No. 645,896. Patented Mar. 20, 1900.

A. C. EINSTEIN & C. J. SCHNAUS.

ACETYLENE LAMP.

(Application filed Feb. 17, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. I.

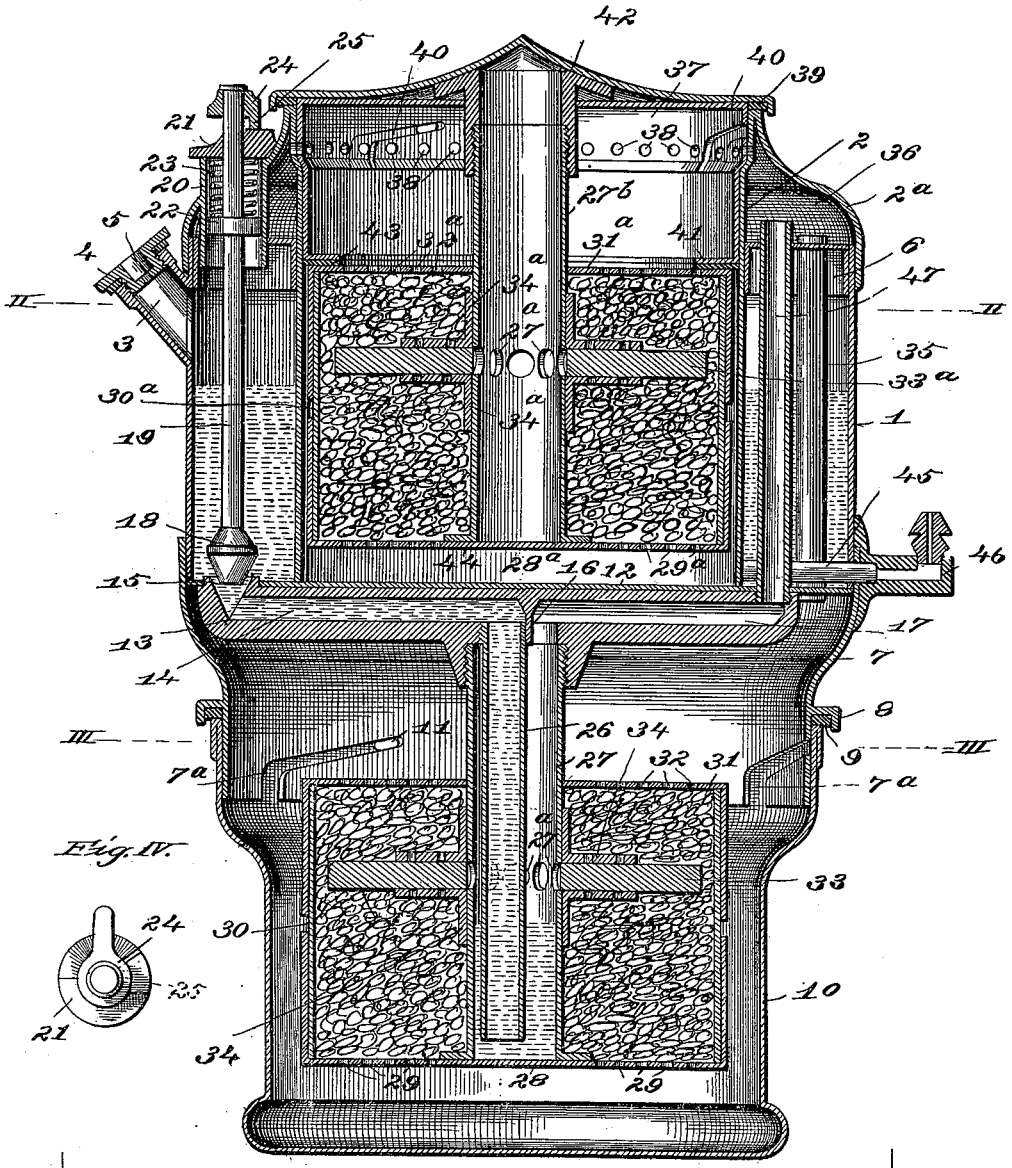

Fig. IV.

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Fig. II.

