No. 624,159. Patented May 2, 1899.

A. & S. M. BEVERIDGE & H. K. SPENCE.

ACETYLENE GAS GENERATOR.

(Application filed Sept. 22, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

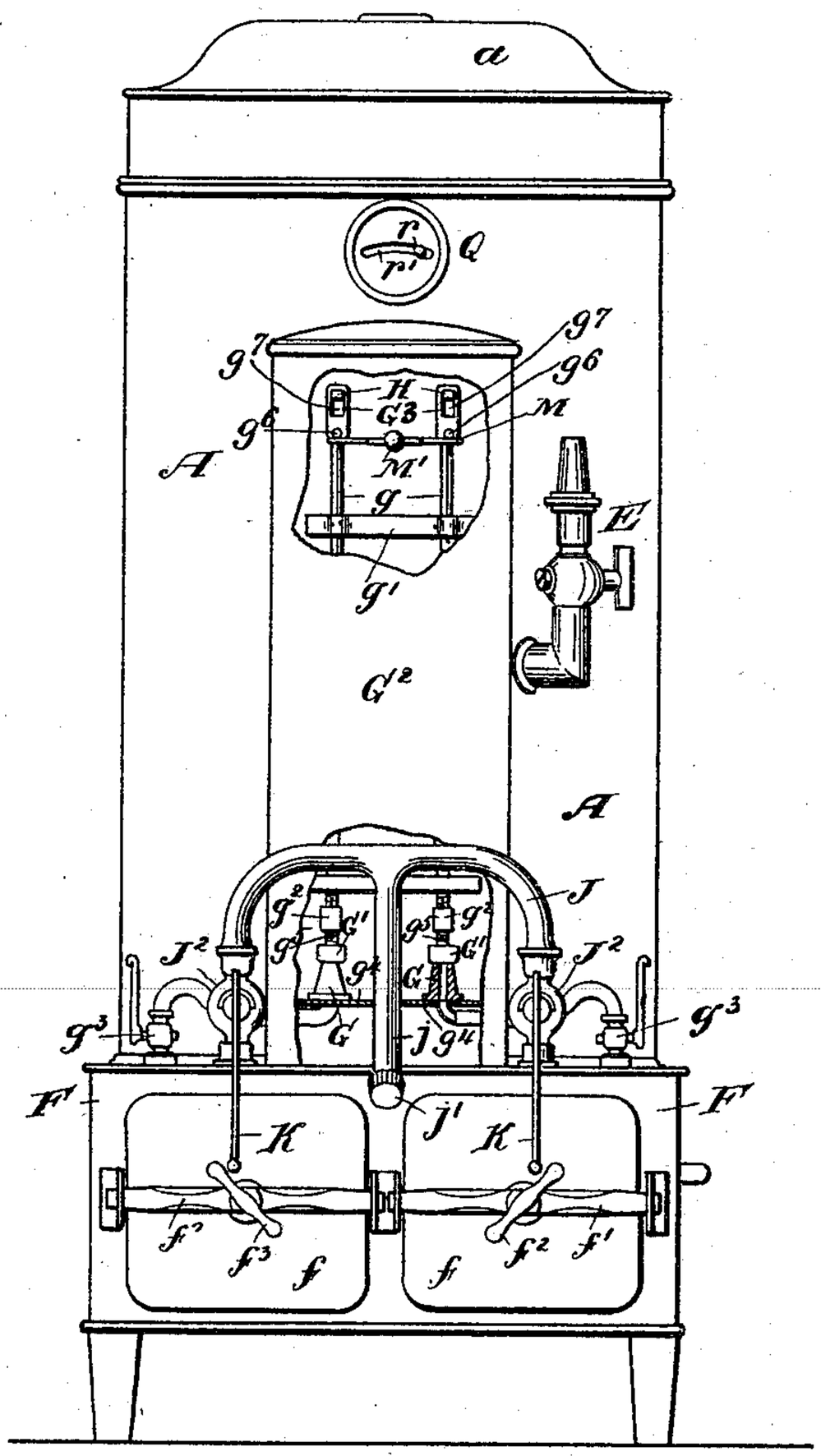

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Fig. II.

