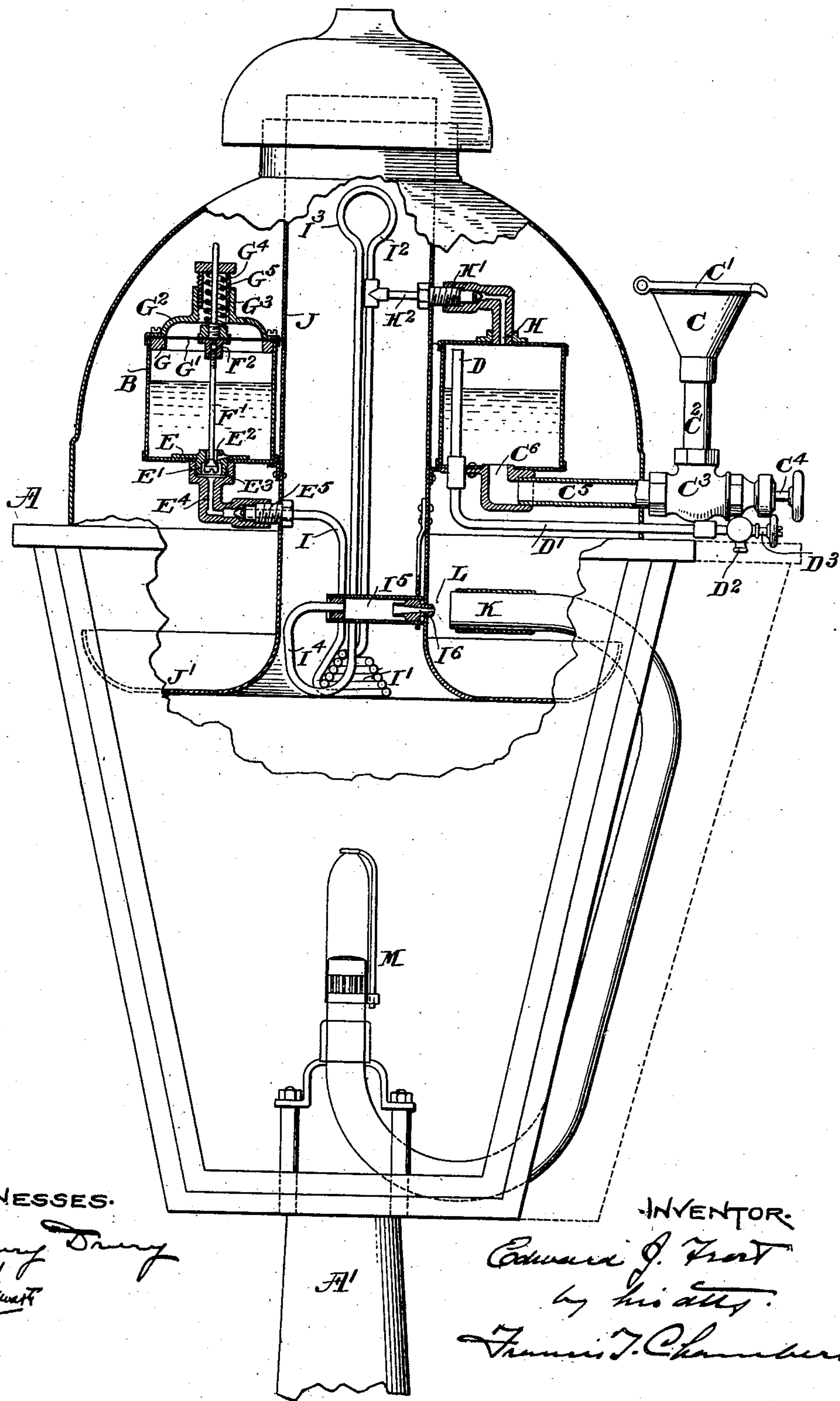


No. 713,295.

Patented Nov. 11, 1902.

E. J. FROST.
VAPOR BURNING LAMP.
(Application filed June 26, 1900.)

(No Model.)



•WITNESSES.

Henry Drury
J. H. K. H.

INVENTOR.

Edward J. Frost
by his atty.
Francis T. Chambers

UNITED STATES PATENT OFFICE.

EDWARD J. FROST, OF PHILADELPHIA, PENNSYLVANIA.

VAPOR-BURNING LAMP.

SPECIFICATION forming part of Letters Patent No. 713,295, dated November 11, 1902.

