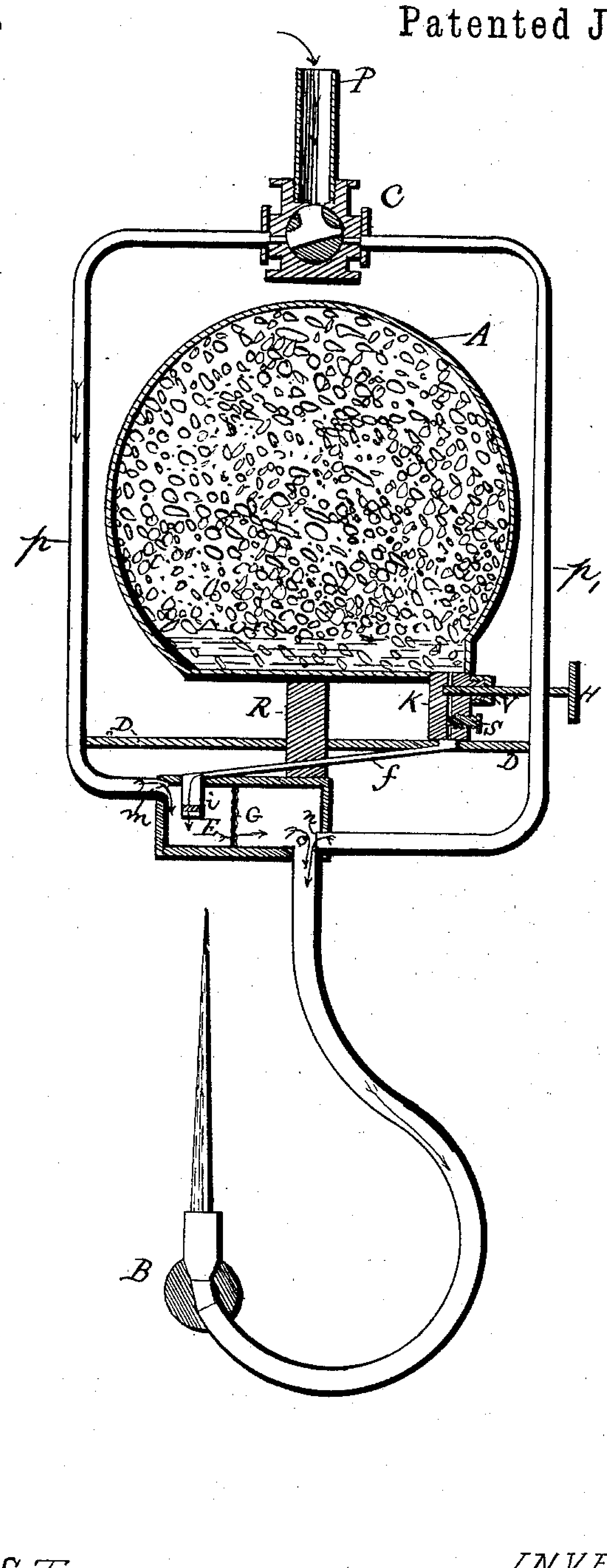
(No Model.)

A. KITSON.

CARBURETING GAS LAMP.

No. 385,673. Patented July 3, 1888.



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CARBURETING GAS-LAMP.

SPECIFICATION forming part of Letters Patent No. 385,673, dated July 3, 1888.

Application filed November 22, 1887. Serial No. 255,878. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR KITSON, a subject of the Queen of Great Britain, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Carbureting Gas-Lamps, of which the following is a specification.

This invention relates to carbureting gas-lamps, and particularly to that kind in which the gas in its passage to the burner is enriched with the vapors of a solid or crystalline hydrocarbon.

The main objects sought after by my improvements in the construction of a carbureting-lamp are to provide, first, for the hastening of the carbureting operation; second, a method of carburation which will operate effectively with every kind of combustible gas, which will work well on very low gas-pressures, and which will carburet a small quantity of gas as effectively as a large quantity.

Heretofore in enriching gas-lamps where solid hydrocarbons have been used it has been customary to liquefy the top layer of the hydrocarbon in the vessel by conveying heat to it directly by the heated gas, or by conduction by means of heated metal inserted in the material, or by liquefying the entire mass of hydrocarbon in the vessel by the burners placed beneath the vessel, while the gas requiring to be enriched has hitherto been brought in contact with the top layer of hydrocarbon, where it has mixed with the volatilized matter. The enriched gas has then ascended directly to the burners, or to a pipe leading to the burners. In every instance the enriched gas has had to ascend before reaching the burners.