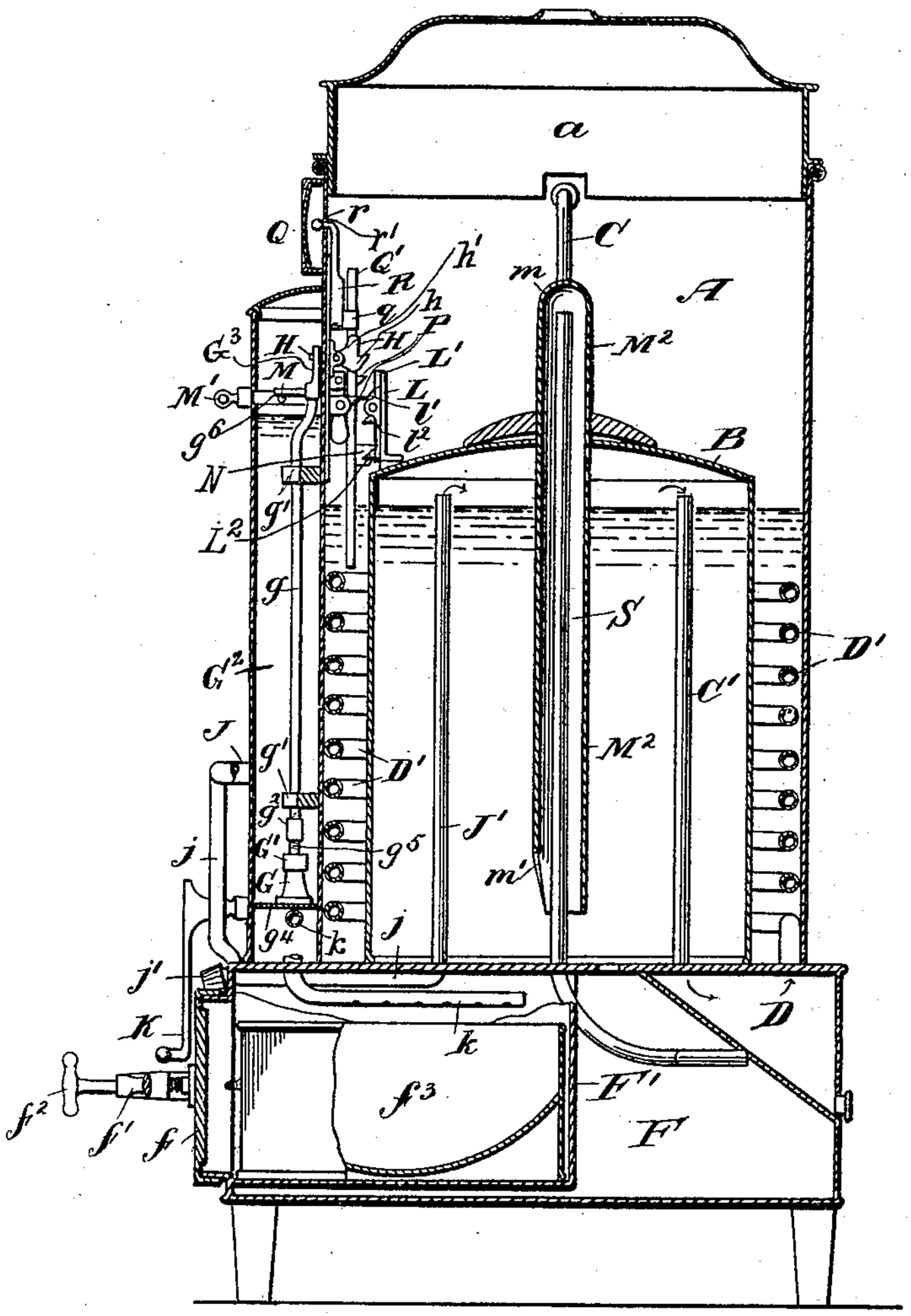

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Fig. III.

