(No Model.) 3 Sheets—Sheet 1.

O. W. BENNETT.

CARBURETING LAMP.

No. 378,647. Patented Feb. 28, 1888.

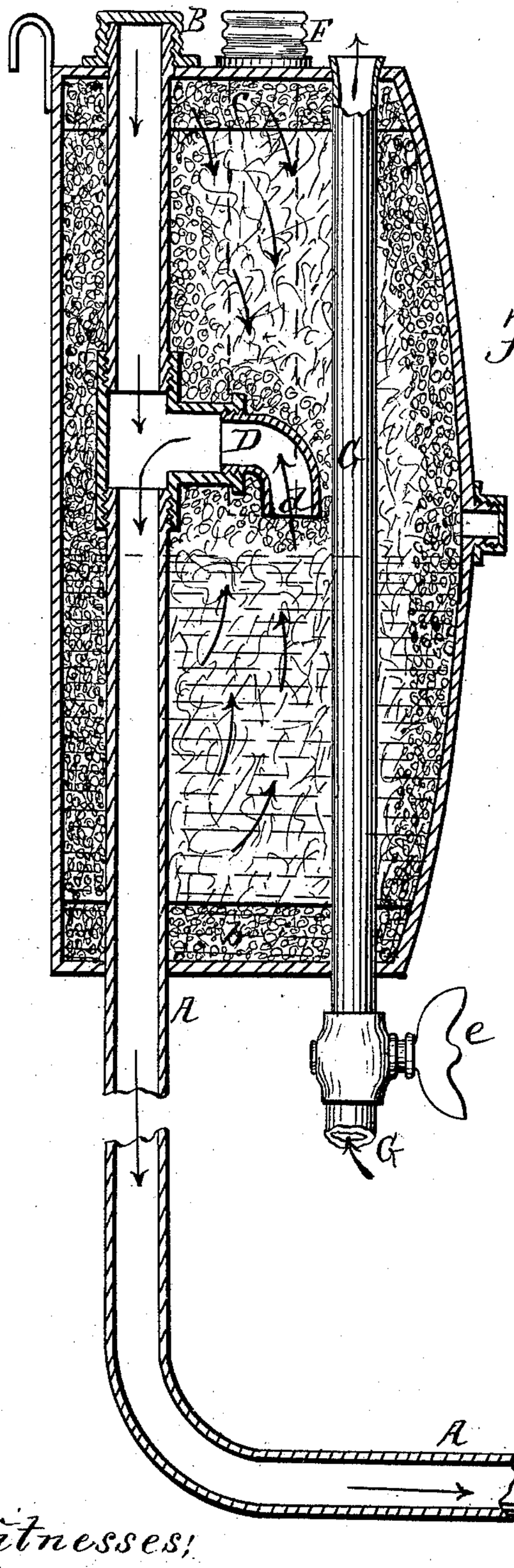
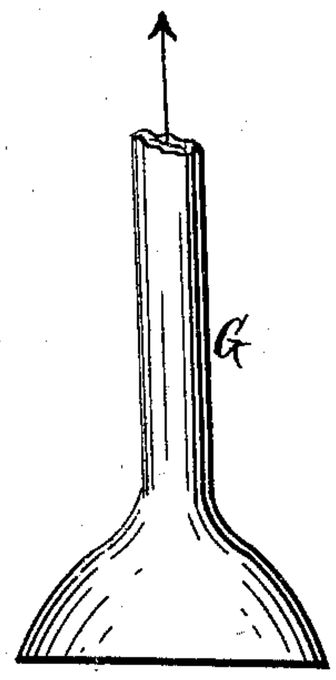
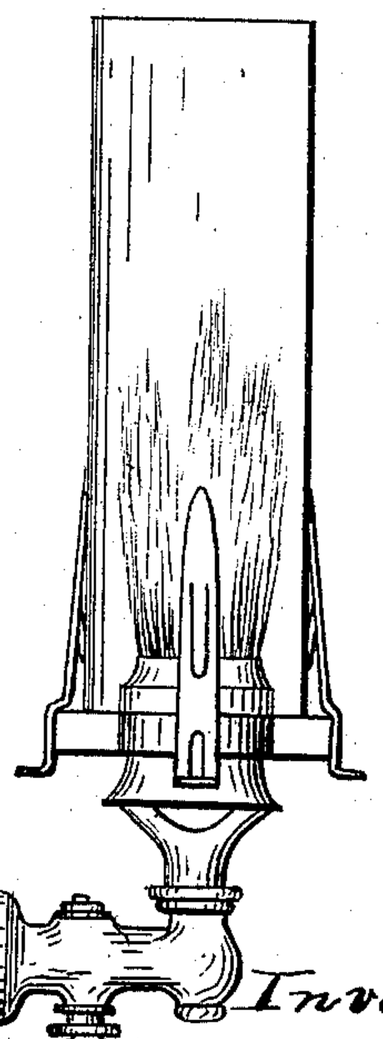


