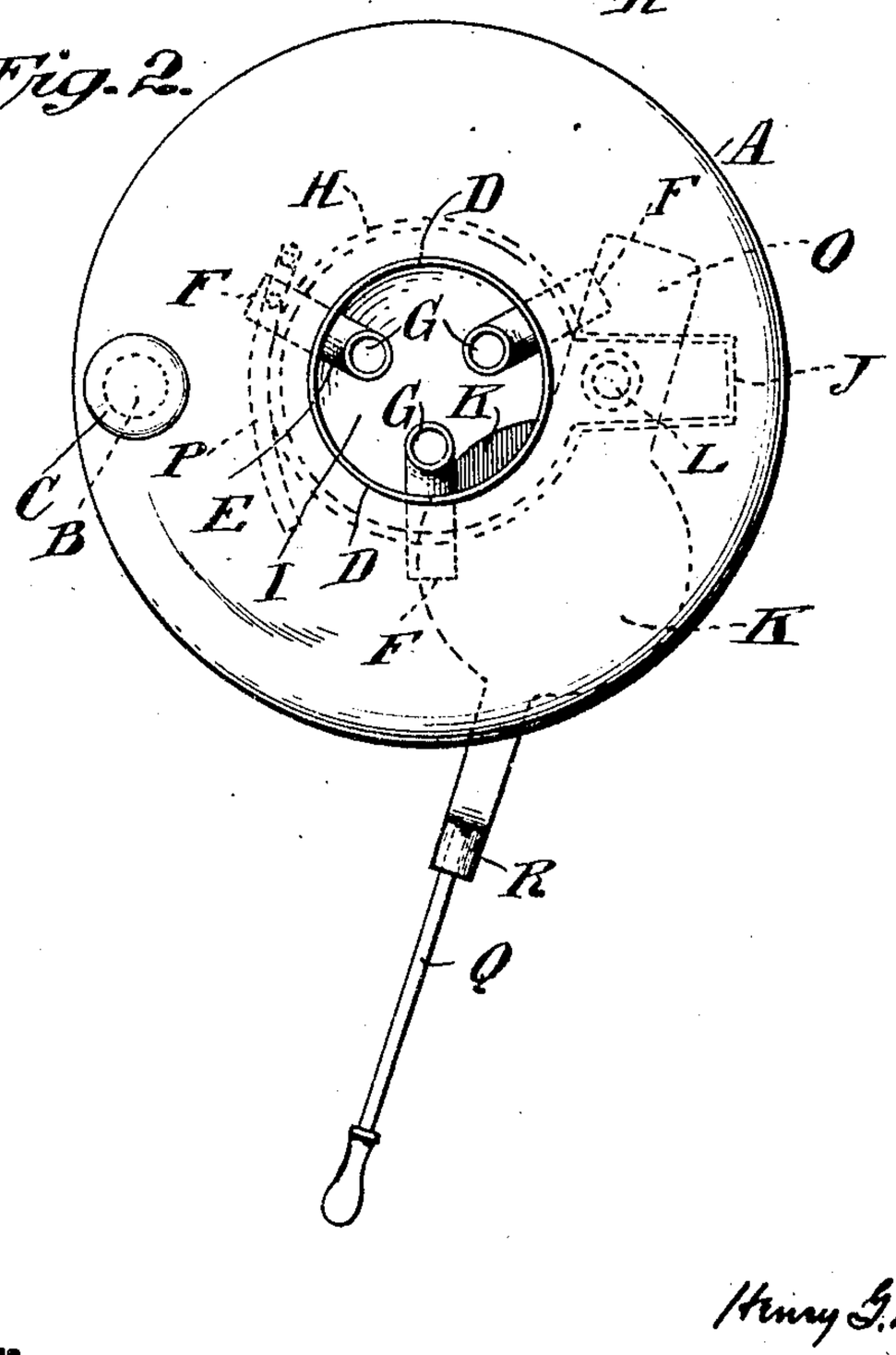


Fig. 2.



Attest:

E. Whitehead

A. L. O'Brien

Inventor:

Henry G. Layng

by Dickerson Brown Rayner & Brien

Attys

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2 SHEETS—SHEET 2.