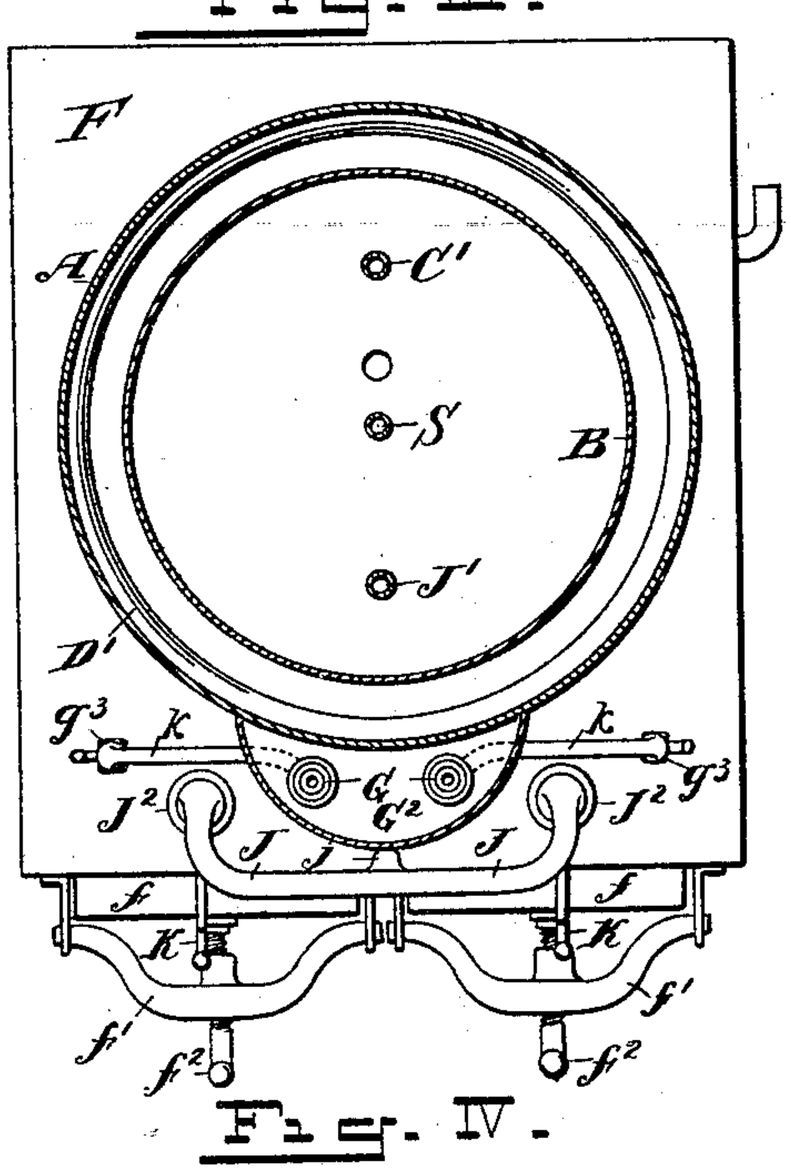

Fig. IV.

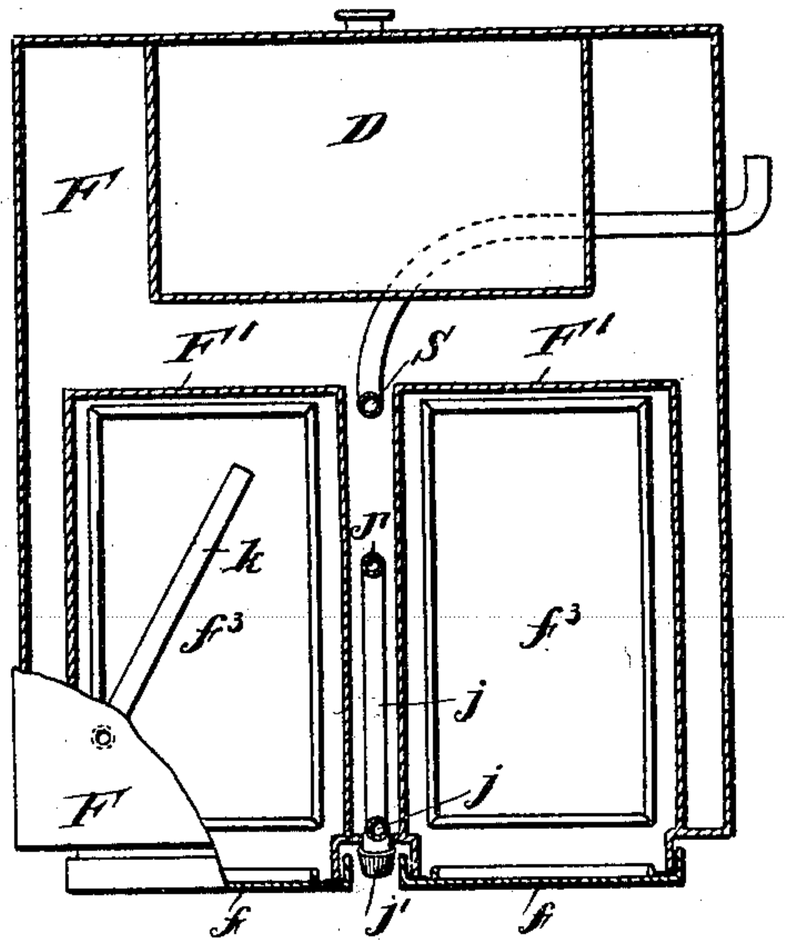

Fig. VII.

