No. 704,226. Patented July 8, 1902.

A. WINCH.

ACETYLENE GAS GENERATOR.

(Application filed July 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

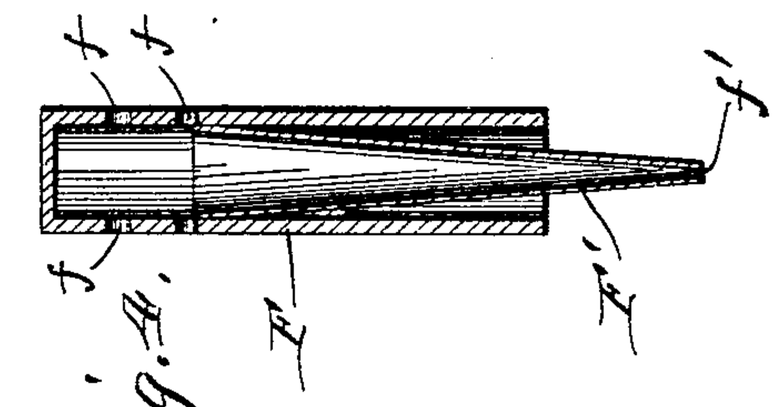

Fig. 4.

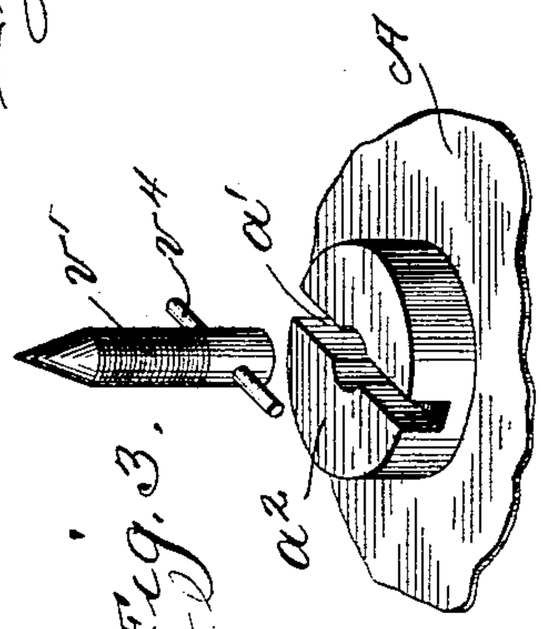

Fig. 3.

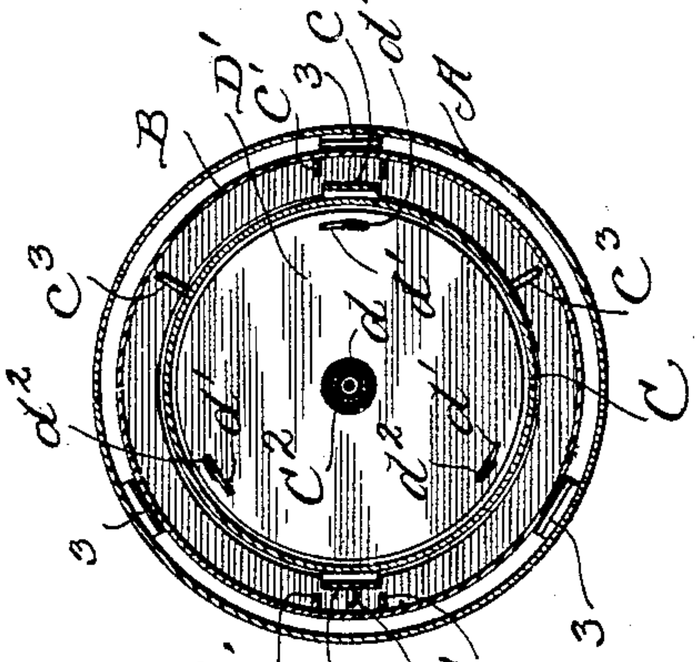

Fig. 2.

