No. 614,440. Patented Nov. 22, 1898.

L. S. BUFFINGTON.

ACETYLENE GAS GENERATING LAMP.

(Application filed Oct. 23, 1896. Renewed Oct. 17, 1898.)

(No Model.)

Fig. 1.

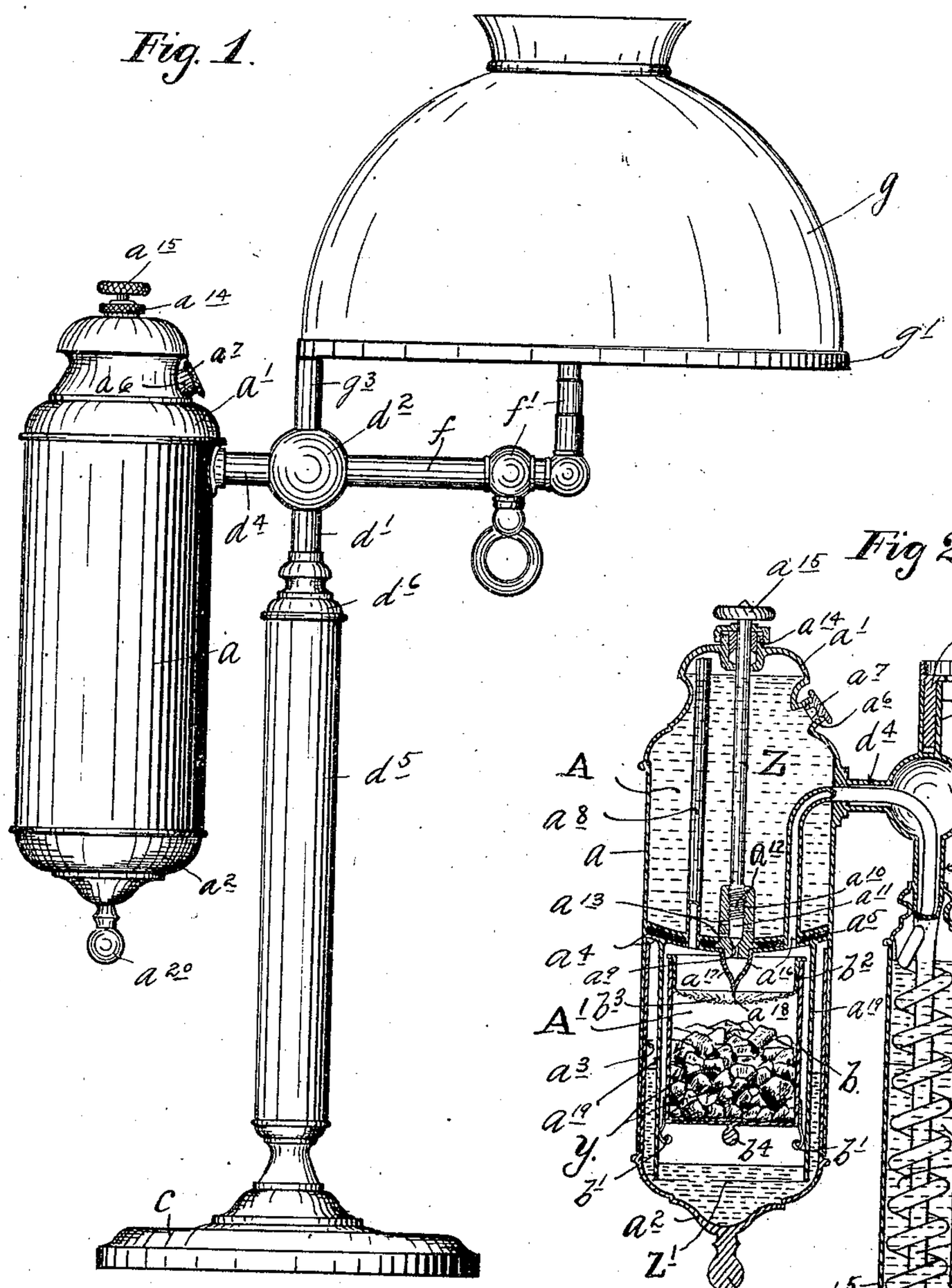
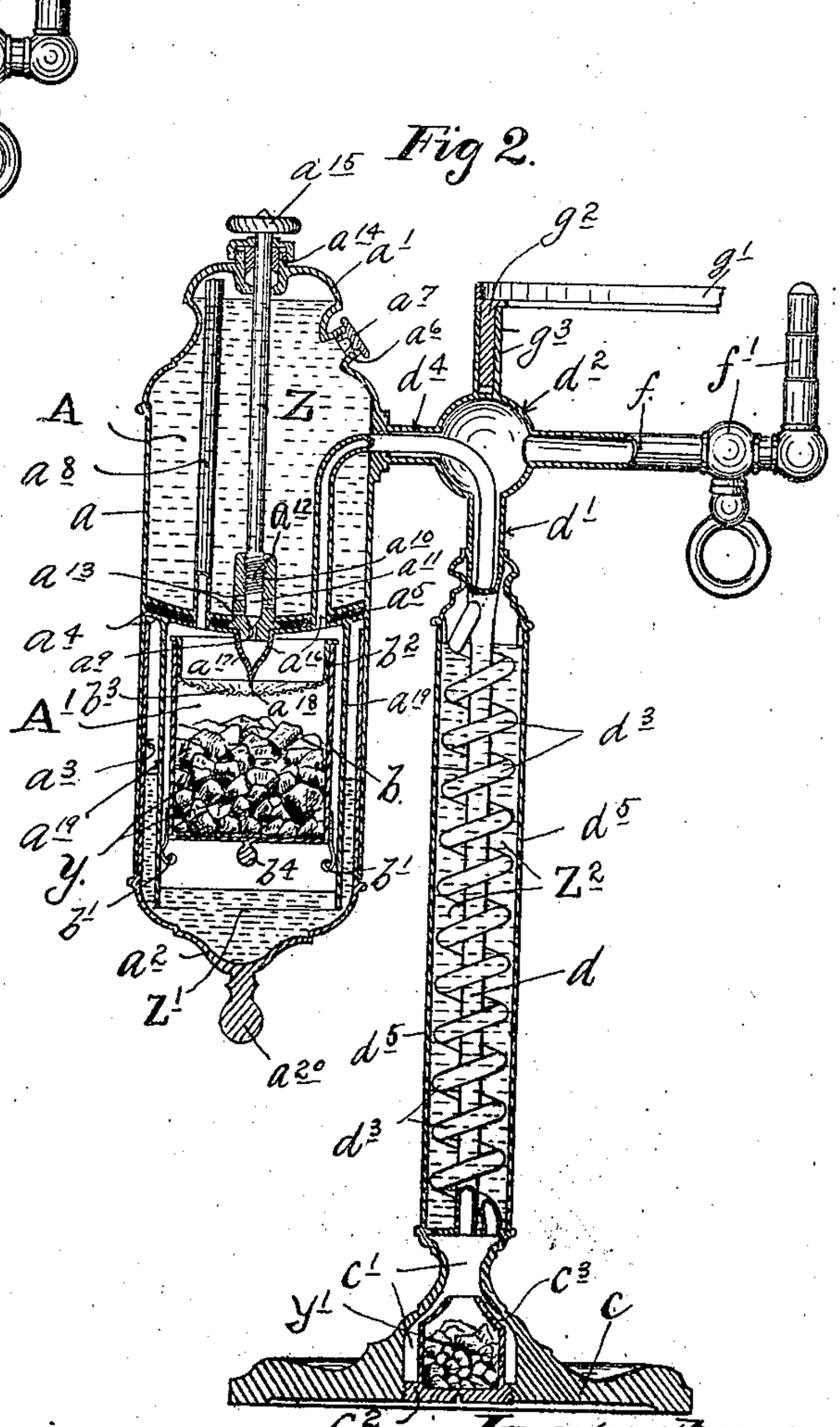


Fig 2.



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ACETYLENE-GAS-GENERATING LAMP.

SPECIFICATION forming part of Letters Patent No. 614,440, dated November 22, 1898.

Application filed October 23, 1896. Renewed October 17, 1898. Serial No. 693,812. (No model.)