Fig. 1.





Witnesses!
Ella S. Johnson.
Wm. E. Mackrille.

Inventor.
O. W. Bennett
By Johnson and Johnson
his Attorneys.

(No Model.)

3 Sheets—Sheet 2.

O. W. BENNETT.

CARBURETING LAMP.

No. 378,647. Patented Feb. 28, 1888.

Fig. 2

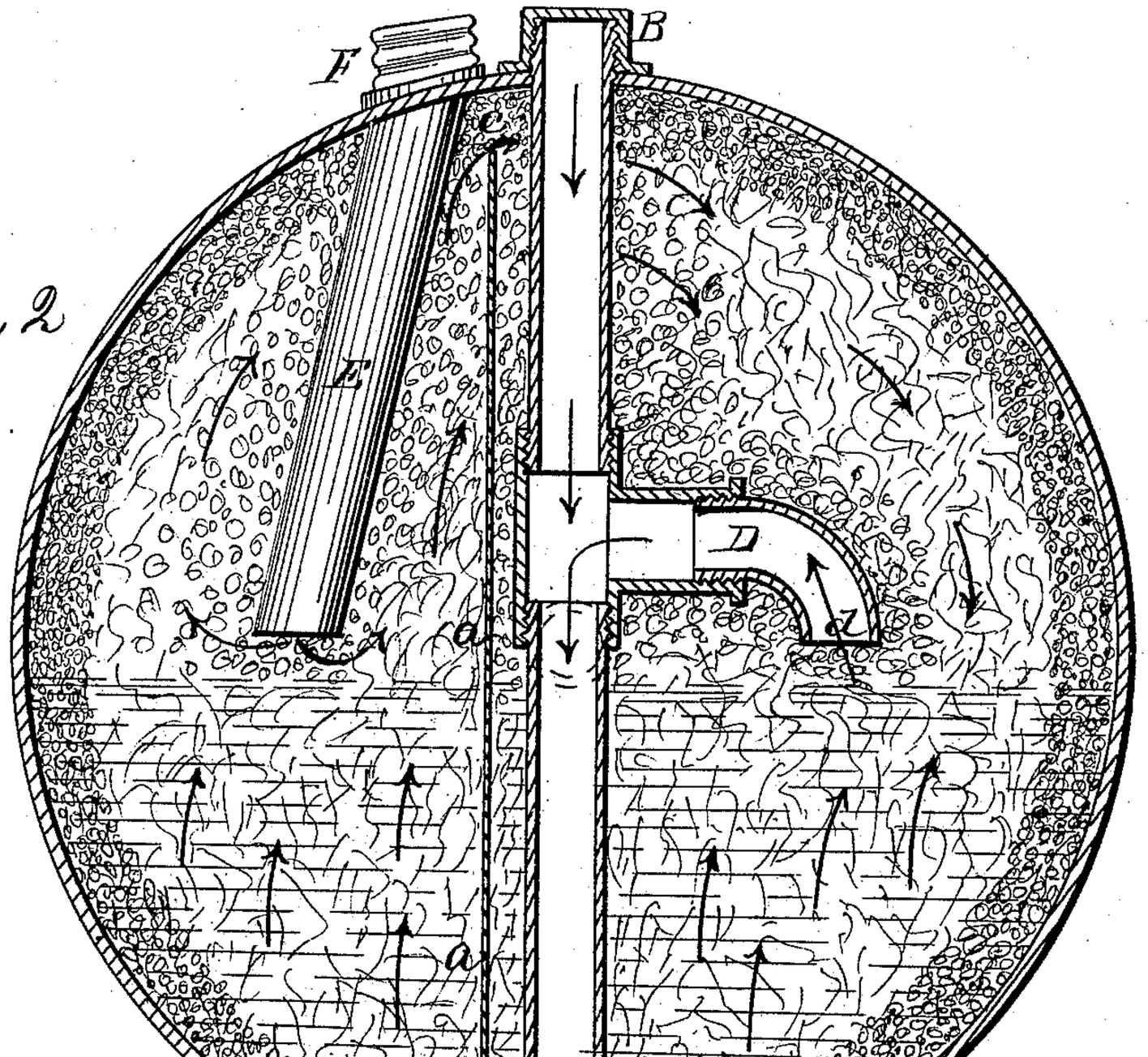
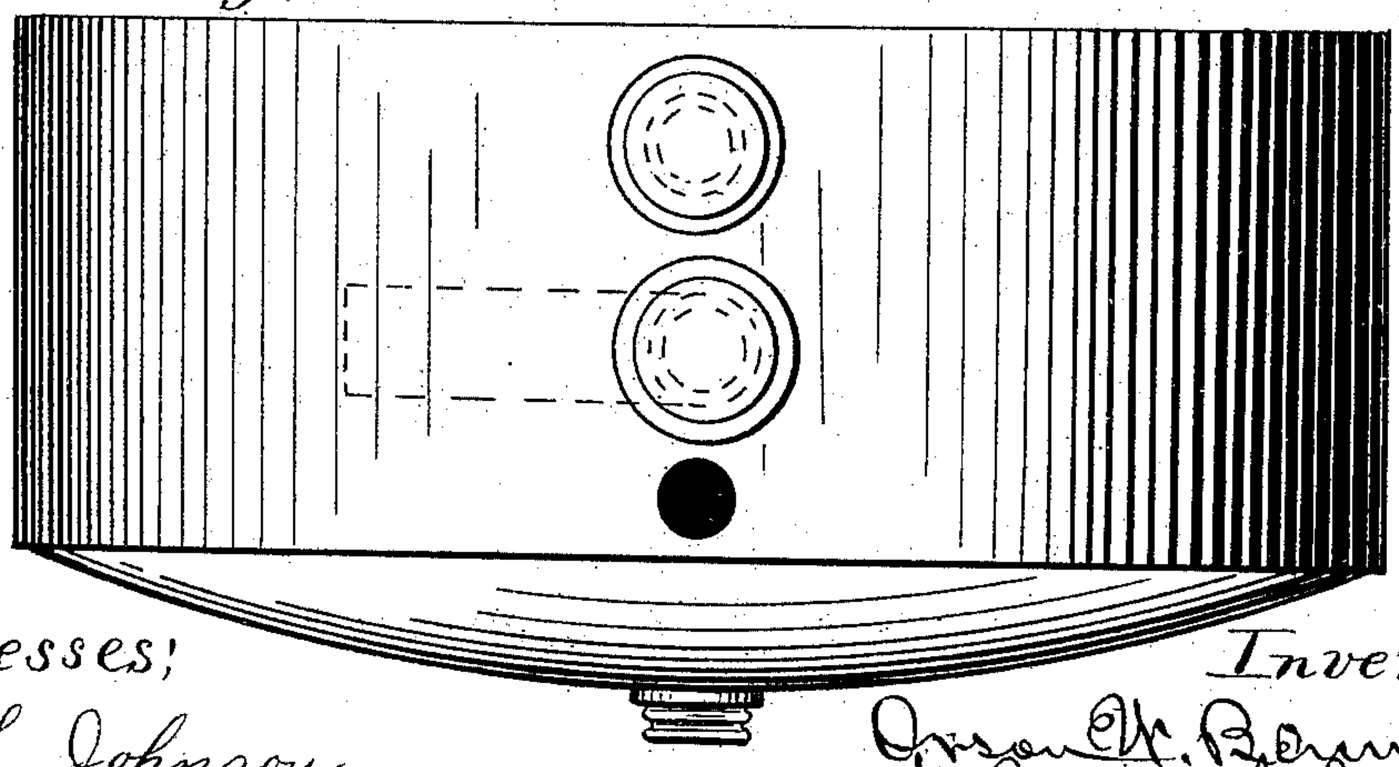


