(No Model.)

C. W. BECK.

ACETYLENE GAS LAMP

No. 591,367. Patented Oct. 5, 1897.

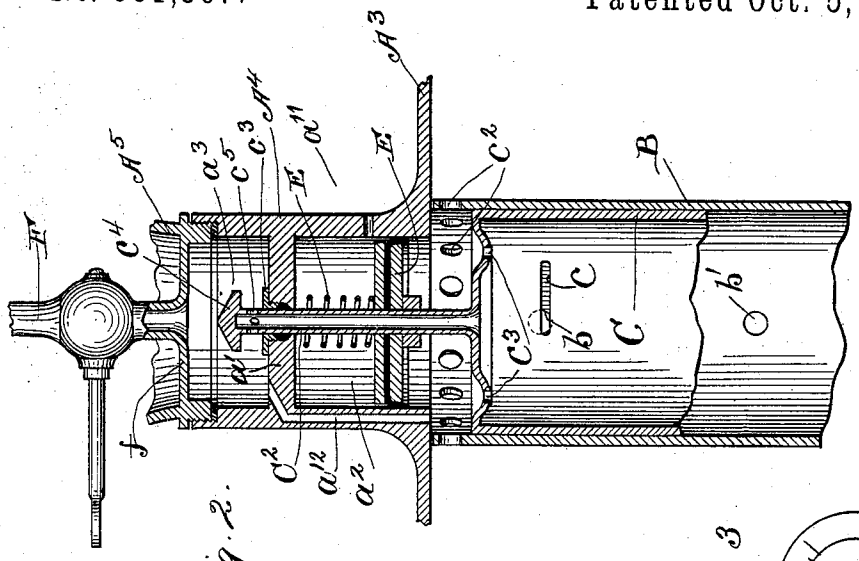


Fig. 2.

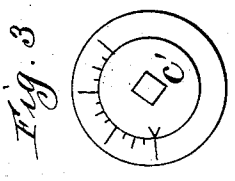


Fig. 3

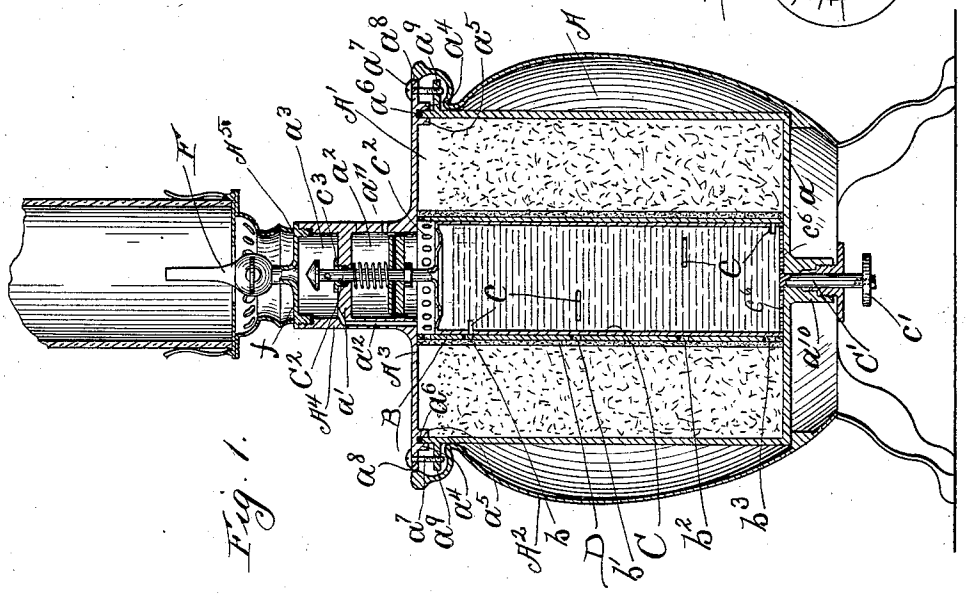


Fig. 1.

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UNITED STATES PATENT OFFICE.

CHARLES W. BECK, OF CHICAGO, ILLINOIS.

ACETYLENE-GAS LAMP.

SPECIFICATION forming part of Letters Patent No. 591,367, dated October 5, 1897.

Application filed September 14, 1896. Renewed September 11, 1897. Serial No. 651,309. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BECK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acetylene-Gas Lamps, set forth in the following specification.