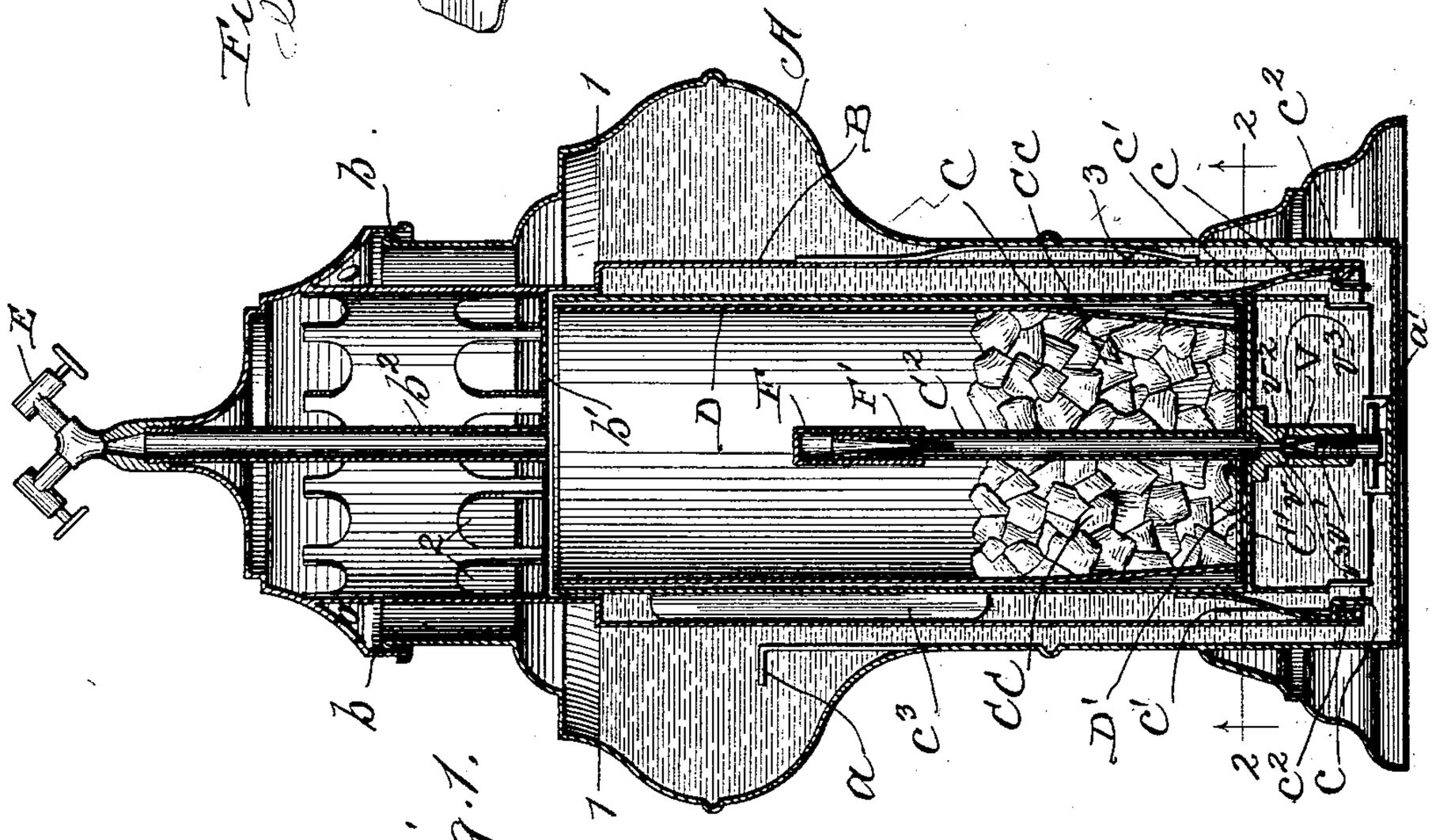

Fig. 1.

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Fig. 7.