Fig. 3.



Witnesses;
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Wm. L. Mackrille.

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(No Model.) 3 Sheets—Sheet 3.

O. W. BENNETT.

CARBURETING LAMP.

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Fig. 4.

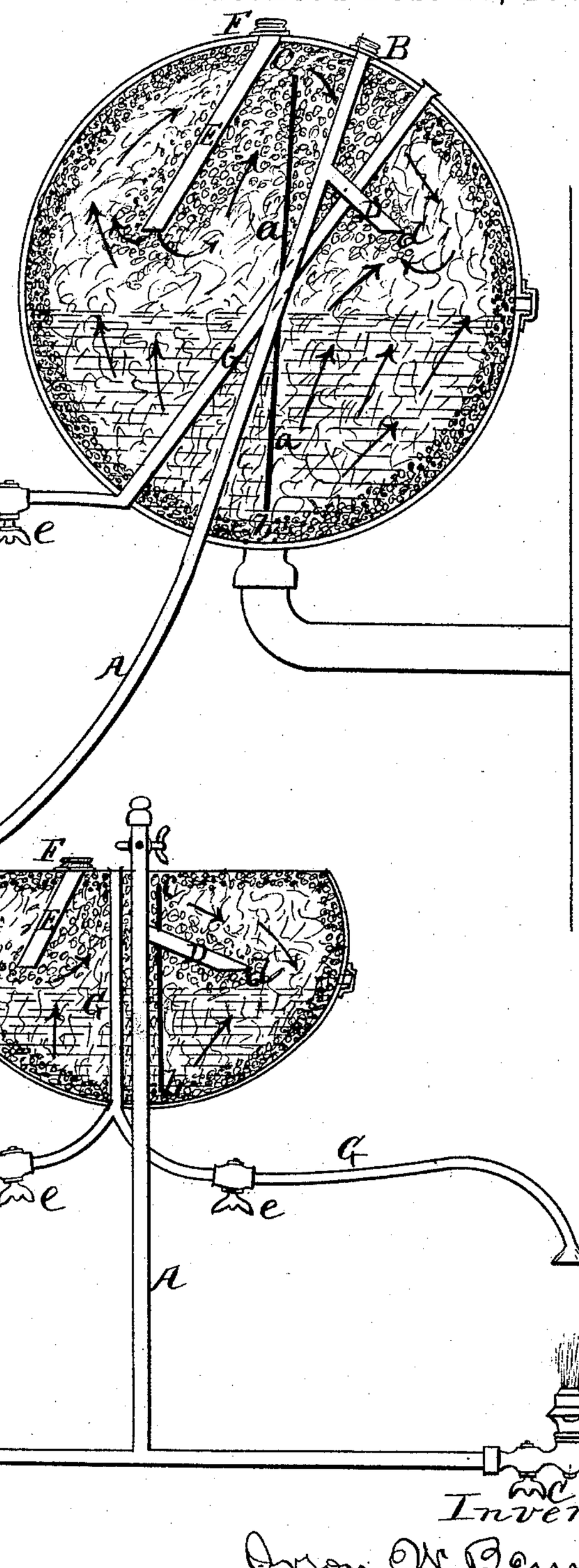

Fig. 5

Witnesses;
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his Attorneys.