Fig. 3

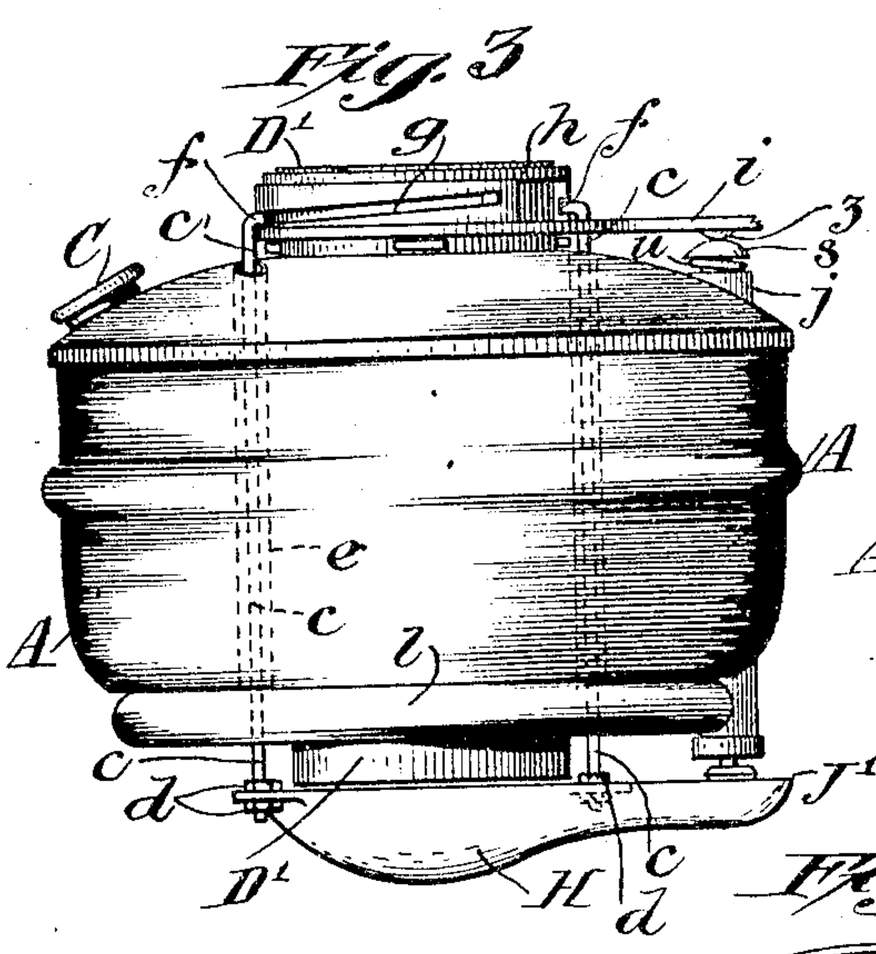


Fig. 4.

