No. 638,797. Patented Dec. 12, 1899.

U. CLAIREFOND.

ACETYLENE GAS GENERATOR.

(Application filed May 25, 1899.)

(No Model.) 2 Sheets—Sheet I.

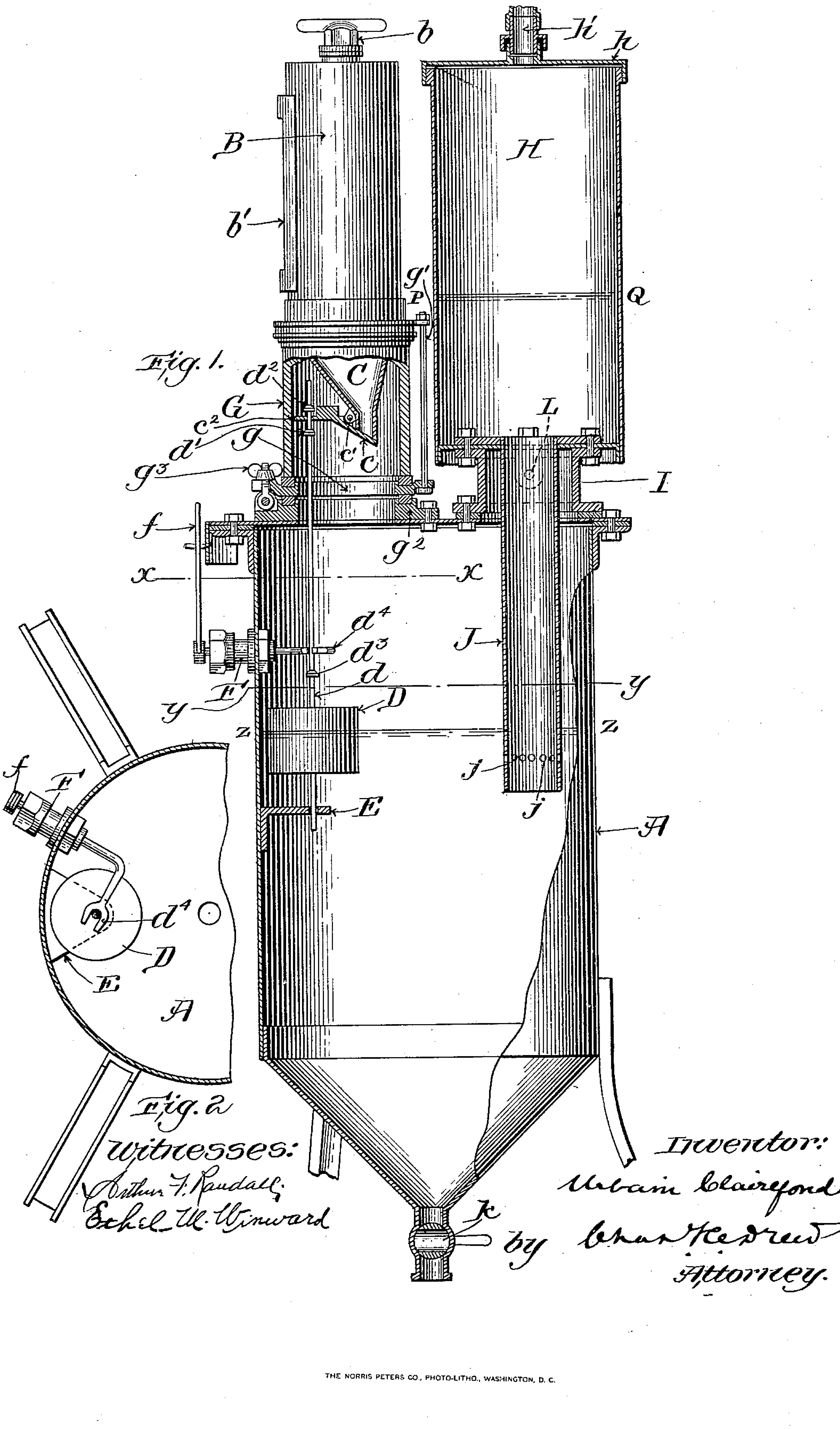

Fig. 2

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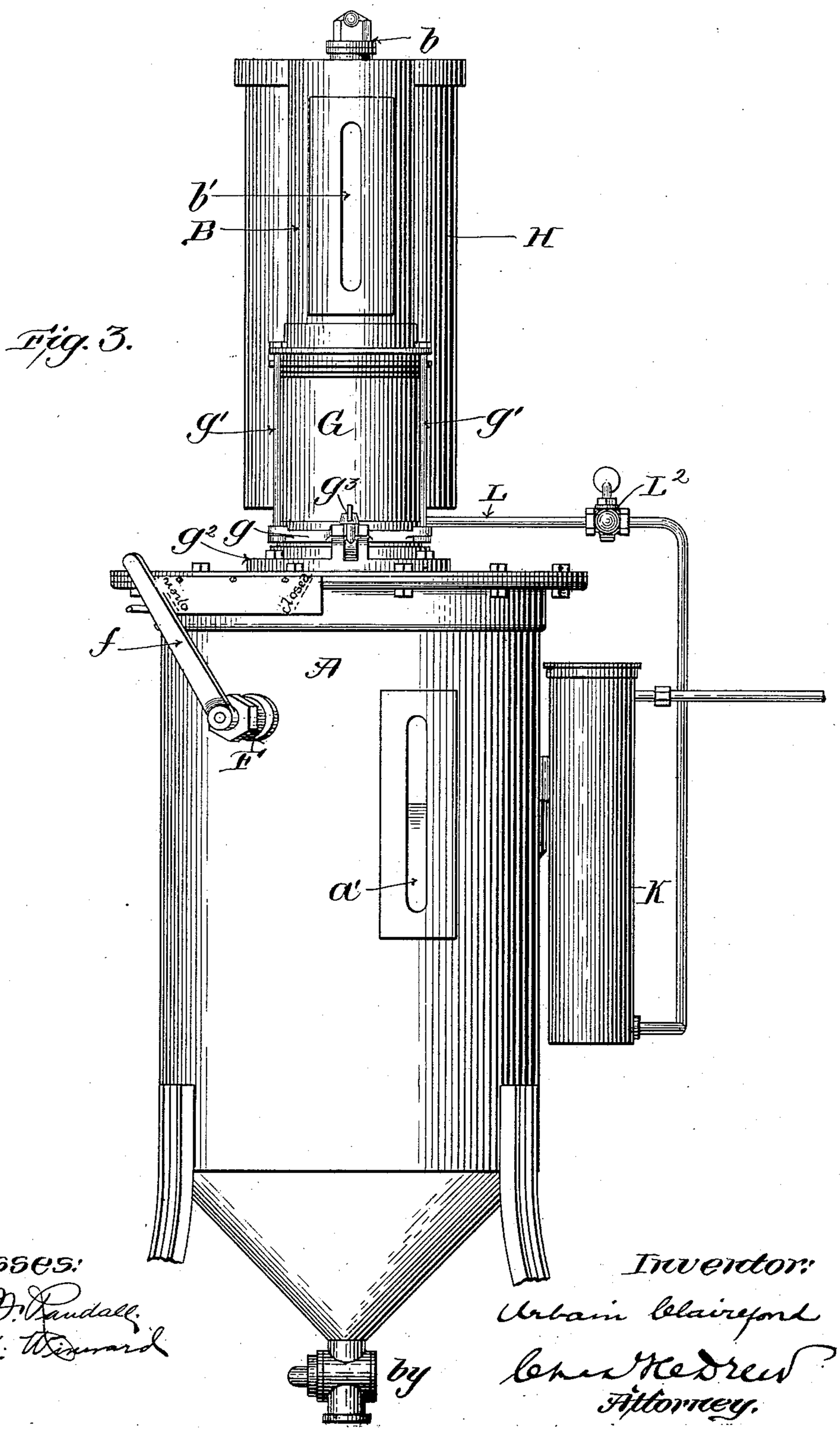
Fig. 3.



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UNITED STATES PATENT OFFICE.

URBAIN CLAIREFOND, OF VILLENEUVE-SAINT-GEORGES, FRANCE, ASSIGNOR TO EUGÉNE BORDIER, OF PARIS, FRANCE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 638,797, dated December 12, 1899.

Application filed May 25, 1899. Serial No. 718,257. (No model.)

To all whom it may concern:

Be it known that I, URBAIN CLAIREFOND, of Villeneuve-Saint-Georges, in the Department of Seine-et-Oise, in the French Republic, have invented a new and useful Improvement in an Apparatus for the Preparation of Acetylene Gas, of which the following is a specification.

My apparatus is intended for the preparation of acetylene gas by the falling of alkaline earthy carbid, preferably carbid of calcium, in small grains or powder into a body of water, the amount of carbid which falls being proportioned to the consumption of gas and taking place as the gas is consumed.