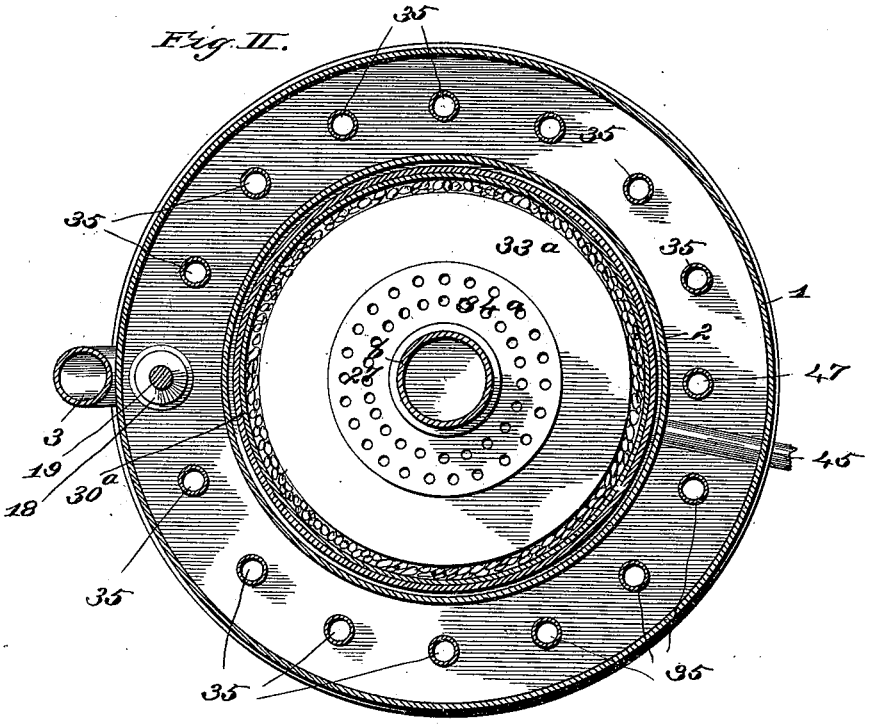
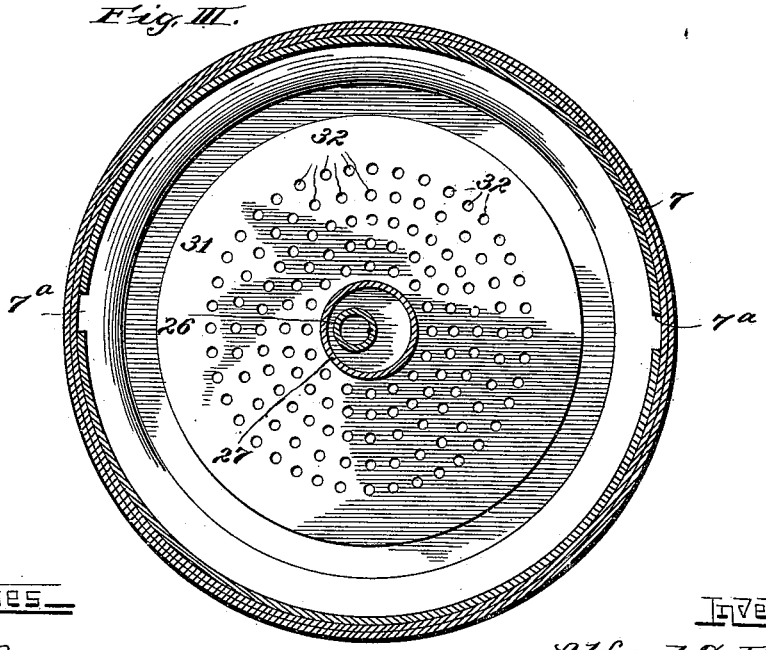


Fig. III.



Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED C. EINSTEIN AND CHARLES J. SCHNAUS, OF ST. LOUIS, MISSOURI; SAID SCHNAUS ASSIGNOR TO SAID EINSTEIN.

ACETYLENE-LAMP.

SPECIFICATION forming part of Letters Patent No. 645,896, dated March 20, 1900.

Application filed February 17, 1899. Serial No. 705,792. (No model.)

To all whom it may concern:

Be it known that we, ALFRED C. EINSTEIN and CHARLES J. SCHNAUS, citizens of the United States, and residents of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Acetylene-Lamps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to that class of lamps in which acetylene gas is generated by causing moisture to be brought into contact with calcium carbid; and, briefly stated, our invention consists in a peculiar arrangement of a lamp whereby the quantity of liquid supplied to the carbid is automatically regulated by the created gas throughout the periods of its generation within the lamp.