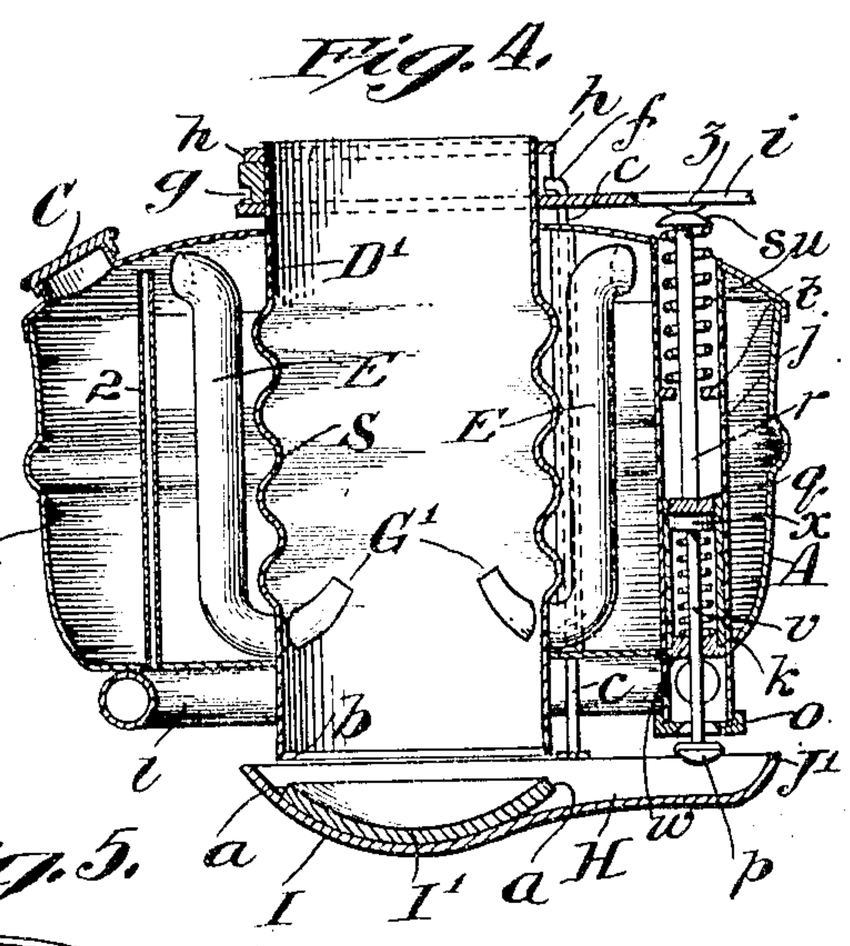
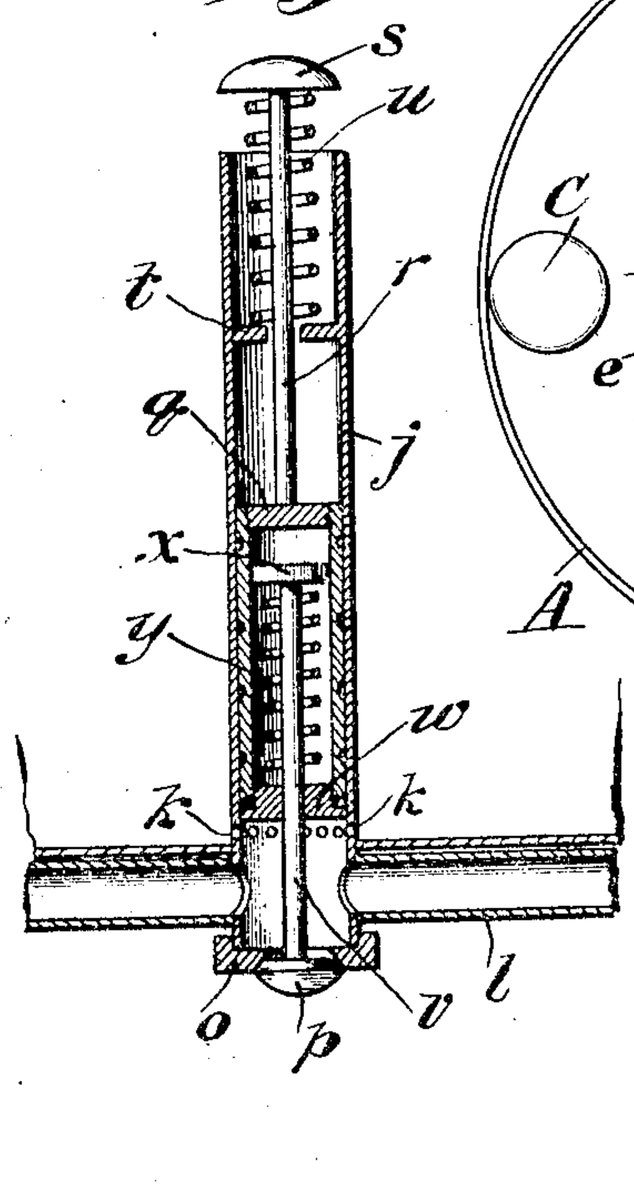


Fig. 5.

Fig. 6.