I have discovered that only gases which have an affinity for the vapor of naphthaline can be enriched by the above-mentioned method, and that heavy gases—such as "producer" gas, which contains many impurities—fail to take up any perceptible quantity of enriching vapor. When, however, a sufficient quantity of hydrocarbon vapor is injected or otherwise conducted into the burner-tube, it will burn freely with any kind of combustible gas, producing a flame of great brilliance. In the methods heretofore employed considerable time, varying from fifteen to thirty minutes, has elapsed after lighting the burners before the process of carburation commenced. In cases where the gas-pressure has been very low the process has failed to act completely, and with a consumption of less than three feet per hour no lamp hitherto constructed has been able to operate successfully.

My invention consists in liquefying the bottom layer of hydrocarbon contained in the carbureting-vessel and running a thin stream of the liquid by gravity into a tube or chamber which is heated by the flame of the burner, and through which the unenriched gas passes on its way to the burner. In this chamber the liquid becomes instantly vaporized by the heat, and is carried on down to the burner by gravity and by the motion of the gas.

It will thus be seen that the method I employ differs essentially from those hitherto employed in the following particulars: first, that only the bottom layer of hydrocarbon is liquefied, the upper portion remaining comparatively cool; second, that as soon as the smallest quantity of enriching material is liquefied the gas becomes fully carbureted; third, that advantage is taken of the greater specific gravity of the vapor by causing it to descend direct from the vessel to the burner.

Gases, therefore, which have no affinity for the heavy hydrocarbon vapors, and which in all hitherto existing devices would pass to the burners unenriched, become enriched by my method to the same degree as do gases which are easily enriched, such as coal-gas.

The means by which I carry my invention into effect are illustrated in the annexed drawing, which represents a vertical section of my improved lamp.

A represents the hydrocarbon-reservoir, to the bottom of which a metallic rod, R, is attached and connects with the metal vaporizing and carbureting tube or chamber E. The main supply-pipe P connects with a three-way valve. (Shown at C.) To this valve the pipes *p p'* are attached, and one of them, as *p*, extends down and connects with the chamber E, near the supply-pipe, admitting hydrocarbon liquid, and into which chamber it delivers its supply of gas, and the other one, *p'*, connects directly with the chamber, close to the burner-pipe B.

K is a metal casting, which is provided with a valve having an operating-button, H. This valve serves to admit the supply of enriching material to the pipe *f*, or shut it off.

S is a small screw for contracting the opening which runs through the casting K, and thus regulates the flow of liquid to E. The small pipe *f* carries the supply of hydrocarbon to the chamber E from the vessel A.

D is a disk of metal, and serves to protect the vessel A and valve K from the direct heat of the flame.

The lamp is operated as follows: After turning on the supply of gas at C through the pipe *p*, the burner is lighted. The valve V is then turned and the screw S gently unscrewed until sufficient hydrocarbon is conveyed to the gas. The heat from the flame rapidly heats the chamber E, pipe *f*, and lower layer of hydrocarbon in A by conduction through the metallic rod R. The liquid flows through K and trickles gently down pipe *f* into the vaporizing and carbureting chamber E, where it is instantly vaporized by the heat. The gas from pipe *p*, issuing into chamber E at *m*, carries the vapor to the burner-opening O, whence it descends to the burner. When the screw S is once regulated to a given supply of gas, it should remain unaltered. The rich gas may be diluted to any degree by means of the cock C, and a supply of plain gas sent through pipe *p'* direct to burner.

G is a piece of fine gauze stretched diametrically across the chamber E, to give steadiness to the flame and prevent pulsations resulting from the flow or dropping of enriching material into the chamber. In place of this gauze I often use some fibrous material or absorbent. The liquid hydrocarbon then falls upon this material and is absorbed by it, and the heat from the burner instantly vaporizes it. The gas passes through this absorbent, and is thus thoroughly impregnated with the enriching vapors. This arrangement likewise prevents the pulsations in the light resulting from the flow or dropping of the liquid hydrocarbon into the chamber.

An additional advantage is also derived from using an absorbent in that, by retaining an amount of vapor after turning off the gas, when the light is again required, the absorbent gives off its vapor before the material in the reservoir is liquefied, and the increased illumination is obtained almost immediately after lighting. Cotton waste or asbestus or any good absorbent may be used. Before turning off the gas it is necessary to close the valve V, to prevent the filling of chamber E with the hydrocarbon after the light is extinguished. If the pipe *f* is sufficiently large, a partition of porous material—such as unglazed earthenware—may be placed in it, as is shown at *i*, and the flow of liquid regulated by the degree of porosity of the partition.