UNITED STATES PATENT OFFICE.

ORSON W. BENNETT, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE STANDARD GAS MACHINE AND PORTABLE GAS LAMP COMPANY, OF SAME PLACE.

CARBURETING-LAMP.

SPECIFICATION forming part of Letters Patent No. 378,647, dated February 28, 1888.

Application filed November 1, 1886. Serial No. 217,753. (No model.)

To all whom it may concern:

Be it known that I, ORSON W. BENNETT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Carbureting-Lamps, of which the following is a specification.

I have improved the lamp in which gas is generated from a hydrocarbon or other illuminating fluid held in suspension by an inclosed absorbent and supplied by gravity to the burner; and the objects of my improvements are to maintain a uniform quality of the gas in the supply-pipe; to provide for mixing air with the gas in the gas-supply pipe, whereby to render the light more constant and to perfect the combustion; to prevent the escape of the liquid into the filling or into the gas-supply pipes in handling the lamp, or in the event of its being turned upon its side or falling; to provide a heat-supply pipe open at both ends, with provision for regulating the heat for controlling the evaporation of the liquid as may be required; to provide for the supply of air into the generating-chamber proper for conversion into gas, and into the gas-supply pipe, for the purpose of diluting the gas when supersaturated, and thus produce the proper mixture of gas and air for perfect combustion, and to furnish a safe lamp of simple construction at comparatively little expense, in which the gas is generated only as fast as it is used, and giving brilliant illumination with gas-burners.

In my improved air-carbureting lamp the generating-chamber is divided into two compartments which communicate at the top and at the bottom of the chamber. Into one of these compartments the liquid and air supply pipe enters, while the gas-supply pipe opens into the other, and also externally of the generating-chamber.

Referring to the drawings, Figure 1 represents in vertical section a portable wall-lamp embracing my improvements. Fig. 2 shows a section of the gas-generating chamber, taken at right angles to Fig. 1. Fig. 3 is a top view of the same. Fig. 4 shows in vertical section a fixed bracket-lamp having my improvements, and Fig. 5 shows in vertical section a lamp adapted for attachment to the ceiling and having my improvements.

The generator or body of the lamp may be of any desired form and size, and is constructed of sheet metal, preferably of brass, having a chamber capacity of a quart to two or more gallons for the gas-generating liquid. It is divided centrally by a vertical partition, *a*, which, however, does not extend to the top or bottom of the said chamber, so that the two compartments will communicate at the bottom by an opening, *b*, to permit the oil to pass from one compartment to the other to find its level in both, while the top opening, *c*, provides for the passage of the gas from the air-receiving compartment into the gas-outlet compartment.

The burner gas-supply pipe A passes vertically through the body of the lamp and opens at the top thereof, where it is provided with a removable screw or other cap or valve, B, which may be opened for the admission of air to mix with the gas as the latter enters and passes through the supply-pipe to the burner, or it may be closed to exclude air, as the condition or quality of the gas may require. This pipe is extended any desired distance below the body of the lamp, and has the usual gas-cock, C, and burner. At a point above the center horizontally of the lamp-body the gas-supply pipe opens into the outlet-compartment by a branch pipe, D, through which the gas enters and passes downward to the burner. The inlet-opening *d* of this pipe should be above a horizontal center line of the gas-generating chamber, and preferably open downward to receive the heavy gas from the bottom, which, by induction of the current of lighter gas, will be drawn upward into said pipe.

The pipe E, through which the lamp-chamber is supplied with oil, and through which the air to be carbureted is also supplied, terminates in the air-receiving compartment at a point just above the horizontal line of the chamber, and is provided at its outer upper end with a screw-cap, F, whereby it may be closed to prevent waste from evaporation when

the lamp is not in use, and by which the air is supplied for conversion into gas, and the lamp filled with oil when required.