The invention further consists in features of construction of the lamp, including interchangeable carbid-containers in one of which the carbid from which the gas is generated is contained and in the other of which the gas is purified and dried before its escape to the point of consumption.

Figure I is a vertical sectional view of our improved lamp. Fig. II is a cross-sectional view taken on line II II, Fig. I. Fig. III is a cross-sectional view taken on line III III, Fig. I. Fig. IV is a detail top view of the liquid-controlling valve-operating lever.

1 designates the outer casing of the liquid-reservoir, which incloses an inner cylinder 2, that is concentric with the outer casing. The space between the casing 1 and cylinder 2 provides a reservoir into which liquid is introduced through an inlet 3, closed by a cap having a vent 5. The inner cylinder 2 extends above the upper end of the casing 1 and is formed with a hood 2^a, (see Fig. I,) that fits over and incloses the upper end of said outer casing.

6 designates an annular ring of inverted-U shape in cross-section and seated between the casing 1 and the inner cylinder 2 at the upper extremity of the casing 1.

7 designates a shell forming the upper part of the container-chamber and connected to the body 1 and extending downwardly therefrom, the said shell being provided with an annular rim 8, containing a packing 9.

10 designates a cup forming the lower part of the container-chamber and secured to the shell 7 by studs 11, fitting in slots 7^a, whereby the said cup may be firmly connected to the shell 7, bringing its upper edge against the packing 9 within the rim 8, and thereby producing a tight joint between the said parts.

12 designates a partition-plate extending across the interior of the lamp at the bottom of the casing 1 and inner cylinder 2. Supported by this plate by rivets or other suitable means is a casting 13, that contains a channel 14, extending from an inlet 15, through which liquid is admitted from the liquid-reservoir. The casting 13 contains a partition 16, located centrally thereof, to which the channel 14 leads, and at the opposite side of said partition is a gas-pressure duct 17, reference to which will be hereinafter made.

The inlet into the channel 14 is controlled by a valve 18, carried by a stem 19. The valve-stem 19 extends upwardly and through the top of the hood 2^a of the lamp, passing through a housing 20, that is closed by a cap 21. The valve-stem is provided with a surrounding shoulder 22, on which a spring 23 is mounted to bear against the cap 21 and through means of which the valve 18 is held depressed into the inlet 15 of the channel 14 when it is desired to close communication between the liquid-reservoir and said channel. The cap 21 of the valve-stem housing is of reduced height at one side, and on this cap is supported a turn-lever 24, connected to the valve-stem 19, (see Fig. IV,) this turn-lever having a leg 25, that may be turned into the position shown in Fig. I onto the most elevated portion of the cap 21, thereby raising the valve from its seat. When the valve is to be seated, the lever 24 is turned to bring its leg 25 to the portion of said cap 21 of less height, thereby permitting the valve to be carried to its seat by the spring 23.

26 designates a pendent pipe suspended from the casting 13 and leading from the channel 14.

Suspended from the casting 13 and having

an approximately-central opening receiving the pendent pipe is a carbid-container, which will now be described. 27 designates a supporting-tube the upper end of which is screw-seated in the casting 13 and is in communication with the duct 17 and incloses the pipe 26. Attached to the lower end of the tube 27 is a cup 28, provided with perforations 29 in its under side. This cup receives and holds a tubular body or cylinder 30, that is surmounted by a removable cap 31 having perforations 32 in its upper side. The space within the cup 28, tubular body or cylinder 30, and cap 31 provides a receptacle in which the calcium carbid is contained, as illustrated in Fig. I. The tube 27 is provided with a series of perforations 27^a, located interior of the carbid-container. Surrounding the tube 27, at the location of the perforations 27^a, is a disk 33 of absorbent material, such as felt or blotting-paper, that is supported by a pair of perforated angle-shaped rings 34. (See Fig. I.) As the liquid is admitted to the channel 14 it flows to and through the pipe 26, from which it escapes at the lower end of said pipe into the tube 27. The liquid then rising in the tube 27 reaches the perforations 27^a and passing therethrough saturates the absorbent disk 33, thereby supplying moisture to the calcium carbid surrounding said disk and causing acetylene gas to be generated, the said gas escaping from the container by passing through the perforations in the cup 28 and cap 31 into the space surrounding the said container within the shell 7 and cup 10.