In the drawings I have shown in Figure 1 a vertical section of my apparatus, in Fig. 2 a horizontal section on line $x\,x$, and in Fig. 3 an elevation of the same.

The apparatus is composed, essentially, of a tank A, which I preferably make of sheet-iron or some equivalent substance and line it with lead or other proper material. A quantity of water is placed in the tank A sufficient to fill about one-half thereof, and into this water the carbid falls through a distributing apparatus controlled automatically by a float placed in the water, the level of which varies with the pressure of the gas. The carbid of calcium in small fragments, either granulated or powdered, is contained in a receiver B, which may be made of sheet-iron lined with lead or other suitable material. The carbid of calcium is placed in the receiver through an opening closed by the stopper *b* or by a valve.

On the side of the receiver B is a window *b'*, of glass or mica, for the purpose of observing the amount of carbid contained in the receiver B. The lower end of the receiver has the form of an oblique cone C, terminating in a short nose cut on a bevel and open at its lower end. The carbid falls through this opening into the water-tank A. The oblique cone C, I construct of brass or other suitable material and incase it in a glass or crystal cylinder G, on which it rests by its upper edge. This cylinder itself rests on a collar *g*, of cast-iron or other proper material, on which is placed a rubber washer. The lower opening of the oblique cone is closed by the hinged valve *c*, of brass or other suitable material, the axis of which is at *c'*. The valve has an extension c^2, with a counterweight so regulated as to press the valve against its seat with a strain slightly greater than the force exerted by the load of the carbid on the valve. A spring may be substituted for this counterweight. Owing to the obliquity of the cone, the pressure of the carbid on the valve is very slight, and the obliquity is also provided in order that in loading the receiver the material may not fall directly on the valve, and thus the valve is prevented from opening when the grains of carbid fall upon it.

In the interior of the tank A is the float D, with a metal rod *d* passing through and fixed to it. The upper end of this rod also passes through the extension c^2 of the valve which distributes the carbid and is guided at its lower end by a metal piece E, fixed at a proper height on tank A. The rod *d* of the float has upon it three stops or disks. One disk d' is near to and below the extension c^2 of the distributing-valve *c*, another, d^2, is placed at a similar distance above this same extension c^2, and the third disk d^3 is placed a little above the float. Above the disk or stop d^3 the fork d^4 engages the float-rod *d* and is extended by a bent lever, of which one branch passes outside of the tank A, Fig. 2, passing through the stuffing-box F. By turning the lever so that the fork presses upon the stop d^3 float D is forced below its floating-line in the water and kept in this position, and the apparatus is then closed, as will be explained hereinafter. The outside end of the bent lever is provided with a handle *f*, which moves in front of a plate fixed to the cover of the tank A and on which are marked the words "Open" and "Closed," corresponding to the two extreme positions of the lever *f*. According as this lever is in the position marked "Open" or that marked "Closed" the float D will either follow the movements of the water-level in the tank A or be held fixed below this level. The receiver B, the oblique cone C, which is the lower extension of it, the glass cylinder G, and the collar *g* form a whole with hermetical joints provided with three or more bolts g' and rubber washers, against which these bolts are tightened. The apparatus itself is fixed by means of three or more hinged bolts or ear-

nuts g^3 to a collar g^2, of cast-iron or other material, bolted to top of the tank A. The tank A has a window a', of glass or mica, by means of which the level of the water and the position of the float D are visible.

At the side of the receiver B is an extension-chamber H, of sheet-iron or other suitable material, lined with lead or other proper substance and closed at the top by a jointed cover h, which is removable, and has a branch outlet h'. This chamber is bolted to the cast-iron branch I, which is also bolted to the cover of the tank A. To the bottom of the chamber H is fixed a metallic tube J, which extends into the water in the tank A and the lower end of which has perforations $j\,j\,j$ a suitable distance below the normal surface of the water. When the pressure of the gas forces the level of the water in the tank A below the openings j, the surplus gas blows off through the openings into the chamber H and escapes. The distance that these holes j shall be below the normal surface of the water depends entirely upon the degree of pressure desired. The tank A is mounted on three legs or in any other suitable way and is terminated at the bottom by a cone provided with a clean-out k of sufficient diameter to permit the taking out of any sediment which may form in the tank and which may be placed at a proper height for an ordinary bucket to be set under it.