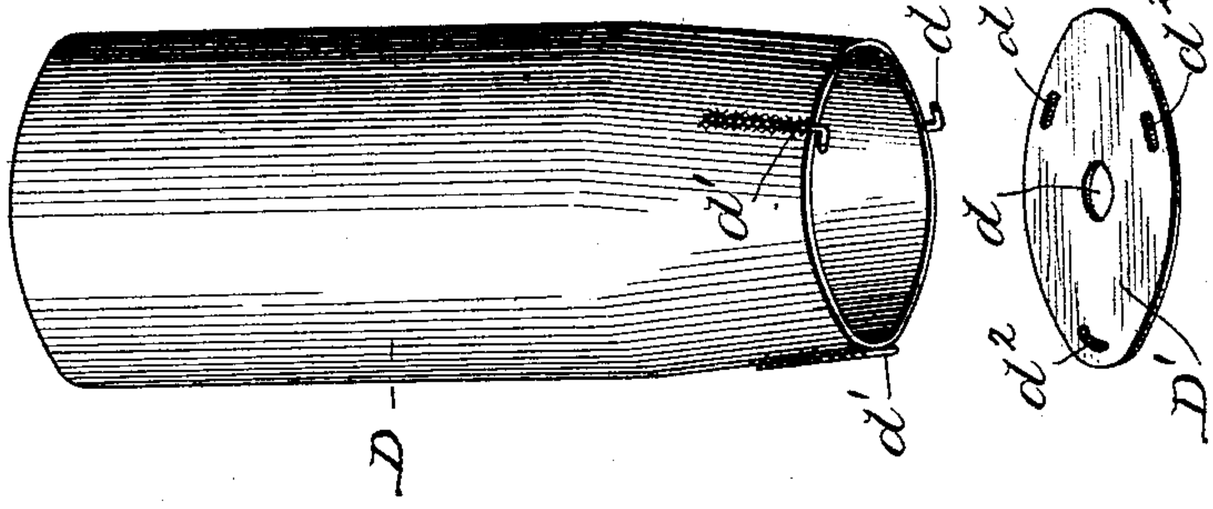


Fig. 6.