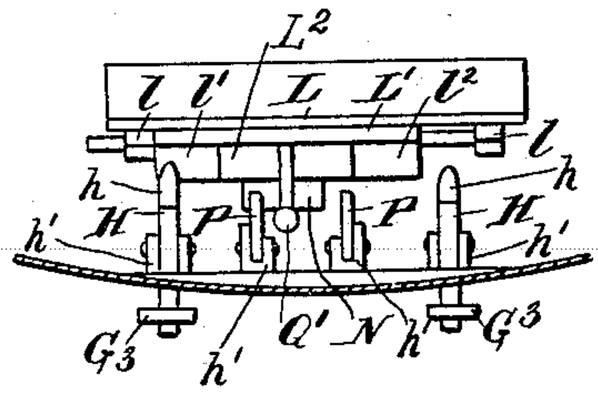

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FIG. V.

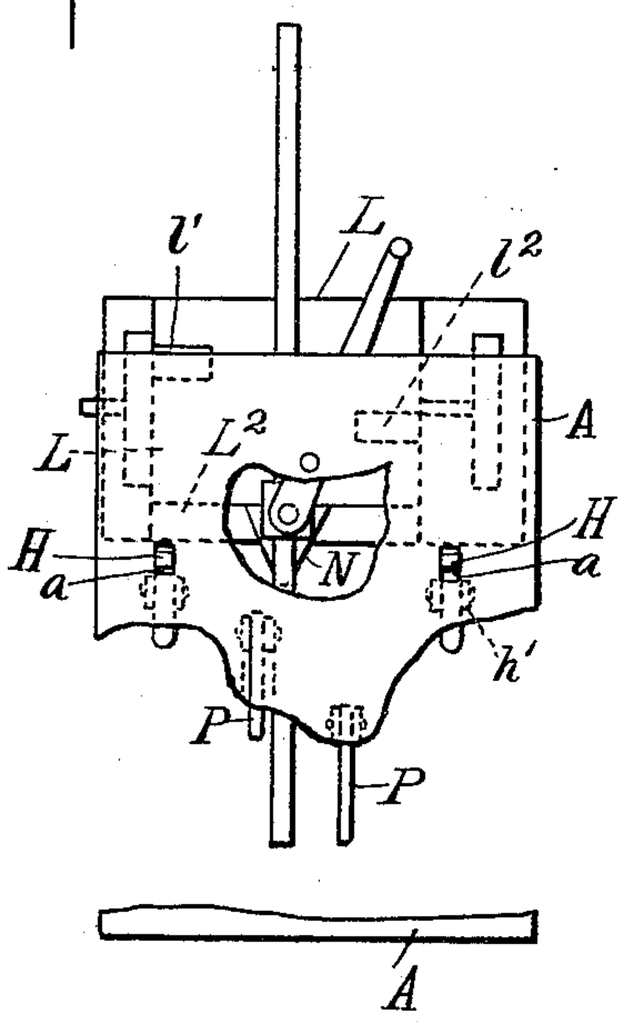
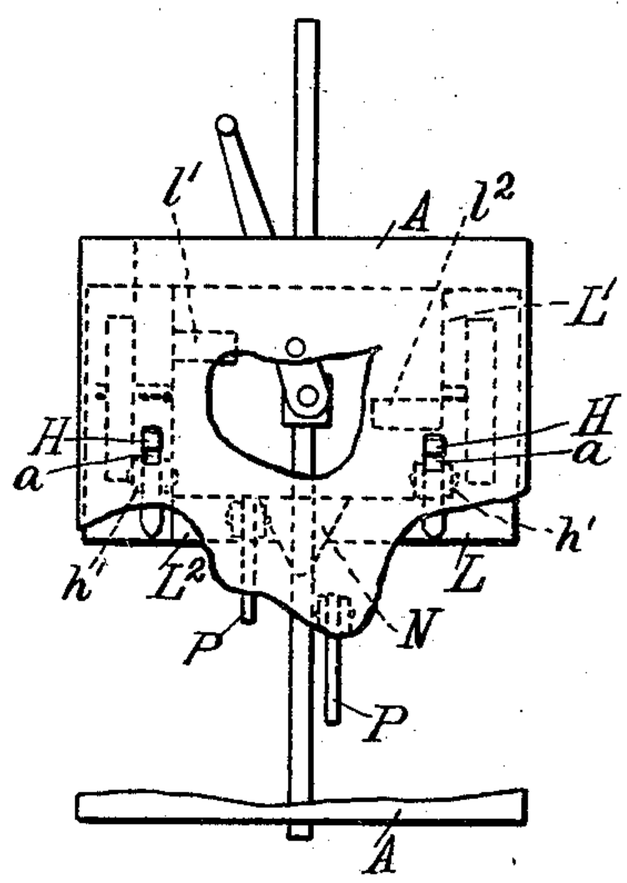


