

No. 611,577.

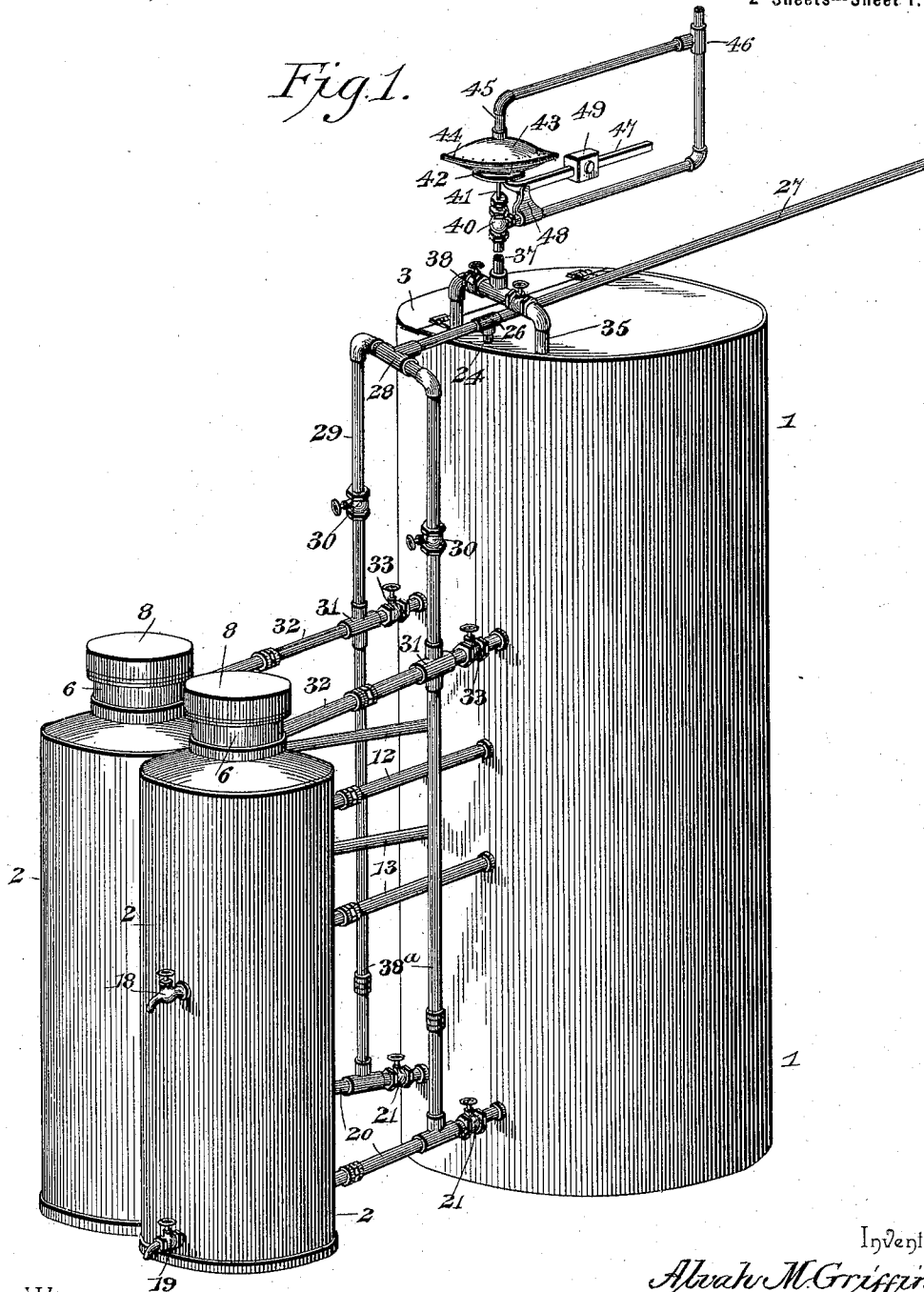
Patented Sept. 27, 1898.