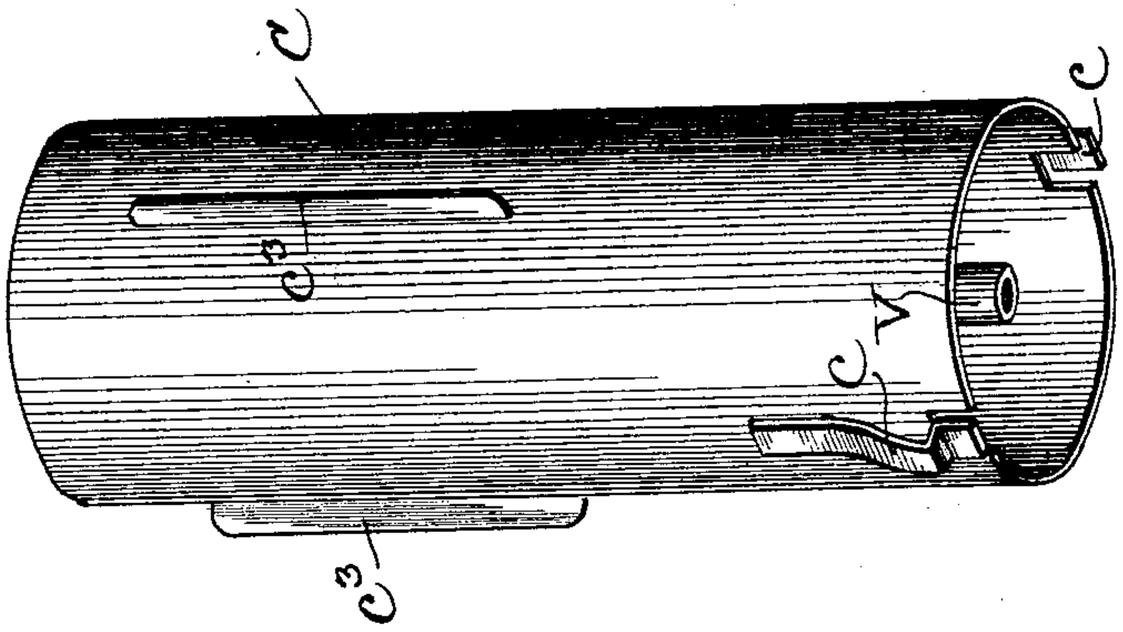
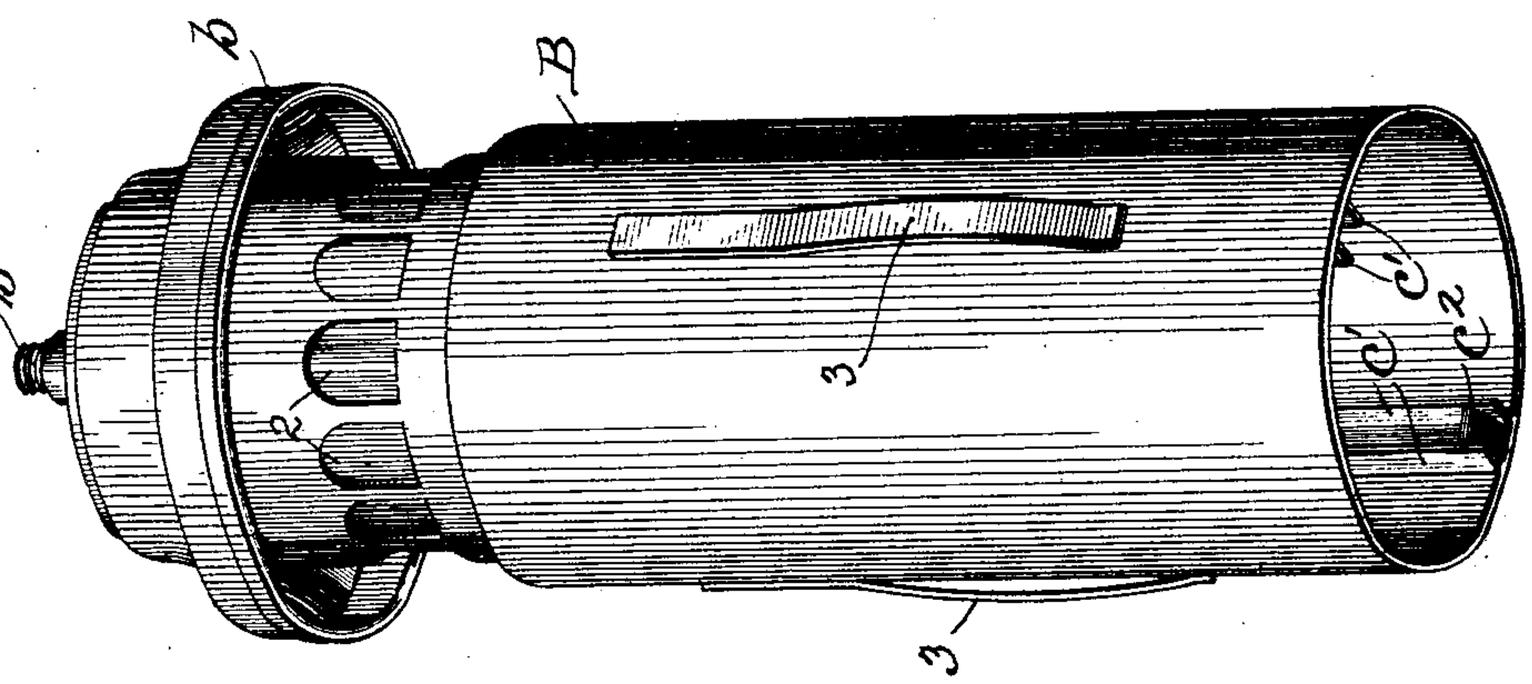


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALLEN WINCH, OF CHICAGO, ILLINOIS.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 704,226, dated July 8, 1902.

Application filed July 15, 1901. Serial No. 68,284. (No model.)

To all whom it may concern:

Be it known that I, ALLEN WINCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acetylene-Gas Lamps, of which the following is a specification.

This invention relates to improvements in gas-burning lamps of that class in which the gas consumed is produced within the lamp by the reaction of water upon calcic carbid.