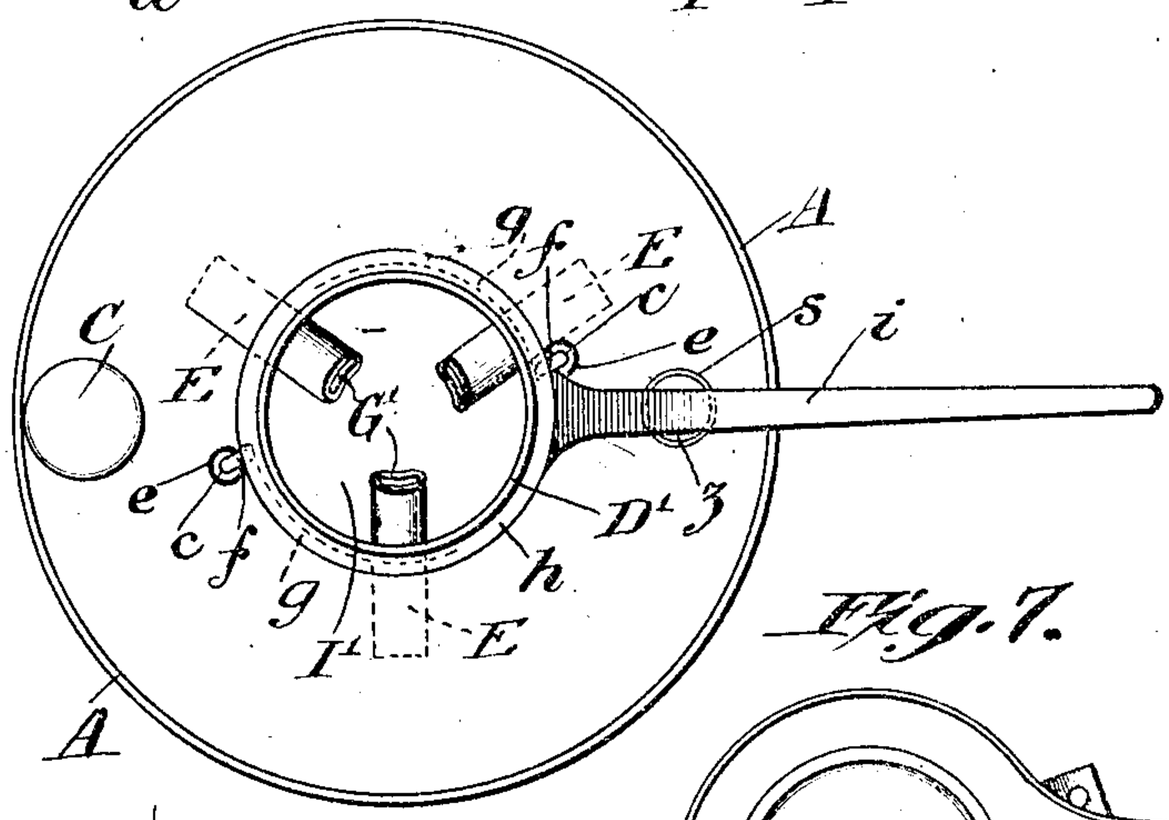
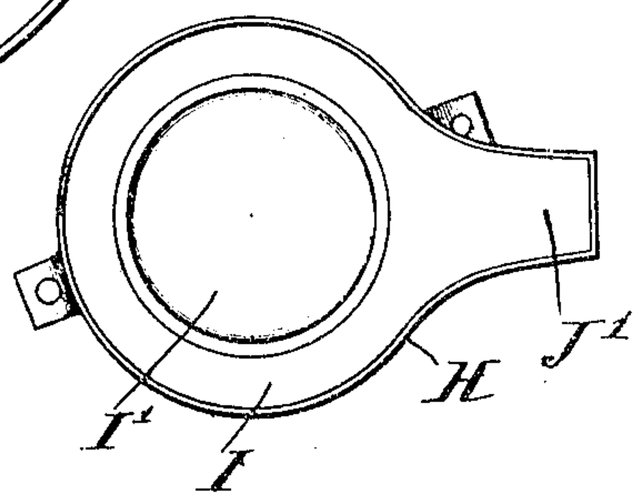


Fig. 7.



Attest:
C. D. Mitchell
A. L. O'Brien

Inventor:
Henry G. Layng
by Dickerson Brown Rawlins & Burns
Attys

UNITED STATES PATENT OFFICE.

HENRY G. LAYNG, OF NEW YORK, N. Y., ASSIGNOR TO JOHN TREADWELL, OF SAN FRANCISCO, CALIFORNIA.

ALCOHOL-GAS LAMP.

No. 885,263. Specification of Letters Patent. Patented April 21, 1908.