To all whom it may concern:

Be it known that I, LEROY S. BUFFINGTON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Acetylene-Gas Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has for its especial object to provide an improved acetylene-gas lamp.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

Certain of the features of construction disclosed in my present invention are also illustrated in a companion application filed of even date herewith, Serial No. 609,817, entitled "Acetylene-gas lamp," and certain features are also, from a broad point of view, illustrated in my prior application, Serial No. 605,383, filed September 10, 1896, entitled "Apparatus for generating acetylene gas."

My present invention is illustrated in the accompanying drawings, wherein like letters refer to like parts throughout both views.

Figure 1 is a side elevation of the preferred form of my invention, shown as constructed on the general design of what is usually termed a "student's lamp." Fig. 2 is a view, principally in vertical central section, with some parts shown in full and others broken away, showing the internal construction of the lamp illustrated in Fig. 1.

Referring to the drawings, a indicates a vertically-disposed cylinder, the upper end of which is closed by means of a fixed cap a' and the lower end of which is closed by means of a removable bottom section a^2, that is provided with a cylindrical portion a^3, which, as shown, telescopes with sufficient frictional engagement to hold the bottom section in working position with the inside of the lower end of the cylinder a. In virtue of the frictional engagement the bottom section a^2 will be forced from position by overgenerations of gas, which approach a pressure dangerous to the apparatus. The cylinder a is divided, so as to form two chambers or receptacles A A', by means of a dividing partition or head a^4. Preferably the partition a^4 is formed with a covering or layer a^5 of asbestos or other suitable material which is a non-conductor of heat.

The upper chamber or receptacle A is to be filled with water, as indicated at z, and this may be accomplished through a nipple a^6, provided with a removable plug a^7.

a^8 indicates a vertically-disposed gas-conveying pipe, the lower end of which opens from the chamber A' and the upper end of which terminates in the chamber A above the highest level of the column of water z.

Opening downward through the center of the partition or head-plate a^4 is a passage a^9, formed in a valve-seat a^{10}. This passage a^9 is adapted to be opened and closed by means of a needle-valve a^{11}, the stem of which has screw-threaded engagement a^{12} with said valve-seat a^{10}. The valve-seat a^{10} is provided with a series of capillary passages a^{13}, which are located one above the other, so as to give in the aggregate a greater or less amount of opening to the valve-passage a^9, according to the distance to which the needle-valve a^{11} is raised. The upper end of the stem of the needle-valve works upward through a stuffing-box a^{14} in the cylinder-cap a' and is provided with a knurled head a^{15}, by means of which the valve may be manipulated. Just below the passage a^9 the partition or head a^4 is provided with a conical nipple a^{16}, which is provided with a series of very small perforations a^{17} and terminates in a depending needle-point a^{18}.

From the bottom of the head or partition a^4 depends another cylindrical section a^{19}. This cylinder a^{19} is of substantially the same length as that portion of the cylinder a which extends below the partition a^4, but is of considerably less diameter.

The carbid-holder shown is formed by a cylinder b with a closed bottom and provided with spring retaining-feet b', which, as shown, project below the end of the holder and tend to spring outward. The upper end of the cylindrical holder b may be provided with a removable cover b^2, the transverse portion of which is formed by a reticulate or wire-woven disk b^3. This reticulate cover serves to prevent the lime products from the decomposed carbid from overflowing the carbid-holder. The carbid-holder b is slightly less in diame-

ter than the cylindrical portion a^{19}, and is adapted to be placed in working position, as shown in Fig. 2 of the drawings, while the bottom section a^2 a^3 is removed by forcing the same telescopically upward into said cylindrical portion a^{19}, in which position the spring-feet b' will engage the interior of the said cylindrical portion a^{19} under sufficient friction to securely hold the carbid-holder in position. The carbid-holder may be drawn downward out of working position by taking hold of a knob or finger-piece b^4, formed on the bottom of said carbid-holder, and in like manner the bottom section a^2 a^3 may be drawn downward out of working position by taking hold of a knob a^{20}, formed on the bottom of the section a^2.

