

No. 631,656.

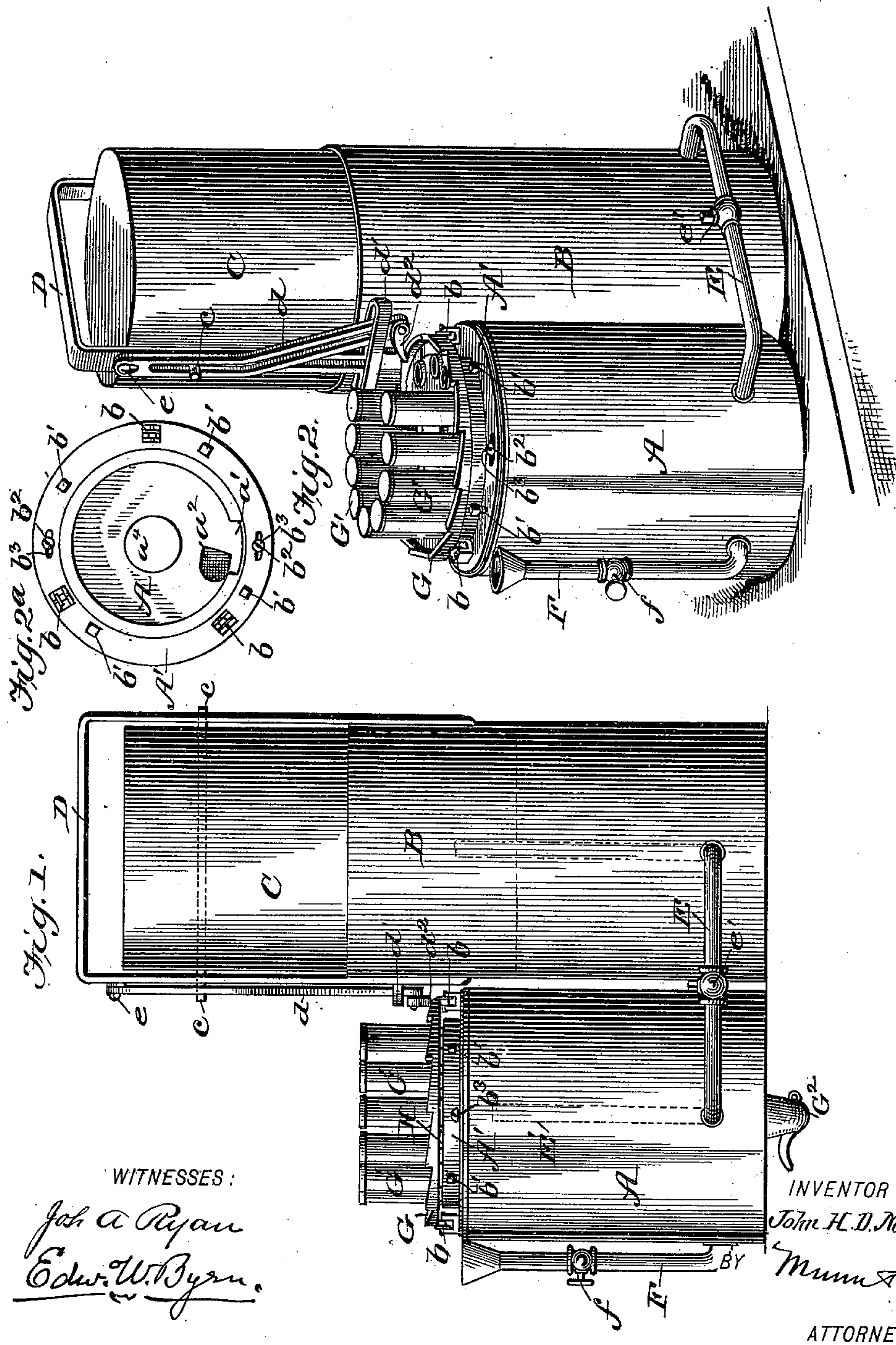
Patented Aug. 22, 1899.