Application filed February 9, 1907. Serial No. 356,542.

To all whom it may concern:

Be it known that I, HENRY G. LAYNG, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Alcohol-Gas Lamps, of which the following is a specification, accompanied by drawings.

This invention relates to gas lamps, more particularly to alcohol gas lamps, and the objects of the invention are to produce a wickless, springless, valveless alcohol gas lamp, which can be lighted and operates automatically thereafter until the full volume of flame is produced, which flame can then be regulated by hand.

Another object of the invention is to produce a non-explosive lamp, and one which will burn denatured alcohol, any liquid which contains alcohol, or any liquid which can be gasified.

Further objects of the invention will hereinafter appear and to these ends the invention consists of an alcohol gas lamp for carrying out the above objects embodying the features of construction, combinations of elements and arrangement of parts having the general mode of operation substantially as hereinafter fully described and claimed in this specification and shown in the accompanying drawings, in which,—

Figure 1 is a vertical sectional view of a simple form of lamp embodying the invention; Fig. 2 is a top plan view of the same; Fig. 3 is a side view of a modified form of lamp; Fig. 4 is a vertical sectional view of Fig. 3; Fig. 5 is a top plan view; Fig. 6 is an enlarged detail vertical sectional view of the charging valve; Fig. 7 is a detail plan view of the lower air valve and spoon.

Referring to the drawings, A represents the body of the lamp, which may be of any suitable construction to form a reservoir, provided with the inlet opening B, having the removable cap C, preferably screw-threaded. A combustion chamber D, made of suitable metal, preferably copper extends vertically through the central portion of the body A, and is open to atmospheric air at both top and bottom. Gas pipes E, of which there may be any desired number, in this instance three being shown, are arranged to connect the dome of the alcohol chamber with the lower portion of the open combustion chamber, and as shown extend through apertures in the lower portion of said chamber. These gas pipes E have open upper ends F, while the lower ends G are also open and preferably extend upwardly to induce an upward draft for the gas. The openings G are of such form and size that the amount of gas consumed may be predetermined.

Suitably secured below the combustion chamber D on a pivot D^2 is a primary charging spoon H having a bowl I and provided with the lip J which forms a convenient means of lighting the necessary amount of alcohol contained in the bowl I to start the lamp in operation. As shown, there is a substantial space between the upper edge of the spoon H and the lower edge of the combustion chamber to afford draft room for the air to support combustion.

Means are provided for controlling the amount of air supplied for combustion, and preferably this same means is utilized to control the filling and lighting of the combustible in the spoon H. As shown, an air slide gate K in the form of a disk is pivoted on the stud L extending downwardly from the body portion A of the lamp, and this gate is, in this instance, provided with an extension O, which is adapted to lie over and cover the lip J of the spoon H when the gate entirely closes the lower end of the combustion chamber D. A suitable guide lip P is provided to support one end of the gate and permit it to slide back and forth beneath the combustion chamber D, but still be maintained tightly against the lower edge of the combustion chamber 2. Preferably a handle Q of wood or other suitable non-conducting material is provided adapted to be attached to and detached from the gate K as by means of a screw-threaded socket.

To start the lamp in operation, the body portion is first filled with alcohol, preferably up to the level of the bottom of the filling screw C, and it will be seen that the upper openings F of the gas pipes E are located in the dome of the lamp where the gas would be formed, and above the normal level of the liquid. The gate K is then moved into the position shown in Fig. 2 to open the lip J, and a small quantity of alcohol is poured into the bowl I of the spoon H through the lip J, filling the lip J and the body I with liquid, to which a match is then touched to ignite the liquid. Or else the spoon may be swung outward on its pivot and filled, then

swung back and ignited. The draft through the combustion tube D carries the flaming liquid upwardly, warming the sides of the combustion chamber and the exposed ends of the gas tubes, which causes the liquid in the body A of the lamp to give off gas. This gas collects in the dome of the body portion A and passes downwardly through the gas pipes E, and upwardly out through the openings G, where it is ignited by the flames which cause the gasification. The lamp then continues to burn and the flame increases until the full volume of flame is reached, which flame continues to heat the walls D of the combustion chamber, and the action is automatic thereafter. The combustion largely depends upon the amount of air admitted to the lower portion of the combustion chamber, and this may be controlled by the operation of the gate K.