35 designates tubes leading from the interior of the shell 7, the said tubes being seated in the plate 12, that forms the bottom of the liquid-reservoir, and also seated in the ring 6, located at the top of said reservoir. On its generation the gas passes from the space within the shell 7 and cup 10 upwardly through the tubes 35 and emerges into the chamber 36 within the hood 2^a. From the chamber 36 the gas passes through perforations 38, contained by a cover 37, that is seated on the upper edge of the hood 2^a, and is held against the packing-ring 39 by being clamped thereto through means of bayonet-joint connections 40. The lower end of the cover 37 is formed with an annular inwardly-extending flange 41, and centrally located within the said cover at its top is a screw-threaded socket 42, that receives the tube 27^b of a second carbid-container suspended within the interior of the inner cylinder 2 of the lamp. This second carbid-container is of substantially the same construction as the one hereinbefore described, located at the lower part of the lamp, and is adapted for interchange with the lower container. It is held against a gasket 43, located between the flange 41 and cap 31^a of the container, so as to produce a tight joint between said parts.

The lower and upper calcium-carbid containers are in all essentials identical in construction and are, as stated, interchangeable with each other. The object of so forming the containers is to enable the use of either container in either the upper or lower positions within the lamp, so that either container may be used for the generation of gas or for the purification and drying of the gas. The advantage of such arrangement is manifest when it is considered that by using the two interchangeable containers the user of the lamp may always carry therein an additional charge of material, from which gas may be generated when the first charge has become exhausted of gas-producing qualities, the only thing necessary being to reverse the positions of the containers to change their locations on the interior of the lamp. It is obvious that in the use of the lamp the upper container (which serves only as a drier and purifier) becomes very slightly saturated with moisture, and therefore the carbid therein contains the necessary qualities for the production of gas after a long use as a drier and purifier, and it is also obvious that although the carbid in the lower container may have been used to such an extent in producing gas as to lose its gas-producing qualities it still retains all the essentials for use as a drier and purifier. It will be understood that when either container is in the upper position and utilized as a drier and purifier the absorbent disk 33^a, the perforations 27^a, and the perforated collars surrounding the tube 27^a are of no utility; but they are merely provided in each container for utility when the container is in the lower location. The second carbid-container is designed to serve as a purifier or drier for the gas generated in the first container, the gas entering the second container through the perforations in its cap 31^a after its entrance into the interior of the cover 37 through the perforations 38. Passing through the carbid contained in said second container, the gas is purified by its contact with said carbid and the moisture contained by said gas is absorbed by the carbid, after which the gas escapes through the perforations 29^a in the pocket 28^a of the container into the chamber 44 beneath said second container and finds egress through a pipe 45, leading from said chamber to the exterior of the lamp. The pipe 45 may discharge directly into a burner 46, as seen in Fig. I, or the gas may be conveyed to any other desired location for consumption.

For the purpose of controlling the regularity of generation of gas in this lamp, we provide an arrangement whereby the liquid flowing to the absorbent disk 33 may be displaced and caused to recede therefrom when an excess of gas has been produced in the lamp. This feature of construction consists in a conducting-pipe 47, leading from the chamber 36 within the hood 2^a to the duct 17, which, as explained, communicates with the tube 27. When an abnormal amount of gas has been generated in the lamp, the gas enters the conveying-pipe 47 from the chamber 36, and passing downwardly therein enters the gas-pres-

sure duct 17, from which it passes into the tube 27. The pressure of the gas flowing into the tube 27 causes the displacement of the liquid within said tube, carrying the said liquid away from the perforations 27^a, and thereby shutting off the supply of moisture to the absorbent disk 33 and effecting a stoppage of the gas generation until such time as the amount of gas contained by the lamp has been reduced below a normal amount, when the pressure of the gas against the liquid in the tube 27 is relieved and the liquid is permitted to return to the perforations 27^a to supply the absorbent disk 33 with moisture as before, to be communicated to the calcium carbid, and thereby continue the generation of gas.

By reason of the tubes 35 extending through the liquid-reservoir of the lamp, the gas passing through these tubes into the chamber 36 is subjected to the cooling effect of the liquid in said reservoir, and the moisture therein contained is largely removed by condensation and descends through said tubes and deposits at the bottom of the cup 10, from which it may be readily emptied on the removing of said cup.