This invention relates to improvements in lamps for generating and burning acetylene gas, and refers more specifically to a lamp having a generator of relatively large capacity, so as to hold a considerable amount of carbid, and the construction of which is such that different portions of the carbid may be successively brought into use, the particular embodiment of the invention chosen for illustration of the invention consisting of a house-lamp or one designed for domestic purposes.

Among the objects of the invention are to provide a construction in which different portions of the charge of carbid may be successively brought into action; to provide means whereby the rate of generation of gas will be automatically controlled by utilizing the pressure of the gas to arrest the supply of liquid whenever the pressure becomes excessive; to provide a simple and effective safety-valve which will automatically relieve the pressure whenever it reaches a point which might be dangerous, and at the same time to so arrange the parts that the supply of gas to the burner will be impeded and the burner thereby visibly affected whenever the pressure becomes too high.

The invention has also in view the production of a simple, convenient, and practical construction which may be cheaply manufactured.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims, and will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical axial sectional view of a lamp embodying my invention. Fig. 2 is a similar enlarged detail view of the operative parts. Fig. 3 is a bottom plan view of the thumb-nut and dial over which the latter rotates.

While I have chosen to illustrate the invention as embodied in a lamp for domestic purposes, yet it is to be understood that the invention may be embodied in other forms—as, for instance, a bicycle-lamp—without substantial departure from the spirit of the invention.

Referring to said figures, A designates as a whole the main body of the lamp, consisting generally of an inner receptacle A′, which forms the generator proper, conveniently and as herein shown made cylindric, and an outer open-ended shell A^2, which may be of any suitable outer conformation and which serves the purpose merely of supporting the generator proper at some distance above the table or other support and at the same time adds a graceful and pleasing appearance to the lamp. The generator as herein shown is closed at its lower end by means of an integral end wall a and at its upper end by a removable cap A^3, from the center of which rises a cylindric extension A^4, horizontally divided about midway of its height by means of a partition or diaphragm a', the lower portion a^2 of the interior of said extension being in open communication with the generator, while the upper portion a^3 forms a gas-chamber with which the jet-nozzle is connected, as hereinafter described.

As a practical and convenient means of securing the cap to the upper end of the generator said cap is shown as provided with concentric depending flanges a^4 a^5, arranged to fit inside and outside, respectively, of the upper margin of the generator-body. A suitable gasket a^6 is interposed between the end margin of the generator-body and the opposing under surface of the cap between said flanges, and the cap is clamped down upon the generator-body by means of a plurality of screws or bolts a^7, arranged to pass vertically through a marginal flange a^8 on the cap and ears a^9, secured upon the exterior of the generator-body and arranged to project outwardly beneath the marginal flange in position to receive said bolts.

The interior of the generator is divided into two compartments by means of a cylindric partition B, arranged concentrically therein, extending from the bottom wall, to which it is united, upwardly to the inner surface of the upper cap, which latter rests thereon. The cylindric chamber thus formed is occupied by a liquid-receptacle C, and the outer

annular space forms the compartment for carbid. Communication between the liquid-receptacle and carbid-compartment is afforded by means of a plurality of passages or ducts b b' b^2 b^3, arranged at different heights from the bottom, and these ducts are adapted to be closed or controlled by movement of the liquid-receptacle bodily, which is arranged to fit accurately but easily within the inner cylindric chamber or well D. Said liquid-receptacle is provided with a series of valve-openings c, adapted to be severally brought into or out of register with the several ducts b b', &c. One or the other of the sets of openings through the cylindric chamber D and wall of the liquid-receptacle, in this instance the latter set, will be arranged spirally with reference to the other set, so that by turning the liquid-receptacle bodily upon its axis the valve-outlets will be brought into register with the ducts successively from the uppermost downward—that is to say, when the liquid-receptacle, which forms in effect a valve-sleeve, is in position for its uppermost outlet to register with the duct b, if it be turned in the proper direction a certain angular distance the next lower outlet will be brought into register with the duct b', and so on. In order that one duct may not be closed before the other is opened, the valve-outlets are preferably made in the form of horizontally-elongated slots. As a means of thus rotating the liquid-receptacle the latter is provided with a stem C', arranged to pass through a suitable gland a^{10}, located axially in the lower end wall of the generator, the lower end of said stem being provided with a thumb-nut c', which may be conveniently provided with an indicator arranged to sweep over a dial formed upon a subjacent part, as indicated in detail Fig. 3, and by means of which the operator is enabled to determine which of the several ducts is open.