It will be seen that since the heat is directed immediately onto the material the enriching or carbureting operation commences almost immediately after lighting the burner, that the heat of a very small quantity of burning gas is sufficient to operate the lamp, and that as the vapor is actually poured into the burner-tube it cannot fail to enrich every kind of combustible gas. Finally, the lamp, it will be seen, operates the same, no mattter how large or small be the amount of enriching material in the reservoir A.

The degree of heat directed on chamber E may be varied by turning the burner and burner-arm directly under or away from it. It will be seen that the lamp can be made with one or more burners, and that the smallest-sized burners may be advantageously employed.

By reversing the position of the arms *p p'* and valve C the lamp can be attached at once onto existing gas-brackets and chandelier-arms.

The form of the lamp may be easily varied and adapted to various uses.

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

1. In an enriching gas-lamp for enriching gas or air with the vapors of solid hydrocarbons, the combination, with a gas-supply pipe, a hydrocarbon-reservoir, and a gas-burner placed beneath said reservoir, of a vaporizing and carbureting chamber communicating with the burner-pipe and situated immediately above the gas-burner and beneath the hydrocarbon-reservoir, and separate passage-ways connecting respectively said chamber to the bottom of the hydrocarbon-reservoir and gas-supply pipe, by which the gas and hydrocarbon are conveyed to the chamber independently, substantially as and for the purpose described.

2. In an enriching gas-lamp, the combination of a hydrocarbon-reservoir, a gas-burner placed beneath said vessel, a vaporizing and carbureting chamber placed between the gas-burner and hydrocarbon-reservoir, a passage-way leading from the bottom of the reservoir to the chamber, by which the hydrocarbon is conducted to the chamber in a liquid state, and a valve for controlling the flow of hydrocarbon into said chamber, with a gas-supply pipe and gas-burner pipe, both connected to said chamber, substantially as described.

3. In an enriching gas-lamp, the combination, with a hydrocarbon-reservoir, gas-burner, and supply-pipe, of a vaporizing and carbureting chamber connected with the lower part of the hydrocarbon-reservoir and with gas-burner pipe, and containing a porous partition placed diametrically across its bore to regulate the supply of hydrocarbon vapor to the burner, and a gas-inlet pipe connecting with such chamber, substantially as described.

4. In an enriching gas-lamp, the combination, with a hydrocarbon-reservoir, a gas-burner and its supply-pipe, of a vaporizing and carbureting chamber placed immediately over the burner and beneath the hydrocarbon-

reservoir, and containing a gauze partition placed sectionally across said chamber, and communicating with the bottom of the hydrocarbon-reservoir by a tube or passage-way, and a gas-inlet pipe connecting with the vaporizing-chamber, substantially as and for the purpose herein described.

5. In a carbureting gas-lamp for enriching gas with the vapors of a solid hydrocarbon, the combination, with a hydrocarbon-reservoir, a gas-burner and its supply-pipe, of a vaporizing and carbureting tube or chamber having a connected gas-inlet pipe and connecting with the reservoir by a hydrocarbon-supply tube, and an absorbent or porous substance placed in the vaporizing and carbureting tube or chamber, whereby pulsation or jumping of the gas-flame is prevented and a steady light is secured.

6. In an enriching gas-lamp, the combination, with a hydrocarbon-reservoir, a gas-burner placed below said reservoir, a vaporizing and carbureting chamber for volatilizing the hydrocarbon and mixing the gas with the vapor, a gas-supply pipe communicating with said chamber, a passage-way leading from the hydrocarbon-reservoir to the chamber, and a valve for controlling the admission of hydrocarbons from the reservoir to the chamber, of a metallic rod connecting the chamber with the reservoir for conducting the heat of the flames to the hydrocarbon in reservoir, and a disk-partition placed between the reservoir and chamber for dispersing the heated products of combustion, substantially as described.

7. In an enriching gas-lamp, the combination of a hydrocarbon-reservoir, a gas-burner placed beneath said reservoir, a vaporizing and carbureting chamber situated immediately over the burner and beneath the reservoir, a passage-way having a controlling-valve leading from said reservoir to the heating-chamber, with a gas-valve and suitable pipes connecting the said valve to the heating-chamber and burner-pipe, respectively, by which the supply of enriched and unenriched gas to the burner is proportioned and regulated, substantially as described.

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Witnesses:
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