A. M. GRIFFIN.
ACETYLENE GAS GENERATOR.

(Application filed Oct. 9, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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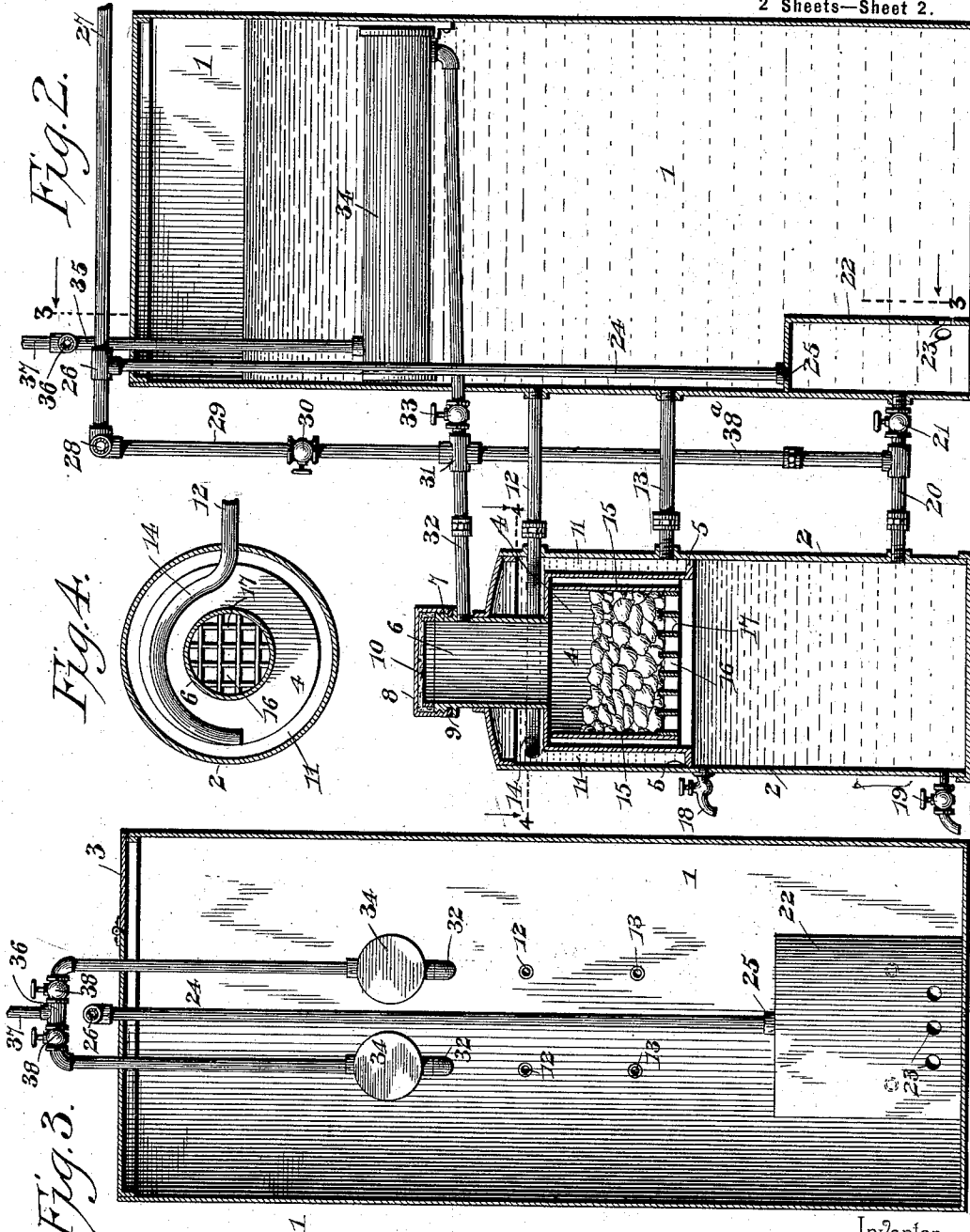
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UNITED STATES PATENT OFFICE.

ALVAH M. GRIFFIN, OF MARYSVILLE, KANSAS, ASSIGNOR TO THE GRIFFIN GAS COMPANY, OF SAME PLACE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 611,577, dated September 27, 1898.