Before the carbid-holder is placed in working position it should of course be filled with bodies of carbid, as indicated at y, and the removable bottom section a^2 a^3 should be partially filled with water or other sealing liquid, as shown at z'. The parts so far described constitute the generator.

In the construction shown in the drawings the generator is supported by means of the gas-conveying pipe or connections between the same and the burner, which connections are so arranged as to serve also as a condenser or cooler. Referring in detail to this construction, c indicates a base-piece which is recessed, as shown at c'. As shown, the bottom of the recess c' is closed by means of a removable screw-threaded plug c^2, which carries a carbid or lime holder c^3, which is open at its upper end, and is adapted to contain a small quantity of carbid or lime y'. d indicates a vertically-disposed pipe or tube, the lower end of which is secured to the base-piece c and opens into the chamber c' and the upper end of which is slightly enlarged at d' and terminates in the hollow ball d^2. d^3 indicates another pipe or tube, the lower end of which is also secured to the base c, opens into the chamber c', and has its body wound around the vertical pipe d in the form of a coil until it reaches the enlarged neck portion d', where it is passed through said portion d' and the hollow ball d^2. After passing through the ball d^2 the pipe d^3 is turned first to the left and then extended inward and downward through the liquid z in the water-chamber A and opens at its lower end through the partition a^4 a^5 into the upper end of the generating-chamber A' of the generator. The hollow ball d^2 is provided with a neck or thimble portion d^4, which surrounds the horizontal portion of the pipe d^3 and serves to rigidly secure said ball d^2 to the cylinder a of the generator.

It will thus be seen that the gas-conveying connections constructed as above described constitute a standard or support for the generator. A gas-tight joint must of course be formed between the neck portion d^4 and the pipe d^3.

Secured at its lower end to the top of the base-piece c, rising vertically and forming a casing for the pipe-section d and the coil of the pipe-section d^3, is a tube or long cylindrical casing d^5, which is adapted to contain water or other cooling liquid z^2. The upper end of this casing d^5 is shown as closed by a movable cap d^6, mounted to slide vertically on the pipe-section d'.

A short stub-pipe f' extends to the right from the hollow ball d^2 and terminates in an ordinary gas-burner f'. As shown, an ordinary shade g is held in position by means of a shade-support g', which in turn is held in place by means of a finger g^2, depending therefrom and working in a keeper g^3, formed on the upper portion of the ball d^2.

The action of the lamp is substantially as follows: The parts of the generator being charged with water and carbid, as already indicated, the generating action may be started by turning the needle-valve a^{11} until it is raised sufficiently to open the valve-passage a^9 and one or more of the capillary passages a^{13}. This will of course permit the water z in the water-chamber A to flow drop by drop onto the carbid-bodies y in the carbid-holder b. The drops of water which have passed through the valve-passage a^9 will next pass through the perforations a^{17} of the nipple a^{16} and will then run down the outside of the same and be dropped from the needle-point a^{18}. This needle-point a^{18}, as it affords but a very small surface to which the drop may cling under the action of capillary attraction, will cause the water to drip therefrom in very small drops. The gas generated in the generating-chamber A' is fed to the burner f' first through the coiled pipe-section d^3 into the drying-chamber c' and from thence through the pipe-section d, bulb d^2, and burner-stem f. As the gas passes through the coiled portion of the pipe d^3, which is submerged in the water z^2, all water and other vaporized liquid substances will be condensed and precipitated and will be discharged from the lower end of the coil into the drying-chamber c'. It will be noted that the lower end of this coil is so positioned that the precipitated products of condensation will drop onto and run down the interior of the neck or wall of the drying-chamber c', and hence in this construction will not be dropped directly into the carbid-holder c^3. However, any moisture which may be held or taken up by the gas which is in the drying-chamber will be brought into contact with the carbid or other drying material contained in the holder c^3 and will be taken up and absorbed or held thereby. In case carbid is placed in the holder c^3 the watery vapors of the gas will, by their contact with the carbid, produce a very slight and slow generation of acetylene gas within the chamber c'. It will thus be seen that the gas in passing through the condensing-coil and drying-chamber will be effectually cleaned and dried. This cleaning and drying of the gas are of the greatest importance in the practical operation of a gas

apparatus of the type shown or of any other gas apparatus which is designed to control the production of acetylene gas, for acetylene gas as it comes from the generating-chamber always contains more or less gummy and other foreign impurities, which in a short time will clog and choke the gas-burners, so that they are rendered useless without cleaning, and, furthermore, these foreign impurities in the gas decrease its illuminating efficiency and often produce smoky flames. However, gas manufactured by my improved apparatus will not clog or choke up the burners, and its highest possible illuminating efficiency is obtained.