The upper part of the chamber D is provided with a plurality of apertures c^2, which afford entrance of the gas generated in the carbid-compartment to the upper part of the said receptacle, and in order to equalize the pressure inside and outside of the liquid-receptacle, which latter is closed at its upper end, inlet-apertures c^3 are formed in the end-closing wall thereof. The lower end of the receptacle with which the depending stem is connected is provided with openings C^6 or made of skeleton form. In order to prevent the carbid from entering the ducts and to retard or regulate the flow of liquid therethrough to some extent, I provide a wrapping D, of porous material—such, for instance, as felt—around the exterior of the liquid-receptacle, which is also extended at its upper end over the gas-inlet apertures c^2, so as to act as a filter for the gas.

To now describe the means whereby the supply of liquid to the carbid will be automatically cut off whenever the gas-pressure exceeds a predetermined height, the upper end of the valve-sleeve is provided with a hollow actuating-rod C^2, arranged to project upward axially through the diaphragm of the cylindric extension A^4 and provided at a point within the lower chamber of said extension with a piston E, fixed rigidly thereon and subject at its under side to the gas-pressure. The piston is normally pressed downward, so as to retain the valve-sleeve with its openings in horizontal alinement with the ducts by means of a coiled expansion-spring E', interposed between the upper surface of the piston and the opposing surface of the diaphragm, and in order to permit egress and ingress of air, so as to allow the piston to reciprocate under the action of the gas and spring, the lower chamber a^2 is provided in its side wall with an aperture a^{11}, which is so located with reference to the position of the piston that it will be passed by the latter and afford an escape for the gas whenever the pressure reaches a dangerous height. Inasmuch as the piston is connected with the valve-sleeve, whenever the gas-pressure rises high enough to raise the piston against the action of the spring the valve-outlets will obviously be raised, so as to pass out of register with the ducts of the liquid-receptacle, thereby cutting off the liquid, and inasmuch as the valve-outlets and ducts are all arranged in horizontal alinement when the sleeve is at its lowermost position it will be obvious that whichever one of the ducts happens to be open will be closed by the lifting of the sleeve.

The upper end of the extension A^4 is closed by a screw-cap A^5, which carries the burner or jet nozzle F, and as a desirable construction for conducting the gas from the generator to the burner a duct a^{12} is shown as arranged to extend vertically upward through the side wall of the cylindric extension and is deflected at its upper portion, so as to open into the space beneath the jet-nozzle. In order to prevent the escape of gas from said space downwardly to the space beneath the diaphragm, the actuating-rod is shown as passing through a suitable gland c^3.

In order that the burner may be visibly affected when the pressure of gas becomes too high, the actuating-rod is made of suitable length, and is provided at its upper end with a valve-plug c^4, which is adapted to be projected into the throat f of the jet-nozzle just before the piston is raised sufficiently to permit the gas to exhaust through the exhaust-outlet, and it will be obvious that inasmuch as the piston will rise slowly the supply of gas will be obstructed or cut off from the burner and the light thereby reduced so as to attract attention.

In order to afford access for filling the liquid-receptacle, the hollow actuating-rod is provided with inlet-apertures c^5 at a point normally above the diaphragm, through which the liquid may be poured when the burner-

nozzle cap has been removed. The carbid-receptacle will be replenished by removing the upper end-closing cap of the generator.

I claim as my invention—

1. A lamp for generating and burning acetylene gas, comprising a compartment for carbid, a liquid-receptacle arranged in juxtaposition to the carbid-receptacle, apertures in each of said receptacles, arranged normally in register, and means operated by pressure of the gas generated, for moving one of said receptacles bodily with relation to the other to close said apertures when the pressure exceeds a predetermined limit.

2. A lamp for generating and burning acetylene comprising a receptacle for carbid, a liquid-receptacle one of said receptacles being made movable relatively to the other, a valve-port in the wall of the movable receptacle, a duct affording communication between the valve-port and stationary receptacle, a piston subject to the pressure of gas generated, directly connected with the movable one of said receptacles, whereby the wall of the latter acts as a valve-plate to close the duct when the pressure exceeds a predetermined limit.