Application filed October 9, 1897. Serial No. 654,684. (No model.)

To all whom it may concern:

Be it known that I, ALVAH M. GRIFFIN, a citizen of the United States, residing at Marysville, in the county of Marshall and State of Kansas, have invented a new and useful Acetylene-Gas Generator, of which the following is a specification:

This invention relates to acetylene-gas generators of that class which are designed to automatically regulate the generation of the gas according to the amount consumed.

To this end the main and primary object of this invention is to provide a new and useful construction of gas-generating apparatus having simple and efficient means for automatically starting and stopping the generation of gas and also means for causing the water to approach and recede from the carbid in such a manner as to prevent accumulations of sediment within the holder or cage for the carbid.

The invention also provides for the ready and convenient manipulation of the apparatus, whereby the control of gas may be regulated and the apparatus properly vented and cleaned.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a perspective view of the complete gas-generating apparatus constructed in accordance with this invention. Fig. 2 is a vertical sectional view, the line of section including the water-supply tank and one of the generating-tanks. Fig. 3 is a vertical sectional view on the line 3 3 of Fig. 2. Fig. 4 is a cross-sectional view on the line 4 4 of Fig. 2.

Referring to the accompanying drawings, the numeral 1 designates an upright water-supply tank which is sufficiently large to hold a supply of water for a plurality of generating-tanks 2, arranged in a convenient position at one side thereof. The said upright water-supply tank 1 is preferably of a cylindrical form and is provided at its upper end with a hinged cover or lid 3, which permits of ready access to the interior of the tank,

particularly for the purpose of refilling the same when the supply of water therein has become exhausted.

While any desired number of the generating-tanks 2 may be used in connection with a single water-supply tank 1, still for the purposes of this application I have deemed it necessary to only illustrate a pair of these tanks, which are duplicates of each other both in construction and operation.

Each generating-tank 2 is preferably of a cylindrical form and has fitted within the upper part thereof a cylindrical chemical-receptacle 4, narrower in width than the tank and joined at its lower edge, as at 5, to the inner sides of the tank, so that the interior of said receptacle will only be in communication with the interior lower portion of the tank below the plane of the lower open end of the receptacle. The said chemical-receptacle, which is fitted within the upper part of each generating-tank 2 in the manner described, has projected from the upper side thereof a gas-chamber extension 6, which extends through an opening in the closed upper end of the tank 2 and is provided with an exteriorly-threaded upper end portion 7, which removably receives thereon the interiorly-threaded screw closure-cap 8. The screw closure-cap 8 for the upper threaded end of the gas-chamber extension or neck 6 works on a packing-gasket 9 to form a gas-tight joint and has fitted therein an asbestos or similar lining 10, which serves to protect the same from the heated gas evolved from the calcium carbid during the generation of the same.

The chemical-receptacle 4 within each generating-tank by reason of being of a smaller diameter or width than the tank forms between the same and the adjacent walls of the tank a water jacket or space 11, through which water is circulated by means of the upper and lower water-circulating pipes 12 and 13, respectively, the lower of said pipes being connected at one end with the water-supply tank 1 and at its other end with the adjacent generating-tank 2, at or near the lower end of the water jacket or space 11. To provide for a proper circulation of water through the jacket or space 11, the upper of

said circulating-pipes 12 is connected at one end with the water-supply tank 1 and has the other end thereof extended into a curved portion 14, which lies within the water jacket or space 11 above the plane of the receptacle 4 and around the gas-chamber extension or neck 6 thereof, so that the pipe 12 will receive water from the side of the jacket or space 11 opposite the side where it enters from the pipe 13. The water jacket or space 11 and the means which are provided for circulating water therethrough provide for maintaining the chemical-receptacle and its gas-chamber cool, so that the same will not become overheated during the operation of generating gas.