The object of the invention is to produce an accurately self-regulating lamp of this character which shall be absolutely safe under all circumstances and the design of which shall be so simple that the lamp can be readily understood and handled by the most inexperienced persons and can be produced at a cost so low as to place it in active competition with oil and vapor lamps.

The invention consists in the matters herein set forth, and particularly pointed out in the appended claims, and will be fully understood from the following detailed description of the construction illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of an acetylene-gas lamp embodying my invention. Fig. 2 is a transverse section thereof, taken on line 2 2 of Fig. 1. Fig. 3 is a perspective detail of the needle-valve which controls the admission of water to the carbid-chamber. Fig. 4 is a sectional detail of the terminal cap of the tube which leads from the needle-valve into the carbid-chamber. Fig. 5 is a perspective view of the main inner casing of the lamp. Fig. 6 is a similar view of the generating-chamber. Fig. 7 is a similar view of the carbid-receptacle which fits within the generating-chamber.

In said drawings, A designates the outer casing or font of the lamp; B, an inner casing removably inserted in the font A; C, a removable generating-chamber removably inserted in the inner casing, and D a carbid-receptacle removably inserted in the generating-chamber C.

The font A acts simply as a tank to contain a body of water large enough in quantity to keep the lamp cool and to also supply the necessary water of generation. This font, as well as the other parts mentioned, is desirably formed of sheet metal and may be made of any suitable or ornamental shape. A fixed pointer or equivalent device *a* in the font designates the level to which it should be filled with water in starting the lamp, and when the inner casing of the lamp is inserted in the font the water will rise to the level of line 1 1.

The inner casing B is small enough to readily set down into the font A and is provided at its top with a downwardly-projecting flange *b*, which fits over the mouth of the font, lateral movement of the casing within the font being further prevented by springs 3 on the casing, which yieldingly engage the wall of the font. A little above the water-line 1 1 this casing is provided with a transverse partition *b'*, from the center of which a tube b^2 leads upwardly to any suitable burner E on the top of the casing. That portion of the casing below the partition *b'* then constitutes a downwardly-opening bell for containing the generating-chamber C, while above the partition the casing is made of skeleton form or provided with openings 2, through which the water in the font is free to circulate when forced up above the partition by the pressure of the generated gas. The entire interior of the font above the partition *b'* serves thus in effect as additional reservoir-space to take care of such rises in water-level in practically the same way as though the casing was not present therein or rather as though the lower bell portion of the casing was connected with its top only by the outlet-tube b^2.

The generating-chamber C is made in the form of an open cylindric cup, which sets up into the lower portion of the casing B and is normally retained therein, so as to be held against rotation relatively thereto by any suitable means, such as spring-catches *c*, which pass between guides *c'* on the inner face of the casing B and snap over lugs c^2 at the lower end of said guides. When the parts are interlocked, these springs *c* project slightly below the edges of the casing C, as shown in Fig. 1, and can be caught and pressed in by the fingers to release the generating-chamber from the casing. Fins c^3 on the generating-chamber are also provided to center it within the casing B and prevent its moving too loosely therein. The bottom of the generating-chamber is formed by a trans-

verse partition C′, located some little distance above the lower edges of its cylindric side walls, and a water-inlet tube C^2 projects upwardly through the center of this bottom to a point about or above midway of the depth of the generating-chamber. At the lower end of this tube is located a needle-valve V, consisting of a valve-seat v, which is secured to the under side of the bottom wall C′ and within which a screw plunger or needle v' is fitted in a familiar manner. This needle when screwed home closes the aperture v^2, leading into the tube C^2; but when unscrewed communication is established between this hole v^2 and lateral holes or perforations v^3, which open out through the sides of the valve-seat. The valve V is designed to be opened and closed by turning the casing B within the font, the lower end of the valve-needle v' being arranged to set down into a socket a' in the font, so as to be held thereby against rotation when the casing is turned. As herein shown, the socket a' consists of a slot cut in an upwardly-projecting boss a^2, that is secured to the bottom of the font, and the valve-needle is provided with a transverse pin v^4, which enters the slot a' and holds the needle stationary, so that as the casing is turned in the font the valve will be screwed toward or from its seat, and thus close or open communication with the tube C^2.