FIG. VI.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 624,159, dated May 2, 1899.

Application filed September 22, 1897. Serial No. 652,540. (No model.)

To all whom it may concern:

Be it known that we, ANDREW BEVERIDGE and SAMUEL MURDOCH BEVERIDGE, of 65 Nether street, and HUGH KERR SPENCE, of 86 Mid street, Kirkcaldy, in the county of Fife, Scotland, manufacturing ironmongers, subjects of the Queen of the United Kingdom of Great Britain and Ireland, have invented certain new and useful Improvements in Acetylene-Gas Generators, (for which we have obtained patents in Great Britain, No. 29,554, dated December 23, 1896; in France, No. 267,355, dated May 28, 1897, and in Belgium, No. 128,663, dated June 3, 1897,) of which the following is a specification.

Our invention relates to improvements in acetylene-gas generators, and has for its object the production of a generator which when once started continues its action automatically—that is to say, it automatically supplies the required quantity of water to the carbid-chambers when needed and when two carbid-chambers are employed when the one chamber is exhausted the other chamber is automatically brought into action.

Our improvements consist in novel features of construction hereinafter described and claimed.

In order that our invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a front elevation of our improved acetylene-gas generator, partly in section. Fig. II is a vertical longitudinal section taken on a line from front to back of the same. Fig. III is a horizontal section showing a plan view taken on a line above the base of the generator. Fig. IV is a horizontal section taken on a line through the base thereof. Fig. V is a detail front view of the automatic arrangement, showing the position of the parts in starting the generator after having charged both carbid-chambers, the strip on the slide part being in contact with the trip of the left-hand valve-rod. Fig. VI is a similar view, the right-hand stop being in contact with the trip of the right-hand valve-rod. Fig. VII is a plan of the automatic arrangement.

Referring to the said drawings, which show an acetylene-gas generator provided with two carbid-chambers, we employ a round or other shaped tank A, which is closed at the bottom and has a removable cover *a* at the top thereof. Within this tank A is a gas-containing bell B. The tank A is designed to contain water, with which it is filled to the required height. The bell B dips into the water and rises and falls therein according as the bell is being filled and being exhausted, respectively.

C are guides secured at intervals to the inside of the tank in order to guide the bell as it rises and falls. The inside of the tank is also provided, at one side thereof, with an upright outlet gas-pipe C′, which leads the generated gas from the inside of the bell down through the lower end of the generator into a chamber D, which is surrounded with water, whereby the gas is cooled, then upward through the ordinary coil D′, surrounding the bell, and out of the gas-supply pipes to the premises to be illuminated or for whatever purpose the generated gas is required. At the side of the generator is a cock E′ (see Fig. I) for turning off and on the flow of gas from the generator. Below the bottom of the tank is a rectangular or other shaped box or casing F to contain the gas-chamber D and two carbid-chambers F′, a space being left below, between, and around the carbid-chambers for containing water, whereby the carbid-chambers are kept cool. These carbid-chambers are situated side by side immediately below the bottom of the tank and are each provided at the front with gas-tight doors *f*, lined with rubber or other material, and by means of a cross-bar *f′* and tightening-screw f^2 similar to that which is used for the door of ordinary gas-retorts the chambers can be readily hermetically closed.