J. H. D. NORDEMAN,
ACETYLENE GAS GENERATOR.

(Application filed Mar. 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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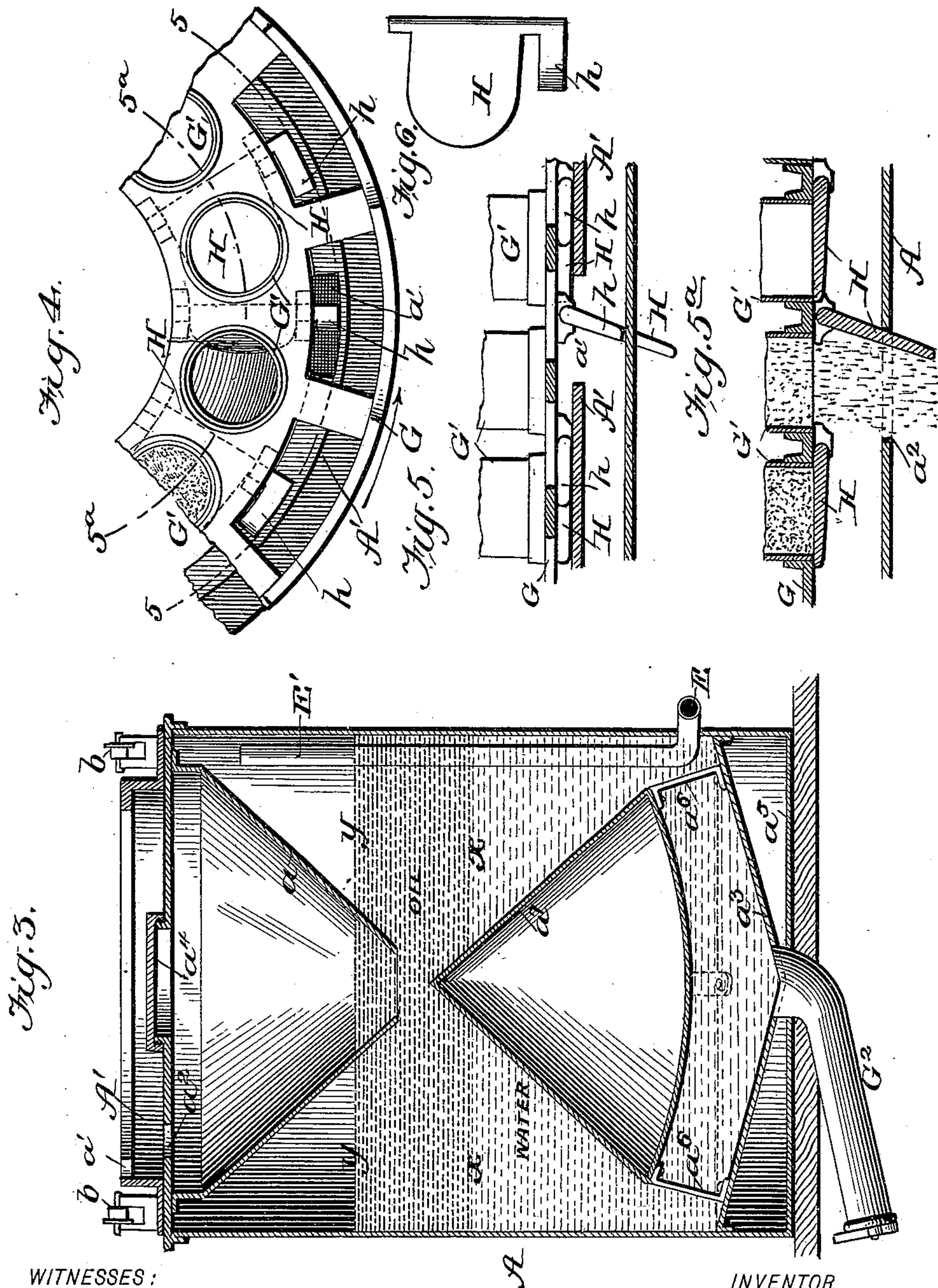
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UNITED STATES PATENT OFFICE.

JOHN H. D. NORDEMAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 631,656, dated August 22, 1899.

Application filed March 8, 1899. Serial No. 708,234. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. D. NORDEMAN, of Washington city, in the District of Columbia, have invented a new and useful Improvement in Acetylene-Gas Generators, of which the following is a specification.

My invention is in the nature of a novel form of acetylene-gas generator of that type in which the calcium carbide is fed to the water in the generator-chamber from a series of loaded cells or receptacles whose contents are successively and automatically discharged into the generator through the movement of the rising-and-falling gas-holder; and it consists in the peculiar construction and arrangement of the various parts of the same forming a simple, practical, and efficient device for the purpose, as will be hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the entire device. Fig. 2 is a perspective view of the same with some of the carbide-cells omitted. Fig. 2^a is a plan of the generator-chamber. Fig. 3 is an enlarged vertical section taken centrally through the generator. Fig. 4 is a partial plan view enlarged. Fig. 5 is a section through line 5 5 of Fig. 4; Fig. 5^a, a similar section on line 5^a 5^a, and Fig. 6 is a detail of one of the valves.

Referring to Figs. 1 and 2, A is the generator, and B is the tank for the floating gas-holder C, which latter is open at the bottom and whose side walls dip down into the water seal in the tank B in the usual way. The generator A communicates with the gas-holder through an outside pipe E, having a cut-off valve *e'*, which pipe E has a vertical stand-pipe E', opening into the generator above the liquid-level, and has also within the tank B another stand-pipe, which opens into the gas-holder above the level of the water seal. By means of the valve *e'* communication between the generator and the gas-holder may be cut off at will.