When the valve K is entirely closed and no volume of air is admitted through the lower portion of the combustion chamber, the flame from the tubes E will burn very low, but may be maintained by the air passing down from the top of the combustion chamber. The flame will be so small, however, that there will not be sufficient heat generated to continue gasifying the liquid in the body A of the lamp unless this liquid is of a very gaseous nature. By admitting the desired volume of air to the lower portion of the combustion chamber, the desired amount of combustion may be obtained to make a thorough and economical mixture of air and gas. This lamp is non-explosive because there are no valves to shut off communication from the interior of the lamp to the outside atmosphere, and the dome of the chamber A is always open to atmospheric air via the gas tubes.

The projection O on the gate K serves the purpose of preventing the filling of the spoon H or the lighting of the liquid in the spoon and lip J when the gate K is closed. In order to pour liquid into the spoon and light it, the gate must be opened which is the normal position for the gate during the operation of the lamp. According to this device, if the spoon is not swung on its pivot, it cannot be filled or lighted unless the gate is opened and thus accidents are avoided.

In Figs. 3, 4, 5, 6 and 7, a modification of the invention is shown, in which automatic means are provided for placing a charge of combustible in the starting spoon H, and other features are shown in this modification which will be described. The body A of the lamp is provided, as in Figs. 1 and 2, with a central combustion chamber D', which in this instance is preferably constructed with a corrugated portion S, which increases the radiation surface and permits freer expansion and contraction in the walls. The gas pipes E in this instance, are provided with lower openings G' which are preferably in the form of slots of suitable size, having one longer dimension so that the flame is seated closer to the burner orifices. Any other suitable form of burner tip may be used for these ends to form flames of different characters and to obtain the combustion at the proper height in the combustion chamber to have the best gasifying effect on the liquid in the body portion A.

According to this modification I prefer to utilize the spoon H to control the volume of air supplied to the combustion chamber through the lower end, and in this instance the spoon H is provided as before with the filling lip J', which in this instance is made of sufficient depth to allow vertical movement of the spoon without interfering with the charging valve. The body portion I of the spoon is preferably provided with a thickened cup shaped disk I', having beveled edges *a* properly ground to fit the beveled lower edge *b* of the combustion tube D'. The spoon H is hung, as shown, on the rods *c* which are suitably connected to the spoon, in this instance with adjustable nuts *d*, although any other desired means may be provided for this purpose. The rods *c* extend upwardly through sleeves *e*, which extend through the body A of the lamp and are open at both ends, but tightly secured to the top and bottom of the body A. The upper ends of the rod *c* are bent at an angle to form hooks *f*. These bent ends *f* or the rollers if provided are adapted to travel in the ring cam *g*, which is provided on or in the ring *h*, which encircles the upper end of the combustion tube D' and is provided with an operating handle *i*, by means of which a ring *h* may be rotated. The cam *g* is provided with high and low portions so that as the ring *h* is rotated the rods move up and down and move the spoon H vertically to or from the lower opening of the combustion tube D'. By this means the closing spoon H is controlled from the top of the lamp and the thickened portion I' may be held tightly against the lower portion of the tube D' to entirely shut off the air.

Automatic means are provided for charging the spoon with substantially the exact quantity of liquid necessary to start the lamp in operation. According to the present construction a tube *j* is provided extending through the body portion A of the lamp and secured tightly to the top and bottom walls. This tube is provided with a number of small holes *k* which communicate with the interior of the body A, and permit the liquid in said body to pass into the tube. Communicating with the lower end of the tube *j* is a charging tube *l*, in this instance shown located beneath the body portion A and encircling the combustion tube D', although this charging tube *l* may be located in any desired posi-

tion. The lower end of the tube *j* is provided with a valve seat *o* having a valve opening with which the valve *p* coöperates. Within the tube *j* is the main piston *q* in the form of a cylinder connected to the piston rod *r* extending upwardly through the tube *j* and provided with a button *s* at its upper end. Between said button and the shoulder *t* in the tube *j* is provided a compression spring *u* which normally holds the piston *q* in raised position to permit the liquid to pass from the body of the lamp through the apertures *k* into the charging tube. The piston *q* is preferably provided with packing rings to form a gas tight piston. The valve *p* is connected to the rod *v* which extends through a gland *w* in the lower end of the piston *q* and is provided with a head *x*, between which head and the lower end of the piston *q* is arranged a compression spring *y* which normally maintains the valve *p* closed. Means are provided for operating the charging valve automatically by means of the handle *i*, and as shown, said handle is provided with a button *z* adapted to coöperate with the button *s*.