Application filed June 26, 1900. Serial No. 21,598. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. FROST, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Vapor-Burning Lamps, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to vapor-burning lamps, and has for its object to provide a lamp of this general character which will be self-regulating, of great simplicity of construction and operation, and in which effective precautions are taken against the flow of oil from the lamp, with its well-understood dangers.

The nature of my improvements will be best understood as described in connection with the drawing in which they are illustrated, the figure showing the lamp as a whole inside elevation and partly in vertical section.

A indicates the lantern, supported on a standard A'; B, an oil-tank, which is preferably made of the annular form shown, and for the best results should be so situated as not to be heated to any material degree by the products of combustion from the burner. Thus, as shown, it surrounds, but is not in contact with, the chimney J, through which the products of combustion pass.

C indicates a funnel for filling the lamp, which is conveniently situated outside of the lantern proper and at a level higher than the oil-level in the tank.

C' indicates a lid for the funnel; C², a pipe leading through the valve-chamber C³, through the pipe C⁵, and thence to the opening C⁶ in the bottom of the tank.

C⁴ indicates a valve by which the connection between the pipe C² and C⁵ is opened in filling and closed at other times.

D indicates a pipe extending through the bottom of the tank and opening near the top, its lower end being connected through a pipe D' with an escape-nozzle D², which is opened and closed by a valve, as indicated at D³. This device is for the purpose of allowing air to escape in filling the tank and also of allowing high-pressure vapors to escape from the

top of the tank, but in the normal operation of my lamp in its best form will be infrequently, if at all, used in this way.

E represents a perforated flange-casting secured to and opening through the bottom of the tank B and having on its under side an externally-threaded extension E', E² indicating the perforation and having, as shown, a valve-seat on its under side.

E³ is an internally-threaded annulus screwing on the threaded extension E' and connecting through the conduit E⁴ with a joint E⁵, by which it is coupled to the vaporizing-tube I.

F indicates the valve secured on the end of a spindle F', having a threaded end screwing into an internally-threaded button (indicated at F²) fastened to the under side of the diaphragm G'.

Immediately above the perforated flanged casting E the top of the tank is cut away in circular form and an annular casting G seated therein, secured between which and a cap-casting G² is the diaphragm, (indicated at G'.) The cap G² is provided with a threaded perforated sleeve, (indicated at G³,) into which screws a cap G⁴, between which and the diaphragm G' is secured a spring G⁵, said spring being adjustable in tension by means of the screw-cap G⁴.

H indicates a pipe leading into the top of the tank B and connected by means of a joint H' with a pipe H', which connects in turn with the vaporizer, as will be described.

J is the chimney, which is preferably made, as shown, with an annular outwardly-extending flange J', arranged to act as a reflector for the light.

I is the vaporizing-tube, which is connected with the end of the conduit E⁴ by means of the joint E⁵ and extending down from thence is formed into a coil, as indicated at I', thence extending upwardly through the chimney to a point above the oil-level in the tank B, then downwardly, its end I⁴ connecting to a horizontal chamber I⁵, also situated in the chimney and in the end of which is the nozzle I⁶.

I² and I³ indicate, respectively, the rising and falling portions of the vaporizing-pipe situated above the oil-level.

It will be noticed that the pipe H² connect-

ing with the top of the tank connects also with the rising portion I² of the vaporizing-tube.

K indicates the pipe leading to the burner M. Its open end lies directly opposite to the nozzle I⁶, with a space L intervening, through which air is drawn into the pipe K in admixture with oil-vapor issuing under pressure from the nozzle.

It will be clearly apparent, especially when the function of the diaphragm G' is explained, that the placing of this diaphragm in direct connection with the tank B is not of the essence of my invention and that it can be situated in any chamber where it is exposed to the pressure of the vapor in the vaporizing-tube and from which its motion can be communicated to the regulating-valve F.

In operation the tank B is filled to the required height by pouring in the oil through the funnel C, the valve C¹ being retracted during the filling and after filling being closed.

In practice the lower portions of the vaporizer—to wit, the coiled portion I' and the terminal chamber I⁵—will always prior to use contain a certain amount of oil. In starting the burner a torch is placed in the lantern, so that the flame will come in contact with the vaporizer and rise through the chimney K, the result being the immediate vaporization of the oil contained in the vaporizer, which will at once cause the vapor to issue under pressure from the nozzle I⁶ and supply the necessary mixture of vapor and air to the burner and will also create a pressure in the vaporizer which is communicated through the pipes H² and H to the upper part of the tank B, acting both to increase the pressure on the surface of the oil and also to push the diaphragm G' upward or in the opposite direction to that in which it is pushed by the spring G⁵, the spring when unopposed or insufficiently opposed holding the valve F open, so that the oil can always flow through it into the vaporizing-tube and to a height not greater than the level of the oil in the tank. As the pressure in the tank increases the valve is drawn closer to its seat, constantly restricting the orifice through which the oil issues or entirely closing it if the pressure is sufficiently great, though obviously the general effect of the apparatus will be to establish and maintain a mean adjustment at which just sufficient oil will be permitted to escape into the vaporizer to insure a practically constant pressure of vapor therein.