To provide for the support of the calcium carbide or other gas-producing solid within the chemical-receptacle 4 of each generating-tank, there is employed a holder or cage 15, suitably secured in place within the receptacle and provided at its lower end with a supporting-grate 16. The sides of the holder or cage 15 are imperforate, so as to compel the water to reach the carbide solely through the grate 16, and said supporting-grate 16 essentially comprises a plurality of thin sheet-metal strips 17, assembled together in a suitable manner to form large square meshes or cells having a depth of about one inch or more, and through which meshes or cells the water is compelled to pass in approaching or receding from the carbide or other solid supported on the grate. The particular construction of the supporting-grate 16 for the chemical in each generating-tank is important to prevent the accumulation of sediment within the holder or cage for the carbide, and at this point it may be observed that when the water touches the carbide and the generation of gas commences the accumulation of gas under pressure will force the water downward through the deep square meshes of the grate; but the water in each mesh or cell is independent of the water in the adjacent meshes or cells and the constant and rapid circulation of the water upward and downward through said meshes or cells will serve to keep the upper edges of the strips 17 perfectly free of lime or other sediment that would otherwise lodge and rest thereon. The washing action of the water in passing up and down the walls of the meshes of the supporting-grate insures a generation of gas only while the latter is being consumed, and it will be noted that the particular construction of supporting-grate referred to is more useful for the purpose described than a perforate sheet-metal or wire-fabric support for the chemical, as perforate sheet metal or wire fabric admits of no washing action of the water and will hold sediment which retains sufficient moisture to cause a continuous generation from the carbide.

Each generating-tank 2 has fitted to one side thereof, immediately below the plane of the chemical-receptacle 4 therein, a draw-off

cock 18, which is used to draw off water from the upper part of the tank when the carbide-holder is being prepared for a new charge, and to the lower end of each tank is fitted a drain valve or cock 19, that provides for draining the tank of sediment and water when it is desired to clean the tank. To provide for supplying each generating-tank with water, a water-feed pipe 20 is fitted at one end to the tank, near the lower end of the latter, and connects at its other end with the adjacent side of the water-supply tank 1, and said water-feed pipe 20 is provided with a controlling-valve 21, which is manipulated to open up or cut off the supply of water to the generating-tank. The water-feed pipes 20 for the separate generating-tanks 2 communicate with the interior of a vent-hood 22, which is fitted within the lower end of the water-supply tank 1, so as to cover the connections of the pipes 20 therewith. The said vent-hood 22 is provided in its side and near the lower end thereof with a plurality of circulating-openings 23, which permit of the free circulation of water from the interior of the water-tank into the pipes 20, while the portion of the vent-hood above the plane of the openings 23 forms a chamber for delivering gas to the gas-vent pipe 24 in the event of there being an overproduction of gas within a generating-tank.

The gas-vent pipe 24 is connected at its lower end, as at 25, with the upper side of the vent-hood 22 and, extending vertically through the water-supply tank 1, is coupled at its upper end, as at 26, to an escape-pipe 27, leading outside of the building within which the generating apparatus is arranged.

The escape-pipe 27 is also coupled, as at 28, to the air-vent pipes 29 for the separate generating-tanks, and each air-vent pipe 29 is provided at a suitable point with a cut-off valve 30, and is connected, as at 31, with a gas-delivery pipe 32, fitted at one end to the gas-chamber or neck 6 of one of the generating-tanks. The gas-delivery pipe 32 for each generating-tank is provided with a controlling-valve 33 and, extending through the adjacent side of the water-supply tank, is connected to one end of a condensing retort or cylinder 34, suitably supported in position within the water-supply tank in a plane intermediate the upper and lower ends of this tank. There is one of the condensing-retorts 34 for each generating-tank, and each of said retorts has connected therewith near the end opposite the connection of the gas-delivery pipe 32 a gas-outlet pipe 35, extended through the top of the water-supply tank and coupled, as at 36, to the gas service-pipe 37, which carries the gas to the point of use. Adjacent to its connection with the service-pipe 37 each of the gas-pipes 35 is provided with a cut-off valve 38, which provides means for controlling the flow of gas from one retort independently of the other.