The operation of my apparatus is as follows: We will suppose the tank A to be filled with water to the level $y\,y$, the lever f being in the position "Closed" and the receiver B being full of carbid. The lever f being in the position "Closed," the float D has been thereby forced down into the water by the pressure of the fork d^4 on the stop d^3 of the float-rod d, the stop d' is at a certain distance below the extension c^2 of the valve c, and the stop d^2 is pressing down on this extension, thereby holding the valve closed. If the lever is pushed over slightly to the position "Open," the float D rises to the surface, the stop d^2 rises above the extension c^2 of the valve c, and the stop d' strikes the under side of the extension c^2, thereby opening the valve c and allowing the carbid to fall into the water and to form acetylene gas. By the pressure of this gas the level of the water $y\,y$ in the tank A is pushed down to $z\,z$ and the water is forced up through the openings $j\,j\,j$ into the extension-tank H to the level P Q. When the water-level in the tank A is changed by the pressure of the gas from the dotted line Y Y to Z Z, the float D descends with the fall of the water and the stop d^2 upon the rod d has a tendency by bearing against the upper side of the extension c^2 on the valve c to close the valve and put a stop to the discharge of carbid into the tank A below. As this extension c^2 is weighted, as shown in Fig. 1, the constant tendency of the valve is to close, and this closing tendency is only overcome when the water rises in the tank A, and then the stop d' on the rod d strikes against the under side of the extension and causes the valve c to open. The pressure of the gas in the top of the tank A forces the water in the tank through the pipe J into the extension-tank H, and the level of the water in the two tanks varies in accordance with the pressure of the gas. No more carbid can fall until the consumption of gas reduces the pressure and allows the water in the tank A to raise the float again and open the valve c. Thus the automatic feeding of the carbid is established.

It will be seen from the above explanation that the regular pressure of gas for a given amount of water in the tank A depends on the relative position of the stop d', d^2, or d^3, which can be set as desired. As the rise and fall of the water is more appreciable in the extension-tank H than in the tank A, owing to its smaller diameter, the variations of water-level corresponding to variations of gas-pressure can be seen by a water-gage on the side of the extension-tank H. The acetylene gas leaves the apparatus through a pipe L, closed by a valve L^2, the pipe L being attached to the branch I and communicating through the latter with the tank A. The gas after passing through the outlet-pipe L passes down through a purifier and drier K, containing suitable ingredients for the purpose of purifying and drying.

If accidentally too much carbid should drop into the water, the increased pressure would lower the water-level below $z\,z$ and sufficiently to let the gas out through the openings $j\,j\,j$ into the tube J and the extension-tank H, from which it would escape by the opening h' and connecting-tube into the open air.

The carbid is placed in the receiver B through the opening which is closed by the cap b and the water through the cover h of the extension-tank H or by a cock which can be placed on the cover of the tank A.

As may be seen from this description, the operation of the apparatus is automatic, the gas is produced as it is consumed, and the pressure remains always substantially the same. No extra pressure can be formed, and the whole operation is in sight, as the carbid may be seen through the sight b', the water-level in the tank A and the position of the float by the sight a', and the movements of the valve c by means of the glass cylinder g, so that the reason for any failure of operation may be at once ascertained.

The general shape and size of the various parts and of the apparatus itself may be modified or changed in any way without affecting the principle of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for producing acetylene gas, the receiver B, placed directly over the top of the tank, and the oblique cone C secured to lower end of the receiver and terminating in a short nose on a bevel, the valve c pivoted to the front lower end of the cone,

and provided with a perforated extension c^2, combined with a float, provided with a rod which extends upwardly above the float, and through the extension on the valve, suitable stops upon the rod for operating the valve, an operating-lever extending through the side of the tank, and a stop upon the rod which engages with the lever, substantially as shown.

2. The receiver B, the oblique cone C placed therein, the glass cylinder G surrounding the cone, the collars g, g^2, suitable clamping-bolts, and means for forming a tight joint between the parts, combined with the chamber H, the cast-iron branch I secured to the top of the tank A, and to the top of which the chamber H is secured, the tube J extending from the chamber down below the top of the water in the tank A, and which tube is provided with perforations a suitable distance below the normal surface of the water, the escape-pipe h' extending to the top of the chamber H, and the pipe L provided with the valve L^2, combined with the purifier K, substantially as shown.

3. The tank A, an operating-lever projecting therefrom, and provided with a cranked inner end, and a float provided with a rod having suitable stops thereon, combined with a receiver B, the cone C placed thereon, the cylinder G secured to the top of the tank A, and forming a support for the receiver, the pivoted valve c, provided with the extension c^2, suitable stops upon the float-rod, and which stops catch above and below the extension on the valve, substantially as shown and described.

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