Attached rigidly to the sides of the tank B and rising to a height a little greater than the extreme vertical movement of the gas-holder there is a metal bail D, whose vertical side bars are slotted longitudinally to receive the projecting pins *c*, attached to the sides of the gas-holder C, and guide it in its vertical

movement. These pins I prefer to construct by means of a rod extending transversely all the way through the gas-holder C.

On one side of the bail D there is pivoted at *e*, at its upper end, a slotted cam-bar *d*, whose lower portion is offset at an obtuse angle and plays through a horizontal guide-loop *d'* and carries below it a pawl *d''*. Through the slot in the cam-bar protrudes one of the pins *c* of the rising-and-falling gas-holder, said pin being made long enough to pass through both the slot in bail-standard D and also the slot in the cam-bar. As the gas-holder descends when its gas is used up the attached pin *c*, descending and moving in a vertical line by the slot in bail D, strikes the offsetting lower portion of the cam-bar *d* and, moving it about its pivotal center *e*, advances the pawl *d''* and, through mechanism which I will presently describe, brings a loaded receptacle into position to discharge its charge of calcium carbide into the generator to generate a fresh quantity of acetylene gas. When this is done and the gas-holder rises again, the cam-bar *d* is carried back again, with its pawl, into position for a second advance.

The generator-chamber A has on top of it a track-ring A', detachably connected to the top of the generator and with provision for leveling it and adjusting the same circumferentially. For leveling it set-screws *b'* are provided, and for adjusting it circumferentially curved slots *b''* are formed on the ring, with screws *b'''* for tightening it and holding it to place. The value of these adjustments will be better understood farther along. On this track-ring A' there are mounted small flanged friction-wheels *b*, upon which is carried a circular turn-table G. This turn-table has along its outer edge a ring of ratchet-teeth which are engaged by the pawl *b''* to turn it in an intermittent manner, as described. This turn-table has mounted on it a circular series of small cylinders or cells G' for containing a definite quantity of calcium carbide. These cells open through the turn-table at the bottom and have at the top screw-caps with elastic packing-rings for closing them tightly, which caps are removed when the cells are to be filled. The bottom of each of these cells is provided with a flap-valve H, bearing an arm *h*. (See Figs. 4 to 6.) These

valves are hinged to the turn-table on its lower side between the cells and when in horizontal position close the bottoms of said cells. They are maintained in horizontal position by the arm h of each valve resting upon the track-ring A' until they come to a certain place in the ring, when it is cut away, as shown at a' , and when they reach this point, the arm h of the valve being no longer supported, the valve drops. Immediately beside this cut-away portion there is an opening a^2 through the top of the generator, and into this opening falls the valve, allowing the contents of the cell to be discharged through this opening a^2 into the generator. When the turn-table moves another step, the arm h of that valve passing beyond the cut-away portion a' of the track-ring rises onto the top of the latter again and restores the valve to its horizontal position, where it closes the bottom end of the cell again. In this connection the value of the adjustments of the track-ring A' may be understood, for the leveling-screws keep the turn-table in a horizontal position in which it is free to move, and the rotary adjustment of the track-ring is designed to bring a proper relation between the action of the pawl on the ratchet and the registration of the valve and its arm with the tripping mechanism.

The generator-chamber (see Fig. 3) is formed with a pendent funnel-shaped device a , attached to the lower side of its top concentrically near its outer edge and extending down with a gradual taper to a central opening near the middle of the generator. Immediately beneath this opening there is the apex of a concentric cone a^7 , which has a closed bottom and is supported upon legs a^6 at some distance from the bottom of the generator-chamber. This cone a^7 is a spreader for the calcium carbid, which catches the same as it falls from the funnel a and causes it to be deposited near the outer periphery of the generator-chamber.

F is a filling-tube, having a funnel-mouth and a valve f , by which water is supplied to the generator, and G^2 is the outlet-pipe by which the slush of spent lime is drawn off. This has a valve of the form of the ordinary molasses-gate, and it opens into the bottom of the generator in central position, whose floor a^3 is funnel-shaped to cause the lime to gravitate toward the center. The outside casing of the generator has beneath the floor a^3 a flat bottom a^5 for more conveniently supporting the device.

In the top of the generator there is a central opening, closed by a screw-cap a^4 , through which a swab or brush may be inserted to clean the upper surface of the cone a^7 .