The condensing retort or cylinder 34 for

each gas-generating tank serves to cool the gas and extract the moisture therefrom, and the moisture thus eliminated from the gas drains through the gas-delivery pipe 32, which is arranged at an inclination, into a drain-pipe 38^a. The drain-pipe 38^a is conveniently coupled at its upper end to the gas-delivery pipe, as at 31, by the same coupling which connects this pipe with the air-vent pipe 29, and the lower end of said drain-pipe 38^a connects with the water-feed pipe 20, so that the drain-water from the retort will be carried back into the lower end of the generating-tank.

The automatic regulation of the pressure of the gas delivered to the service-pipe 37 is effected through the medium of an automatically-operating pressure-regulating device which I shall now proceed to describe. This pressure-regulating device involves the use of an ordinary angle-valve 40, which is fitted to the service-pipe 37 at any convenient point, which valve is provided with a vertically-movable stem 41, extended outside of the valve-casing and having fitted to the upper end thereof a pressure-disk 42, directly above which is arranged a flexible inflatable pressure-bulb 43, preferably made of two disks of rubber securely fastened together at their meeting edges, as at 44. The said inflatable pressure-bulb 43 is fitted to one end of a branch gas-pipe 45, the other end of which pipe connects, as at 46, with the main service-pipe 37, so that the gas will be delivered directly from the service-pipe into the said bulb 43. In connection with the inflatable pressure-bulb 43 and the disk there is employed a regulating-lever 47, fulcrumed intermediate its ends to a supporting bracket or arm 48, conveniently and preferably fitted to the service-pipe 37, adjacent to the angle-valve 40. The short end of the regulating-lever 47 at one side of its fulcrum is arranged under and bears directly against the pressure-disk 42, while the long arm of the lever has adjustably fitted thereon a sliding weight 49, which is adjusted to any position desired, according to the predetermined pressure desired to be maintained in the service-pipe.

It will be understood that in the operation of the pressure-regulating device an excess of gas-pressure will cause an expansion of the bulb 43 and a consequent depression of the disk 42 and the valve carried by the valve-stem 41, so as to retard the flow of gas until the pressure again becomes normal.

While the operation of the herein-described apparatus may be readily understood from the foregoing description, still a further statement may give a better understanding of the use of the different pipes and valves, and at this point it may be explained that after the water-supply tank has been filled with water and the chemical holders or cages supplied with the calcium carbide or other gas-producing solid the valves 21 are opened to permit of water flowing into the generating-tanks,

and at the same time the cut-off valves 30 are opened to permit of the free escape of air into the escape-pipe 27 until the water reaches the chemical, and then the said valves 30 are closed and the valves 33 opened, so that the gas as it generates may escape from the gas-chambers or necks 6 through the delivery-pipes 32 and into the condensing-retorts 34. After the generation of gas has commenced either or both of the valves 38 may be opened to permit the gas to pass into the service-pipe 37. The gas may be used successively from the separate generating-tanks should it be desired, and when it is necessary to recharge either tank the valves 21 and 33 for such tank are first closed and the valves 30 and 18 opened, the latter valve permitting the water to be drawn off from the tank until the lever thereof is below the plane of the carbide holder or cage. By then closing the valve 18 and removing the screw-cap 8 a new charge of the chemical may be introduced into the holder or cage therefor and by manipulating the valves as previously described the generation of gas may be again started. Further reference is made at this point to the particular construction of the supporting-grate 16, which grate has been described as essentially comprising a plurality of thin sheet-metal strips 17, assembled together in a suitable manner to form large square meshes or cells which permit of a washing action of the water as the same approaches or recedes from the carbide. In order to insure a thorough washing of the grate at all times and thereby prevent any accumulation of sediment on the same, I preferably construct the grate with an uneven upper surface. This uneven upper surface is produced by having the upper edges of one series of the intersecting strips 17 project above the plane of the corresponding edges of the other series of said strips, which construction affords no support for small particles of sediment and prevents the latter from lodging at the corners of the grate, or at least at the corners of the meshes thereof.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described generating apparatus for acetylene gas will be readily understood without further description, and I will also have it understood that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

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

1. In an acetylene-gas generator, a main water-supply tank, a generating-tank arranged exterior to the water-tank, and having a water-feed-pipe connection therewith, a chemical-holding receptacle fitted within the upper portion of the generating-tank and

smaller in size than the latter, said chemical-holding receptacle having a gas-chamber extension or neck projected through the top of the generating-tank, and having its lower edge meeting the inner sides of said generating-tank in a closed joint to form a closed and isolated water-jacket surrounding the sides and top portion of the receptacle, a gas-delivery-pipe connection with said gas-chamber extension or neck, and separate water-circulating pipes connecting said water-jacket with the water-supply tank, substantially as set forth.