In the operation of the device when the handle *i* is turned into position to bring the button *z* over the button *s*, the piston *q* is forced down, closing the apertures *k*. The further downward movement of the piston forces the head *q* downward, thereby opening the valve *p* and permitting the contents of the tube *l* to flow into the spoon. A suitable vent is provided for the charging pipe *l* in order to permit the liquid to flow into and out of said pipe and to take care of any gas which may be generated in the pipe, due to the heat in the operation of the lamp and in this instance a vent pipe 2 is provided communicating with the tube *l* and with the dome of the lamp inside of the top.

When the handle *i* is moved away from the button *s* the springs restore the mechanism to normal position, thereby closing the valve *p* and opening the aperture *k* to permit another charge of liquid to flow into the charging tube *l*. The movement of the lever away from the button *s* also tends to move the spoon H upward, due to the travel of the upper ends of the rods *c* from the low to the high portions of the cam *g*. When the charge in the spoon H is lighted, the walls of the combustion chamber are heated sufficiently to gasify some of the liquid in the body A, and the gas flows down through the gas tubes E and is ignited at the orifices G′, after which the operation of the lamp is automatic as before described. By continuing the movement of the handle *i*, thereby rotating the ring *h* and cam *g*, the spoon is raised vertically and the gate valve therein gradually closes the lower opening of the combustion tube D′, shutting off the air from the combustion chamber as in Figs. 1 and 2.

Obviously some features of this invention may be used without others, and the invention may be embodied in varying forms.

Without enumerating equivalents, I claim and desire to obtain by Letters Patent the following:

1. A gas lamp having a liquid reservoir, a vertically extending combustion chamber communicating with the reservoir and open at both ends, means for continuously gasifying the liquid in the reservoir by heat generated throughout the entire height of the combustion chamber, and an independent starting receptacle located below the lower open end of the combustion chamber for initially heating the walls of the combustion chamber to start the operation of the lamp.

2. A gas lamp having a liquid reservoir, a combustion chamber inclosed by the reservoir and extending vertically throughout the height of the body of the lamp; said combustion chamber communicating with the reservoir, a starting receptacle located beneath the combustion chamber, and means for opening and closing the same adapted to prevent the filling and igniting of the starting receptacle unless said receptacle is open.

3. A gas lamp having a liquid reservoir, a combustion chamber inclosed by the reservoir and extending vertically throughout the height of the body of the lamp, said combustion chamber communicating with the reservoir, a starting receptacle located beneath the combustion chamber, and means for automatically supplying substantially fixed charges of combustible to said starting receptacle.

4. A gas lamp having a liquid reservoir, a combustion chamber communicating therewith, a starting receptacle located beneath the combustion chamber, means for supplying substantially fixed charges of combustible to said charging receptacle, and means for adjusting the starting receptacle to control the amount of air supplied to said combustion chamber.

5. A gas lamp having a liquid reservoir, a combustion chamber communicating with the reservoir, a starting receptacle located beneath the combustion chamber and means for raising and lowering said receptacle to control the amount of air supplied to the combustion chamber.

6. A gas lamp having a liquid reservoir in the body of the lamp, a central combustion chamber surrounded by said reservoir and extending vertically throughout the height of said body, said chamber communicating with the reservoir, a starting and air regulating device located beneath the combustion chamber, and means for adjusting said device to control the amount of air supplied to the combustion chamber.

7. A gas lamp having a liquid reservoir in

the body of the same, a central open ended combustion chamber surrounded by the reservoir and extending throughout the height of the lamp body, communicating means leading from the top or dome portion of the reservoir to the lower portion of the combustion chamber, a starting and air regulating device located beneath the lower open end of the combustion chamber, and means for adjusting said device to control the amount of air supplied to said chamber.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY G. LAYNG.

Witnesses:

OLIN A. FOSTER,

A. L. O'BRIEN.