In the operation of the device the generator is filled with water to about the level of the line x , and on top of this is poured a layer of oil rising to about the level of the line y . This layer of oil may be either one of the lighter or heavier petroleum products, or it may be an animal or vegetable oil. Its func-

tion is to seal the inlet for the calcium carbid so that the acetylene gas will not escape through the same and to retard the action of the water on the calcium carbid. Now when a charge of calcium carbid is dumped through the opening a^2 into the funnel a it passes through its central outlet and onto the cone a^7 , which spreads it and throws it to the outer periphery of the generator-chamber, where it is distributed in a ring while the water is acting upon the same. The object of this is to cause the gas (as it rises in straight vertical lines) to enter the annular upper portion of the generator, where it is trapped against any possible escape through the opening in the bottom of funnel a . It will be perceived that the layer of oil not only traps the opening in the bottom of the funnel a but it also extends down over the apex of the cone a^7 to a circumference equal to the opening in the funnel, so that the carbid does not come into contact with the water and the acetylene gas does not commence to be generated until the carbid has passed out of the vertical line of said opening, thus avoiding any leakage of gas back through the funnel a . The gas which accumulates in the upper annular space in the generator around the outside of the funnel a enters the stand-pipe E' and passes to the gas-holder, and whenever the supply of gas in the gas-holder becomes depleted and the holder descends it automatically turns (by means before described) the nest of carbid-receptacles and mixes a fresh quantity of carbid with the water, and thus renews the supply of gas.

An important distinction with regard to the value of the funnel a , arranged within the generator-chamber and dipping down into the liquid seal, is that it not only forms an annular gas-chamber, but also forms a carbid-chute or entrance-chamber into which the carbid is deposited, which chamber is largest at the top, and this gives the important result of causing the liquid as it rises in the funnel from the pressure of gas outside to reach only a very limited height, since the liquid rising in the funnel passes to the larger upper end of the funnel, where its bulk is taken up in a comparatively thin layer of slight vertical height, and as there is no danger of the liquid being forced up into the carbid-receptacles the generator may be shortened up vertically and made much more compact.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an acetylene-gas generator, the combination with the generator-chamber, and a surmounting turn-table with valved cells, of a circular track mounted on top of the generator and beneath the turn-table and having a circumferential adjustment, and tripping devices for the valves substantially as and for the purpose described.

2. In an acetylene-gas generator, the combination with the generator-chamber, and a sur-

mounting turn-table with valved cells; of a circular track mounted on top the generator and beneath the turn-table, and having both leveling devices, and rotary adjusting devices substantially as and for the purpose described.

3. The combination with the generator-chamber, and its surmounting turn-table with a circular series of cells, and a circular ring of ratchet-teeth; of a tank having a vertically-slotted standard, a slotted cam-bar d pivoted at its upper end and carrying a pawl at its lower end engaging the ratchet-teeth of the turn-table, and a gas-holder having a pin or stud playing through the slotted standard, and cam-bar to actuate the pawl-and-ratchet ring substantially as and for the purpose described.

4. The combination with the generator-chamber having an inlet a^2 at its upper end, and a track-ring A' with cut-away portion a' , a turn-table mounted above the track-ring and bearing a circular series of cells, valves H at the bottom of each cell having arm h riding on the track-ring and dropping into the cut-away portion a' to open the valve and dump the cell substantially as and for the purpose described.

5. An acetylene-gas generator comprising an outer casing having in the upper part of the same a tapering chute for the calcium carbide with an opening at its upper end for receiving the carbide, said chute being made largest at the top, and having its lower discharge end dipping down into and sealed by the subjacent liquid, whereby the rise of the liquid-level in this chute from the pressure of the acetylene gas outside, is limited or reduced in its vertical movement by passing

into a larger transverse area substantially as described.

6. An acetylene-gas generator having an inlet-opening in its top through which successive charges of carbide may be fed, a funnel attached at its upper edge to the under side of the top and dipping down into a liquid seal to constitute a carbide-chute largest at the top, and forming also an annular gas-chamber largest at the bottom, and a subjacent distributing device for transferring the calcium carbide laterally to a point out of vertical range of the discharge-orifice of the supposed funnel as described.

7. An acetylene-gas generator having an inlet-opening in its top through which successive charges of carbide may be fed, a funnel attached at its upper edge to the under side of the top and dipping down into a liquid seal to constitute a carbide-chute largest at the top, and forming also an annular gas-chamber largest at the bottom, and a concentric distributing-cone sustained above the bottom of the generator with its apex below the discharge-opening of the funnel substantially as and for the purpose described.

8. An acetylene-gas generator having a central opening with screw-cap a^4 , and an eccentric inlet a^2 for the carbide, the pendent funnel a , the concentric subjacent cone a^1 , and an inert liquid seal covering both the top of the cone and the bottom of the funnel substantially as and for the purpose described.

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Witnesses:

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