In preparing the lamp for use the charge C C of carbid is placed in the lower portion of the generating-chamber and the latter thrust into the casing B and locked there by the spring-catches c. The casing B, with its inclosed generating-chamber, is then set down into the water in the font A, and when it is desired to use the lamp the casing is turned sufficiently to slightly unscrew the valve-needle v'. This permits the water in the font beneath the generating-chamber to rise through the tube C^2 and flow over upon the carbid, thus causing an evolution of acetylene gas, which will pass off through the outlet-tube b^2 to the burner E, where it may be ignited. Instead of placing the charge of carbid C C directly in the generating-chamber, however, the latter will desirably first be supplied with a removable carbid-cup D, having a detachable bottom D′, provided with an aperture d for the passage up through it of the tube C^2. The lower end of this receptacle D is preferably made to converge downwardly slightly, so to remove an exhausted charge of carbid which may have settled into a hard cake in the bottom of the receptacle D. It is only necessary to take off the detachable bottom D′ and strike the hardened cake of ash within, when it will loosen and fall freely through the larger end or mouth of the receptacle. The detachable connection between the bottom D′ and the cylindric tube of the receptacle is herein shown as formed by wires d', which are soldered to the receptacle and have their lower ends bent parallel with the lower rim of the receptacle and pointed in the same direction with respect thereto. The bottom D′ itself is then provided with slots d^2, through which the bent ends of the wires d' will simultaneously pass as the bottom is placed against the open lower end of the receptacle. A slight twisting movement of the bottom D′ will then obviously move the wires in the slots, so that the ends of the wires will hook beneath the bottom and hold it in position.

As thus described the lamp will be in some degree self-regulating, owing to the back pressure of the gas upon the column of water within the tube C^2, this back pressure serving to force down the water in the tube and prevent its flowing over into the generating-chamber except as the gas consumed serves to release the pressure sufficiently to permit the water to flow again from time to time. I have, however, found in practice that such regulation is but imperfect unless the end of the tube C^2 is covered by a cap F, the construction of which is shown in Fig. 4 and which constitutes an important feature of my present improvements. This cap is made of tubing just large enough to fit closely over the upper end of the tube C^2 and is itself closed at its upper end except for one or more lateral openings f near its closed top. Within the cap is a downwardly-converging funnel-shaped tube F′, the upper end of which reaches just about to the level of the lower openings f, where it is soldered or otherwise secured in place. This funnel F′ enters the mouth of the tube C^2 when the cap F is telescoped over the latter, and communication between the generating-chamber and the tube C^2 can then take place only through the openings f and through the funnel F′, the lower end f' of which is contracted to a very narrow diameter, and the passage of the water through this funnel and through the openings f then seems to take place so gradually and under such conditions that the flow is perfectly controlled as it should be by the operating back pressure of the gas. In this connection also I have found that the aperture v^2 through the needle-valve should also be made very small and that the closed top of the cap F should be located only a short distance above the upper end of the funnel in order to produce the best results.

The manner of using a lamp thus constructed will be readily understood. The carbid-chamber D, with its detachable bottom secured in place on its lower end, will be inserted in the generating-chamber C and filled with carbid to a depth sufficiently less than the height of the tube C^2 to permit the expansion of the charge when moistened from clogging the outlet-apertures f in the tube. The generating-chamber will then be thrust into the casing B and interlocked therewith by means of the spring-catches c. The font A having been filled with water to the height of the indicator a, the casing B, with its inclosed charge of carbid, will be set down into