2. In an acetylene-gas generator, a main water-supply tank, a generating-tank having a feed-water-pipe connection with the water-tank, a gas-delivery pipe having a connection with the generating-tank, an interior vent-hood fitted within the water-tank over the connection of the feed-water pipe therewith, and a gas-vent pipe connected at one end to the vent-hood, and leading to a point exterior to the water-tank, substantially as set forth.

3. In an acetylene-gas generator, a main water-supply tank, a separate generating-tank arranged exterior to the water-tank and having a water-feed-pipe connection therewith, a closed condensing retort or cylinder supported within the water-tank and having a gas-service-pipe connection, a gas-delivery pipe leading from the exterior generating-tank to the retort or cylinder within the water-tank, an interior vent-hood fitted within the water-tank over the connection of the water-feed pipe therewith, a gas-vent pipe connected at one end to the vent-hood and leading to a point exterior to the water-tank, and an air-vent pipe coupled with the exterior end of the gas-vent pipe, and also connected with said gas-delivery pipe leading from the generating-tank to the retort or cylinder, substantially as set forth.

4. In an acetylene-gas generator, a main water-supply tank, a generating-tank having a feed-pipe connection with the supply-tank, a chemical-receptacle fitted within the generating-tank and having a gas-chamber extension, a condensing retort or cylinder supported within the supply-tank, a gas-delivery pipe leading from said gas-chamber extension to the retort within the supply-tank, a drain-pipe connection between the water-feed pipe and said gas-delivery pipe, an air-vent pipe connected with said gas-delivery pipe, and a draw-off cock connected with the generating-tank immediately below the plane of the chemical-receptacle therein, substantially as set forth.

5. In an acetylene-gas generator, a main

water-supply tank, a generating-tank having a feed-pipe connection with the supply-tank, a chemical-receptacle fitted within the generating-tank, a gas-delivery pipe having a connection with said chemical-receptacle, an interior vent-hood fitted within the lower end of the water-supply tank over the connection of the feed-pipe therewith, and a gas-vent pipe connected at one end to the upper side of the vent-hood and leading to a point exterior to the water-supply tank, substantially as set forth.

6. In an acetylene-gas generator, a generating-tank having water-supply and gas-delivery pipe connections therewith, and a chemical-supporting grate supported within the tank and comprising a plurality of intersecting flat sheet-metal strips arranged edge-wise with their flat sides in vertical planes and assembled together to form vertically-disposed meshes or cells within which the water maintains a washing action, as it rises and falls, one series of said strips having their upper edges project above the plane of the corresponding edges of the other strips, substantially as set forth.

7. In an acetylene-gas generator, a main water-supply tank, a generating-tank having a feed-pipe connection with the water-tank, a gas-delivery pipe having a connection with said generating-tank, an interior vent-hood fitted within the water-tank over the connection of the feed-pipe therewith, a gas-vent pipe connected at one end to the vent-hood and leading to a point exterior to the water-tank, and a drain-pipe connection between the water-feed pipe and said gas-delivery pipe, substantially as set forth.

8. In an acetylene-gas generator, a main water-supply tank, a generating-tank having a feed-pipe connection with the supply-tank, a gas-delivery pipe having a connection with said generating-tank, an interior vent-hood fitted within the lower end of the water-supply tank over the connection of the feed-pipe therewith, and provided in its side and near the lower end thereof with a plurality of circulating-openings, and a gas-vent pipe connected at one end to the upper side of the vent-hood and leading to a point exterior to the water-supply tank, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALVAH M. GRIFFIN.

Witnesses:

W. H. SMITH,

J. A. WALKER.