I provide for maintaining a uniform temperature within the gas-generating chamber by means of a pipe, G, open at both ends, passing through the body of the lamp and having a bell or bells to receive and conduct the heat resulting from combustion at the burner and conduct it through the body of the lamp, and thereby heat the vessel and its contents, while at the same time permit the free escape of the air, after having given up its heat, to the lamp, and thus create a draft of heated air through the pipe. This draft may be regulated and cut off by a cock, *e*, so as to increase or diminish the heat of the vessel, as may be required, to regulate the evaporation of the oil. By this construction the products of combustion are excluded from the gas-generating chamber, and at the same time the heat from such products is utilized and controlled as an evaporating medium.

Both compartments of the chamber are filled with an absorbent material, preferably of asbestus fiber, properly mixed with a woody fiber known as "excelsior." I prefer to so dispose this absorbent as to give it greater compactness or density at the walls of the chamber and having a less dense filling at the middle and at the passage-way between the openings of the inlet and outlet of the gas and air supply pipes for the free passage of the gas and air from the receiving to the outlet compartment. I make the outer and surrounding portion of the filling more dense, that it may hold more oil in suspension, and thereby supply the less dense part and increase the evaporation.

The lamp has an opening in its side at the center horizontally which is closed by a can-screw cap, and when filling the lamp this screw-cap is removed to show when the oil is at the proper level, or to remove the oil when required.

The opening of the air and gas supply pipes into their respective compartments on a horizontal plane with each other and above the center of the lamp-body gives the advantage of preventing the escape of the oil into said pipes or out of the lamp, and for this purpose I prefer to place the inner open ends of said pipes equidistant between the walls of the chamber and its middle partition, and I prefer also to incline these pipes, as shown.

The provision for mixing air and gas directly within the gas-supply pipe is necessary to reduce the density of the gas when such necessity is indicated by the character and reddish color of the light, which is produced when the gas is too rich or the air is supersaturated with the vapor of the oil. When the volume of the liquid is high and fresh in quality and the gas is too rich to produce perfect combustion because of a want of a sufficient quantity of oxygen, the gas in the supply-pipe may be diluted by introducing air at the open top end of said pipe, so that it will mix and descend with the gas by induction. When the liquid is of low gravity, the gas is less volatile and the proportion of air may be too great, resulting in a decrease of the volume of the light. This is corrected by closing the opening at the top of the gas-supply pipe and thus cutting off the supplemental air-supply.

The state of the art shows carbureting-lamps of various constructions in which one or more chambers are provided for the fluid to be evaporated, and made to communicate with each other in various ways for the supply of the vapor and of air, the latter both in a heated and in a cold condition. In such lamps the supply-pipe for the hydrocarbon fluid has also formed the air-supply pipe, while separate pipes have been used for supplying the carbureting-chamber with hydrocarbon liquid and with air, and the combination of a chamber containing hydrocarbon liquid and an absorbent, or of communicating chambers, one containing hydrocarbon liquid and the other an absorbent, a pipe centrally arranged in relation to said chambers for supplying vapor to the burner, and an air-supplying pipe opening into one of said chambers is old in lamps in which these elements are variously used; but, so far as I know and find, a vaporizing-chamber containing hydrocarbon liquid and an absorbent divided by a partition-plate into communicating spaces, one of which spaces is provided with a tube which supplies both oil and air, is open to the latter, and also opens into the absorbent above the level of the oil, and through the other of which the burner-pipe passes and opens at the top to form a supplemental air-supply pipe direct to the burner-pipe, and is provided with a branch which supplies vapor direct to the burner-pipe from the body of the absorbent above the level of the oil, is new both as to the combination and operation of these parts arranged as I have devised them. The advantages or results incidental to this new combination are, the burner-pipe opens direct into the air to admit and mix a sufficient quantity of air into the vapor as it enters said pipe to reduce the density of the vapor, which is found to be too rich for perfect combustion when the lamp is freshly charged; and in such case the air is allowed to enter and descend the burner-pipe along with the vapor by induction, and thus dilute the vapor directly in the burner-pipe in addition to the supply of air afforded by the primary air-supply pipe. When, however, the hydrocarbon is of low gravity, the air-supply is regulated and supplied solely by the primary air-pipe, and these two independent air-supplies insure perfect combustion and a full volume of light under all conditions of the vapor, whether the air be too highly saturated with the vapor of the oil, or whether the proportion of air be too little. These conditions are indicated by the color of the light, and the provision for correction is almost instantaneous by adjusting the air-inlets of these two