3. A lamp for generating and burning acetylene gas, comprising a receptacle for carbid, a liquid-receptacle, one of said receptacles being made movable relatively to the other, a valve-port in the wall of the movable receptacle, a duct affording communication between the valve-port and stationary receptacle, a cylinder and a piston therein, said cylinder being in communication with the carbid-receptacle at one side of the piston and in communication with the atmosphere at the opposite side thereof and directly connected with the movable one of said receptacles, and a spring acting on the piston in opposition to the internal pressure.

4. A lamp for generating and burning acetylene gas, comprising a carbid-compartment, a liquid-receptacle, a series of outlet-ducts arranged at different levels of the liquid-receptacle, means for opening said ducts successively, a slide-valve arranged to control said openings, a piston subject to pressure of the gas generated and operative connections between the piston and slide-valve whereby the supply of liquid will be automatically cut off when the pressure reaches a predetermined limit.

5. In a lamp for generating and burning acetylene gas, the combination of a generator, comprising an outer receptacle for the carbid, an internally-arranged cylindric liquid-receptacle provided with outlet-passages arranged at different levels, a valve-sleeve having telescopic connection with the cylindric walls of the said liquid-receptacle and provided with valve-outlet apertures adapted to be moved into and out of registry with the outlet-passages of the liquid-receptacle, a cylindric chamber communicating with the carbid-receptacle and also having communication with the atmosphere through an aperture in the side wall thereof, a piston in said chamber, a spring arranged to hold said piston normally in a position to prevent the escape of gas through the aperture in the cylindric chamber, and operative connections between said piston and valve-sleeve whereby the latter will be raised so as to shut off the supply of liquid to the carbid whenever the pressure exceeds a predetermined limit.

6. In a lamp for generating and burning acetylene gas, the combination of a generator, comprising an outer receptacle for the carbid, an internally-arranged cylindric liquid-receptacle provided with outlet-passages arranged at different levels, a valve-sleeve having telescopic connection with the cylindric walls of the said liquid-receptacle and provided with valve-outlet apertures adapted to be moved into and out of registry with the outlet-passages of the liquid-receptacle, the apertures in one of said bars being arranged spirally with relation to those of the other, a cylindric chamber communicating with the carbid-receptacle and also having communication with the atmosphere through an aperture in the side wall thereof, a piston in said chamber, a spring arranged to hold said piston normally in a position to prevent the escape of gas through the aperture in the cylindric chamber, operative connections between said piston and valve-sleeve whereby the latter will be raised so as to shut off the supply of liquid to the carbid whenever the pressure exceeds a predetermined limit, and a stem connected with said valve-sleeve and extending out through the generator-casing whereby the valve-sleeve may be rotated upon its longitudinal axis.

7. In a generator for acetylene gas, the combination of a carbid-receptacle, a liquid-receptacle having communication therewith, a cylindric chamber, a piston therein subject upon one side to the pressure of the gas generated, a spring arranged to act on said piston in opposition to the gas-pressure and an exhaust-passage controlled by said piston and arranged to be opened when the piston is forced back to a predetermined point by the pressure of the gas, and a valve actuated by said piston to restrict the flow of gas to the burner when the pressure exceeds a predetermined height, so as to visibly affect the burner.

8. In a lamp for burning gas generated from calcic carbids and similar compounds, the combination of a chamber for the compound, a concentric cylindrical chamber for the slaking fluid, perforated for the passage of said fluid, a perforated sleeve fitting the perforated wall of the fluid-chamber and means for rotating one of said parts relatively to the other to register progressive areas of its openings with the openings of the other part.

9. In a lamp for burning gas generated from calcic carbids and similar compounds, the combination of a chamber for the compound, a concentric cylindrical chamber for the slak-

ing fluid, perforated for the passage of said fluid, a perforated tubular wall closing around said latter chamber, means for rotating said diaphragm to register progressive areas of its openings with the openings through the wall of the fluid-chamber, and an external scale indicating the areas thus opened.

10. In a lamp for burning gas generated from calcic carbids and similar compounds, the combination of a chamber for the compound, a concentric perforated chamber for the slaking fluid, a perforated sleeve closing around said latter chamber, a sheet of porous material interposed between the fluid and carbid, through which the fluid is compelled to filter, and means for shifting the position of the diaphragm to register progressive areas of its openings with the openings through the fluid-chamber.

In testimony that I claim the foregoing as my invention I affix my signature, in the presence of two witnesses, this 12th day of September, A. D. 1896.

CHARLES W. BECK.

Witnesses:
WILLIS D. SHAFER,
ALBERT H. GRAVES.