By placing the connecting-pipe H² on the rising side of the upward extension of the vaporizer it will be evident that any oil contained in the vaporizing-pipe at starting and which would be forced up by the generation of vapor in the coil I' will be trapped off at this point and permitted to flow back into the tank B, so that only vapor will pass to the descending portion of the vaporizing-pipe. Again, any oil which may condense in the

lower part of the descending pipe after the burner is extinguished will be trapped in the chamber I⁵ and not issue through the nozzle I⁶ until it is again vaporized either by the torch applied in starting or by the subsequent heat of the burner.

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

1. In a vapor-burning lamp, an oil-tank, a vaporizer connected to receive oil therefrom and having an intermediate portion rising above the level of the oil in the tank, and a burner arranged to be fed by vapor from said vaporizer and to heat the vaporizer, said burner being connected with the vaporizer on the delivery side of the intermediate portion aforesaid, in combination with a regulating-valve exterior to the vaporizer controlling the flow of oil from the tank into the vaporizer, a regulator for said valve controlled by the varying pressure of vapor in the vaporizer for moving the valve to increase the flow as said pressure falls and to diminish said flow as the pressure increases, and a connection from the rising side of the intermediate portion of the vaporizer-tube to the upper part of the tank above the oil-level therein.

2. In a vapor-burning lamp, an oil-tank, an oil-vaporizer connected to receive oil from the tank and a burner fed by vapor from said vaporizer and arranged to heat said vaporizer, in combination with a regulating-valve governing the flow of oil from the tank into the vaporizer, a regulator for moving said valve to increase the flow as the pressure in the tank falls and to diminish the flow as the tank-pressure increases and a connection from the vaporizer to the tank whereby the pressure of vapor in said vaporizer is communicated to the tank.

3. In a vapor-burning lamp, an oil-tank, an oil-vaporizer connected to receive oil from the tank and a burner fed by vapor from said vaporizer and arranged to heat said vaporizer but not the tank, in combination with a regulating-valve governing the flow of oil from the tank into the vaporizer, a regulator for moving said valve to increase the flow as the pressure in the tank falls and to diminish the flow as the tank-pressure increases and a connection from the vaporizer to the tank whereby the pressure of vapor in said vaporizer is communicated to the tank.

4. In a vapor-burning lamp, an oil-tank in combination with a vaporizer-tube connected at one end to the lower part of the tank and having an intermediate portion rising above the oil-level in the tank, a burner fed by vapor from the vaporizer and arranged to heat it, a regulating-valve governing the flow of oil from the tank into the vaporizer, a regulator for moving the valve to increase the flow of oil as the pressure in the tank falls and to decrease the flow as the pressure increases, and a connection between the rising portion of the vaporizing-tube where it extends above

the oil-level in the tank and the upper part of the tank whereby the pressure in the vaporizer is communicated to the tank and a conduit afforded for oil to flow from the vaporizer into the tank.

5 5. In a vapor-burning lamp, an oil-supply tank, in combination with a vaporizing-tube connected at one end to the lower part of the tank and having an intermediate portion ris-
10 ing above the oil-level in the tank, an oil-chamber situated at the end of the tube, a nozzle for the exit of vapors connected with the vaporizing-tube through said oil-chamber, and a burner fed by the vaporizer-noz-
15 zle and arranged to heat the vaporizer and the oil-chamber adjacent to the nozzle.

6. In a vapor-burning lamp, an oil-supply

tank in combination with a vaporizing-tube connected at one end to the lower part of the tank and having an intermediate portion ris- 20
ing above the oil-level in the tank, a tube connecting the rising portion of the vaporizing-tube at a point above the oil-level with the upper part of the oil-tank, an oil-chamber situated at the end of the tube, a nozzle for 25
the exit of vapors connected with the vaporizing-tube through said oil-chamber, and a burner fed by the vaporizer-nozzle and arranged to heat the vaporizer and the oil-chamber adjacent to the nozzle.

EDWARD J. FROST.

Witnesses:

H. G. HART,

D. STEWART.