It will be understood, of course, that in the generating action the pressure of the gas confined in the generating-chamber A′ will force the column of liquid z' which is contained within the depending cylindrical portion a^{19} downward and cause the same to rise in the annular compartment formed between the cylindrical portions a^3 and a^{19}. Hence any variation or unevenness in the rate of generation, with reference to the speed with which the gas is burned, will simply cause the water to rise to a greater or less altitude in the said annular chamber.

Inasmuch as the chambers A and A′ are in communication with each other through the pipe a^8, the pressure of the gas both on the top of the column of water z and on the bottom of the same, (when the valve-passage a^9 is open) will be equal, and hence as the action of gravity on the column of water is not interfered with by the gas-pressure the said column of water z may be used until it has been completely exhausted.

The insulating-partition is very important, as it prevents the heat generated within the generating-chamber from having any material heating effect on the water z in the water-chamber A. The water z being thus left cool will of course keep the section of the pipe d^3 which is passed therethrough also cool, and hence a considerable condensation of the liquid impurities of the gas will be precipitated in this pipe-section and will run back into the carbid-holder, where they will be mixed with and taken up by the lime products.

Of course by moving the needle-valve vertically, so as to uncover or open more or less of the lateral perforations a^{13}, the rate at which the water will flow into the generating-chamber may be varied at will, and when the burner f' is lighted the size of the flame will serve to indicate when the proper adjustment of the valve is accomplished.

It will be understood, of course, that various alterations in the details of construction above set forth may be made without departing from the spirit of my invention; also, that the device may be used to control the production of any gas which may be formed by the contact of any liquid gas-producer with any solid gas-producer or other gas-producing substance, and hence that such terms as "water-containing compartment" and "carbid-holder" are not intended as limitations on the use of the device, but are used simply for the purpose of clearness.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a gas-lamp, the combination with a pair of receptacles located one above the other and in communication with each other through a valved passage, of a burner, and a pipe or tubular gas-conveying connection between one of said receptacles and said burner, wound or bent to form a standard, and constituting a support for said receptacles and said burner, and serving also as a condensing coil or section, substantially as described.

2. In a gas-lamp, the combination with a pair of receptacles in communication with each other through a valved passage, of a gas-burner, gas-conveying connections between one of said receptacles and said burner, involving a pipe-section wound in the form of the condensing-coil, a drying-chamber below said condensing-coil, and a water-jacket surrounding said condensing-coil, said condensing-coil and said water-jacket constituting a supporting-standard for the generator and burner, substantially as described.

3. In a gas-lamp, the combination with the pair of receptacles A and A′, in communication with each other through a valved passage, of a gas-burner, the base-piece c provided with the drying-chamber c' and removable holder c^3, and gas-conveying connections between the generating-receptacle A′ and said gas-burner, involving a pipe-section d^3 wound in the form of a coil, and the straight pipe-section d passed through the coil of said pipe d^3, substantially as described.

4. In a generator, the combination with a pair of receptacles, of a valved communicating passage between said receptacles and the dripping-nipple a^{16} secured below said passage and provided with the lateral perforations a^{17} and depending needle-point a^{18}, substantially as and for the purpose set forth.

5. A generating-receptacle provided with a water-ingress passage in its upper portion and with an open lower end, of a carbid-holder supported by and within said generating-receptacle, below said ingress-passage, and a liquid-containing telescopically-removable bottom section, into the sealing liquid of which the open lower end of said generating-receptacle is immersed, spaced outward from said generating-receptacle, to form an equalizing-chamber for the sealing liquid, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LEROY S. BUFFINGTON.

Witnesses:
JAS. F. WILLIAMSON,
F. D. MERCHANT.