The vessels f^3 within the carbid-chambers for containing the carbid may be made of sheet-iron, and each preferably consists, as shown, of a trough fixed within a rectangular box or frame, with a hinged handle for readily drawing the boxes out for recharging.

Above the top of the rectangular box F, mounted on the plate g^4 and communicating within the space occupied by the two carbid-chambers F′, are situated valves G for allow-

ing the required quantity of water to be supplied to the carbid, the said valves being of a conical shape and having their faces carefully ground to form seats for the valve-covers G′. The said valves are inclosed by a semicircular casing or tank G^2, secured to the side of the tank A, and in order to enable the flow of the water to be checked between the tank and the carbid-chambers in case of anything going wrong with the valves independent cocks g^3, having elongated handles, are employed between the valves and the discharge-pipes. Each of the valves G is operated by an upright rod g, working in guide-brackets g', secured to the tank A. The lower end of each rod g and the upper end of each cover-stem g^5 are formed with right and left screw-threads, whereby the distance between them can be regulated by an adjustable nut g^2 to enable the distance between the valve and a pin g^6 on the valve-rod, whereby the valve is raised, to be correctly determined during the fitting up of the machine and also to permit the valve to be again readily adjusted should it by any chance become deranged, each of the said rods being formed at the top with a slotted portion G^3, within which work the outer ends of two trips or catch-pieces H, having inner projections h and secured within the tank A, the said projections being engaged by actuating devices provided at the top of the bell. The trips are hinged to interior brackets h' and project through the slots a in the wall of the tank to engage in the slots g^7 in the heads G^3 of the rods g. The arrangement is such that after the apparatus has been first actuated, as hereinafter explained, it operates automatically in the following manner: The bell being charged and in its highest position descends according as the generated gas is consumed, causing one strip projection L^2 on the bell to strike one of the projections which operate the valve-rods, by which means one of the valves is opened and a supply of water allowed to run into the one carbid-chamber. When that one carbid-chamber is exhausted, the other stop on the bell is automatically caused to strike the projection, operating the other valve-rod to supply the necessary amount of water to the other carbid-chamber. The particular mechanism for effecting this is hereinafter referred to. There is a branch gas-pipe J between the two carbid-chambers F′, which are connected to the bell gas-supply pipe J′ by a pipe j, an outlet j' being provided for running off any moisture formed. Each carbid-chamber is also supplied with an independent cock or valve J^2 for opening and shutting off the communication between the carbid-chamber and the gas-containing bell, and in order to insure that when the one carbid-chamber is opened to be recharged the gas connection is turned off we connect an actuating-handle to each cock or valve J^2, which handle is on the outside of the apparatus. The said handles are provided with an elongated lever portion K, and the arrangement is such that when the lever portion is located across the face of the door f of the one carbid-chamber F′ the gas connection is open; but when it is turned around so as to be free of the front of the carbid-chamber door the gas connection is cut off, this arrangement insuring that the doors of the carbid-chambers can never be opened until the gas has been cut off. The water-supply from the water-tank G^2 to the carbid-chambers is preferably by means of a pipe k, extending from end to end of each carbid-chamber and perforated with small holes to regulate the supply of water over the carbid, the said pipe being led from the bottom of the water-tank along the top of the carbid-chamber, at the inside thereof, and the holes facing downward, so that the water drops down to the center of the carbid.

Referring back to the automatic arrangement by means of which the one carbid-chamber is started after the other is exhausted; it is as follows: At the top at one side of the bell is fixed an angular plate L. Secured flat against the face of this plate is a slide-plate L′, which is held in guides l and which is adapted to be moved sidewise. The slide-plate is provided with a strip projection L^2 at its lower edge, adapted to engage a trip projection in starting the generator. The one end of this slide-plate has a stop l', which comes in contact with the projection h of one of the trips H of one of the water-valve rods g, and the other side is provided with a second similar stop l^2, arranged at a lower level than the stop l' and adapted to come in contact with the projection h of the other trip H of the other water-valve rod g. Situated at the upper ends of the valve-rods g is a horizontal arm-piece or lever M, which is pivoted at the center of its length to the side of the water-tank G^2. The pivoting-pin of this arm or lever is passed through the shell of the tank G^2 to a handle M′ on the outside thereof. To start the apparatus, this handle is operated in the one direction, which raises the one arm of the lever M and lifts the water-valve rod g by means of the rod-pin g^6. This allows a supply of water to fall onto the carbid. The generated gas immediately passes into the bell, which rises until the bell is filled, which can be indicated by means of a tube or indicator M^2, fixed in the bell B, the end m of which passes through the cover a of the water-tank A. As the gas is consumed the bell descends until the stop l' on the one side of the bell strikes its corresponding trip, which is at the top of the water-valve rod. The said valve is thus opened again, and another supply of water is dropped on the carbid, thus generating another supply of gas. The bell thus rises again automatically, and the same action goes on until the gas in that one chamber is nearing exhaustion. This exhaustion causes the bell to fall to such a lowness that a V-shaped stop N, situated at the center of the slide-plate L′ on the bell B, strikes one of