pipes by the caps at their upper open ends. This is the matter which distinguishes my lamp from all others in which gas generated from a hydrocarbon is held in suspension by an absorbent and supplied by gravity to the burner.

The provision for maintaining a uniform temperature within the vapor-generating chamber does not contemplate supplying heated air direct into the vaporizing-chamber or upon the outer walls thereof, but by a heat conducting pipe passing directly through the vaporizing-chamber open to the air at both ends outside of said chamber, and thereby exclude the products of combustion from the vaporizing-chamber and provide for heating the contents, and not the vessel or the air to be carbureted. In such an arrangement of the heating-pipe a valve is important for controlling or cutting off the heat when it becomes too great or is not needed.

I claim—

1. The combination, in a carbureting-lamp, of a chamber for containing hydrocarbon and an absorbent, with a pipe passing entirely through said chamber having an air-inlet at its outer end controlled by a cap, and having a branch pipe opening into said chamber above the level of an overflow-opening therein and conducting vapor to the burner, and an independent air-supply opening in the top of said chamber controlled by a cap, substantially as described, for the purpose specified.

2. In a carbureting-lamp, the combination, with the lamp-chamber for containing hydrocarbon oil and an absorbent, of a pipe passing entirely through said chamber having a branch pipe opening therein above the level of an overflow-opening and conducting vapor to the burner, and an air-supply opening in the top of said chamber controlled by a cap, substantially as and for the purpose specified.

3. In a carbureting-lamp, the combination of a chamber for containing hydrocarbon liquid and an absorbent and divided into communicating spaces by plate *a*, with a pipe conducting vapor to the burner passing entirely through said chamber, having an air-inlet at its outer end provided with a cut-off, and a lateral supply branch pipe opening into said chamber above the level of an overflow-opening therein, and a pipe, E, opening at the top of said chamber extending and opening therein above the level of said overflow-opening and provided with a cut-off at its upper open end, the said burner-pipe and its supply branch arranged in one compartment of said chamber and the pipe E arranged in the other compartment of said chamber, substantially as described, for the purpose specified.

4. In a carbureting-lamp, the combination, with the burner and a chamber for containing hydrocarbon liquid and an absorbent and divided into communicating spaces by a plate, *a*, of the burner-supply pipe A, passing entirely through said chamber having the screw-cap B, and the lateral branch D and the pipe E, having the screw-cap F, the said pipes arranged on opposite sides of the said division-plate, and the said supply branch D and pipe E opening into said chamber at a point always above the level of an overflow-opening therein, as described, and for the purpose stated.

5. In a carbureting-lamp, the combination of a chamber for containing hydrocarbon liquid and an absorbent with a pipe conducting vapor to the burner, a pipe supplying air to said chamber, and an air-heating pipe passing entirely through said chamber open at its upper end and having a bell at its lower end directly over the burner, and a regulating-valve, substantially as described, for the purpose specified.

6. In a carbureting-lamp, the chamber for holding the hydrocarbon oil having the vertical partition-plate *a*, and between it and the walls of the chamber the opening *b c*, the said chamber for containing an absorbent, in combination with a pipe conducting vapor to the burner, having a lateral branch opening into the chamber on one side of said plate *a*, an air-supply pipe opening into said chamber on the other side of said plate *a*, and an air-heating conducting-pipe passing entirely through said chamber and having a heat-regulating valve, *e*, placed between the burner and the lamp, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ORSON W. BENNETT.

Witnesses:

A. E. H. JOHNSON,

W. C. HULL.