said font until the needle-valve stem enters the socket a'. This will raise the water in the font to the level of the line 1 1 and at the same time will force the water up between the inner casing and the generating-chamber and effectually seal the latter. The lamp is now ready for action and may be turned on at any time by rotating the casing B within the font, so as to open the needle-valve and permit the water to rise through the tube C^2 and funnel F' and flow over upon the carbid through the apertures f in the cap F, whereupon the gas will immediately begin to be generated and will pass off through the tube b^2 to the burners E, where it may be ignited. As soon as the process of generation has produced a gas-pressure within the generating-chamber greater than the head of water afforded by the supply in the font A the column of water within the tube C^2 will be forced down below the openings f and the water-supply cut off, thus restricting generation until by the subsequent consumption of gas the pressure in the generating-chamber decreases to a point where the water will begin to flow again. The generation thus afforded and as modified by the funneled cap F and valve V, having the restricted opening v^2, I have found to be exceedingly close and effective, and I consider the construction in this respect to be an essential feature of the present improvements. When the carbid is exhausted, the lamp will be recharged by lifting the casing B from the font, withdrawing the generating-chamber from the casing, lifting out the carbid-receptacle from the generating-chamber, removing the detachable bottom of the carbid-receptacle, and knocking out the residuum which remains in the latter, this residuum being readily gotten rid of by reason of such detachable bottom and of the downwardly-converging shape of the receptacle at its lower end, the construction in these respects being also a desirable part of the present improvements.

It will of course be obvious that instead of consuming the gas generated in burners, such as E, which are directly attached to the lamp, may be piped off to any suitable place of consumption or storage desired, in which case the apparatus will constitute merely a gas-generator instead of a generator and lamp, and it will therefore be understood that while the construction described is especially designed with reference to its portability and convenience as a lamp, and is consequently referred to as such throughout these specifications and claims, the latter are intended to cover the essential elements described, no matter where or in which way the generated gas may be consumed. It will also be understood that various changes may be made in the details of the construction shown without departing from the broad spirit of the invention claimed.

I claim as my invention—

1. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up from the bottom of the generating-chamber, a valve at the lower end of said tube, a laterally-perforated closed cap on the upper end of said tube, and a downwardly-converging funnel extending from the perforations in said cap down into the tube and terminating in a restricted opening, substantially as described.

2. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, and a downwardly-converging funnel extending down into the tube and terminating in a restricted opening through which the water in the tube passes to enter the generating-chamber, substantially as described.

3. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, a laterally-perforated cap on the upper end of said tube, and a downwardly-converging funnel extending from the perforations in said cap down into the tube and terminating in a restricted opening, substantially as described.

4. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, a downwardly-converging funnel extending down into the tube and terminating in a restricted opening, an inlet-valve at the lower end of the tube provided with a restricted opening, substantially as described.

5. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, a laterally-perforated cap on the upper end of said tube, a downwardly-converging funnel extending from the perforations in said cap down into the tube and terminating in a restricted opening, and an inlet-valve at the lower end of the tube provided with a restricted opening, substantially as described.

6. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, a laterally-perforated cap on the upper end of said tube, the upper end of said cap being closed and terminating not far above its lateral perforations, and a downwardly-converging funnel extending from the perforations in said cap down into the tube and terminating in a restricted opening, substantially as described.

7. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending into the generating-chamber, and a removable carbid-receptacle in said generating-chamber consisting of a cylindric cup provided with a detachable bottom perforated to set over the inlet-tube, substantially as described.

8. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending into the generating-chamber, and a

removable carbid-receptacle in said generating-chamber consisting of a cylindric cup provided with a loose bottom perforated to set over the inlet-tube, slots in said bottom, and bent wires secured to the receptacle and entering said slots to hold the bottom in place, substantially as described.

9. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, and a closed cap on the upper end of said tube, provided with perforations at different levels, substantially as described.

10. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber, a closed cap on the upper end of said tube provided with perforations at different levels, and a downwardly-converging funnel extending from the lower perforations in the cap down into the tube, substantially as described.

11. A gas-lamp comprising a font, a generating-chamber in said font, an inlet-tube extending up into the generating-chamber and provided with a valveless port affording open communication between the upper end and body portion of the tube, and a laterally-perforated closed cap on the upper end of said tube, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two subscribing witnesses, this 12th day of July, A. D. 1901.

ALLEN WINCH.

Witnesses:
HENRY W. CARTER,
K. A. COSTELLO.