While we have described the substance used in the containers of our lamp as calcium carbid, it is evident that any analogous substance might be utilized in lieu of calcium carbid without departing from our invention.

We claim as our invention—

1. A container having openings in the outer surface thereof for the escape of the gas generated therein, and constructed with a tubular body, an end cup, an end cap, and a central tube having a single series of perforations only, located, approximately, at the central part of the container for conducting liquid to the carbid-chamber; substantially as described.

2. A container having openings in the outer surface thereof for the escape of the gas generated therein, and constructed with a tubular body, an end cup, an end cap, a central tube formed with a circle of openings, a disk of absorbent material surrounding the circle of openings for conducting liquid to the carbid-chamber, and means whereby the disk is supported on the central tube; substantially as described.

3. A container comprising a tubular body, a cup having perforations, a cap having perforations, a central tube having perforations, a disk of absorbent material surrounding the perforations of the central tube, and the rings whereby the disk is supported on the central tube; substantially as described.

4. A container comprising openings in the outer surface for the escape of the gas generated therein, a tubular body, a lower cup, an upper cap, and a central tube having a single series of perforations only, located, approximately, at the central part of the container for conducting liquid to the carbid-chamber, and means whereby the central tube is adapted to be suspended within a container-chamber of a lamp; substantially as described.

5. A gas-generating device comprising a container-chamber, a container-body having a tube-opening, a liquid-reservoir located above the container-chamber, a central pendent tube on which the container-body is supported within the container-chamber, and having perforations for conducting liquid into the carbid-chamber of the container-body, a pendent liquid-conveying pipe located within the pendent tube and connected with the liquid-reservoir, a gas-chamber located above the liquid-reservoir, a gas-pipe extending from the container-chamber to the gas-chamber, and a pipe extending from the gas-chamber to the pendent tube; substantially as described.

6. A gas-generating device comprising a container-chamber, a liquid-reservoir located above the container-chamber, a gas-chamber surmounting the liquid-reservoir, a pendent liquid-conveying pipe connected with the liquid-reservoir, a pendent perforated tube surrounding the liquid-conveying pipe, a container supported on the pendent tube, a pipe extending from the container-chamber to the gas-chamber, and a pipe extending from the gas-chamber to the pendent tube; substantially as described.

7. A gas-generating device comprising a container-chamber, a casting having independent liquid and gas channels, a liquid-reservoir located above the casting and with which the liquid-channel connects, a gas-chamber surmounting the liquid-reservoir, a pipe extending from the container-chamber to the gas-chamber, a pipe extending from the gas-chamber to the gas-channel, a pendent liquid-conveying pipe connected with the outlet of the liquid-channel, a pendent perforated tube surrounding the liquid-conveying pipe and connected with the outlet of the gas-channel, and a container supported on the pendent tube; substantially as described.

8. A gas-generating device comprising a container-chamber, a casting having independent liquid and gas channels, a liquid-reservoir located above the casting and with which the liquid-channel connects, a valve for controlling the inlet to the liquid-channel, a gas-chamber surmounting the liquid-reservoir, a pipe extending from the container-chamber to the gas-chamber, a pipe extending from the gas-chamber to the gas-channels, a pendent liquid-conveying pipe connected with the outlet of the liquid-channel, a pendent perforated tube surrounding the liquid-conveying pipe and connected with the outlet of the gas-channel, and a container supported on the pendent tube; substantially as described.

9. A gas-generating device comprising an outer casing, an inner cylinder concentric with the outer casing, and a partition-plate providing a liquid-reservoir, a hood providing

a gas-chamber and inclosing the outer casing, the annular ring separating the liquid-reservoir chamber from the gas-chamber, the shell forming the upper part of the container-chamber, the cup forming the lower part of the container-chamber, the casting having a liquid-channel connected with the reservoir and a gas-channel, a valve controlling the inlet to the liquid-channel, a pendent liquid-conveying pipe connected with the outlet to the liquid-channel, a pendent perforated tube surrounding the liquid-conveying pipe and connected with the outlet to the gas-channel, a pipe extending from the container-chamber to the gas-chamber, and a pipe extending from the gas-chamber to the inlet to the gas-channel; substantially as described.

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In presence of—
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