two projections P, which are secured to the inner side of the water-tank A at a point below the top of the water-valve rods, the said projections P being pivoted and weighted, so as to allow the bell to rise. Owing to the V shape of the bell-stop N the slide-plate on the bell is shifted to the one side. This shifting brings the stop l^2 on the other end of the slide-plate L′ in contact with the trip H of the other water-valve rod, whereby the said valve is opened and the supply of water given to the other carbid-chamber, whereby the same action takes place as with regard to the first carbid-chamber. The exhausted chamber can then be opened and recharged. When the second chamber is nearing exhaustion, the bell descends until the V-shaped stop N engages with the other projection P, which places the parts in their original position.

In order to indicate which carbid-chamber is in action, we provide an indicator Q at the one side of the water-tank. This indicator may be actuated by means of an upright rod Q′, fixed to the front of the V-shaped stop of the bell slide-plate, so as to rise and fall with the bell. A small fork-piece q fits loosely on this guide-rod and swivels on the one arm of a pivoted pointer R, the end r of which pointer is bent and projects through a slot r' in the shell of the water-tank, the extended length of the guide-rod working the pointer no matter what may be the height of the bell within the tank.

In order to check any excess of gas-pressure in the bell, a "let-off" upright gas-pipe S may be fixed within the water-tank A, which pipe telescopes within the larger pipe M^2, depending from the top of the bell, and the arrangement is such that when the bell rises to a certain height the excess of gas-pressure enters the pipe M^2 by the aperture m', from which it is allowed to escape down through the said upright pipe S, through the bottom of the water-tank, and out of the side of the rectangular casing.

Although we have described the apparatus with a double carbid-chamber, it is understood that the apparatus can also be worked with a single carbid-chamber only, in which case of course the automatic mechanism for changing the action from the one chamber to the other chamber would not be required, and also that we do not limit ourselves to the precise details described, as it is obvious that any modifications of the same may be employed without departing from the scope of our invention.

Having thus described our invention, the following is what we claim as new therein and desire to secure by Letters Patent:

1. An acetylene-gas generator comprising a main tank, a casing beneath the main tank, carbid-chambers within the casing, a bell, a valve-tank at the side of the main tank, the pipes connecting the valve-tank with the carbid-chambers, the valves within the valve-tank controlling the pipes, having valve-rods provided with slots at their upper ends, the hinged catch-pieces extending through the slots, the plate fixed to the bell, and the slide-plate secured to the fixed plate, having stops for engaging the projections; substantially as described.

2. An acetylene-gas generator comprising a main tank, a casing beneath the main tank, carbid-chambers within the casing, a bell, a valve-tank at the side of the main tank, the pipes connecting the valve-tank with the carbid-chambers, the valves within the valve-tank controlling the pipes, having valve-rods provided with slots at their upper ends, the hinged catch-pieces extending through the slots, the plate fixed to the bell, the slide-plate having stops and V-shaped shifting-piece, and the projections secured to the valve-tank and receiving the impact of the shifting-piece for moving the slide-plate; substantially as described.

3. An acetylene-gas generator comprising a main tank, a casing beneath the main tank, carbid-chambers within the casing, a bell, a valve-tank at the side of the main tank, the pipes connecting the valve-tank with the carbid-chambers, the valves within the valve-tank controlling the pipes having valve-rods provided with slots at their upper ends, the hinged catch-pieces extending through the slots, the plate fixed to the bell the slide-plates having stops and V-shaped shifting-piece, the projections secured to the valve-tank and receiving the impact of the shifting-piece, the pivoted indicator, and the indicator-rod secured to the shifting-piece; substantially as described.

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