(No Model.) 2 Sheets—Sheet 1.

R. F. CARTER.

APPARATUS FOR PRODUCING ACETYLENE GAS.

No. 598,048. Patented Jan. 25, 1898.

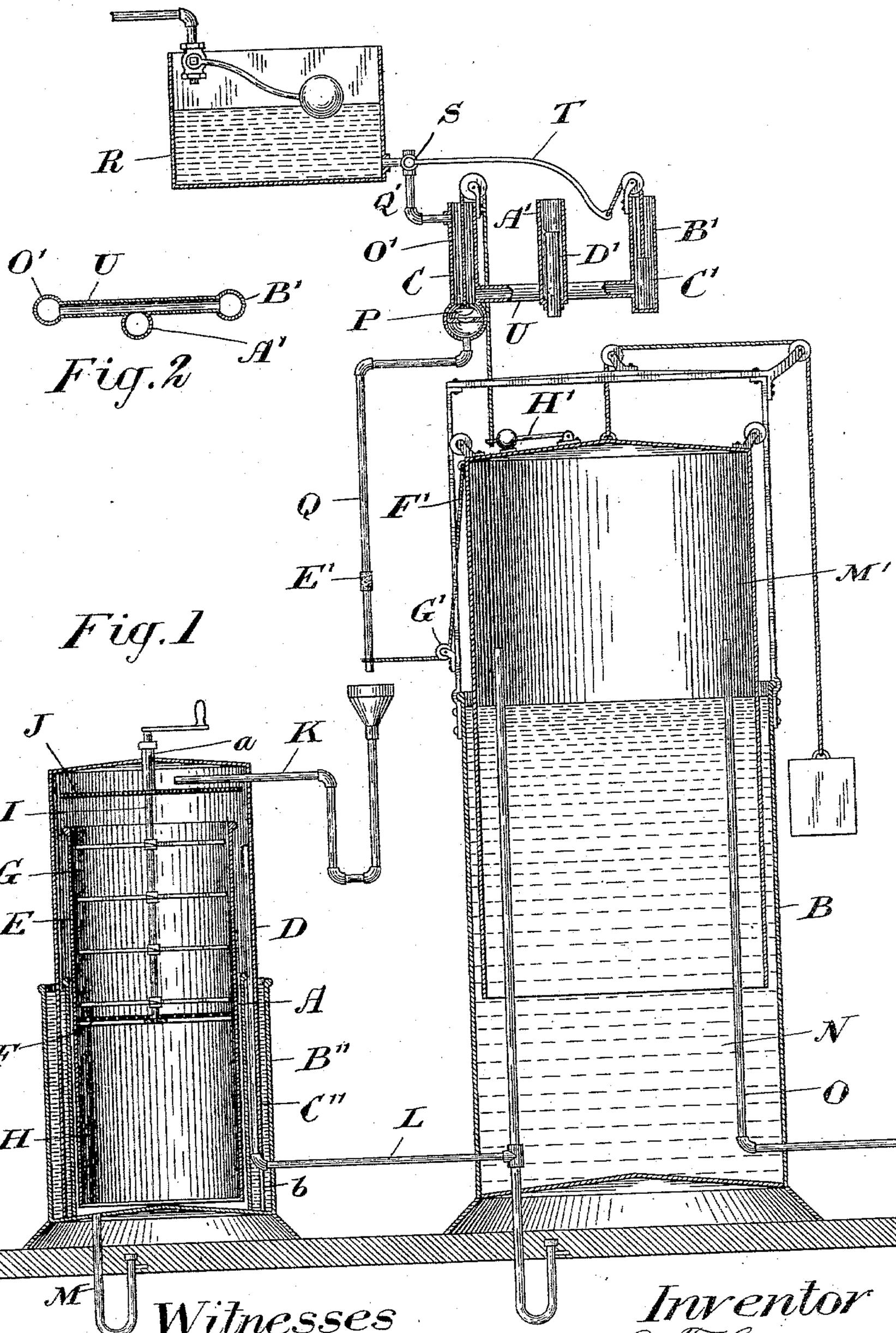

Fig. 1

Fig. 2

Witnesses
W. G. McMillan.
Fred'k Clarke

Inventor
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(No Model.) 2 Sheets—Sheet 2.

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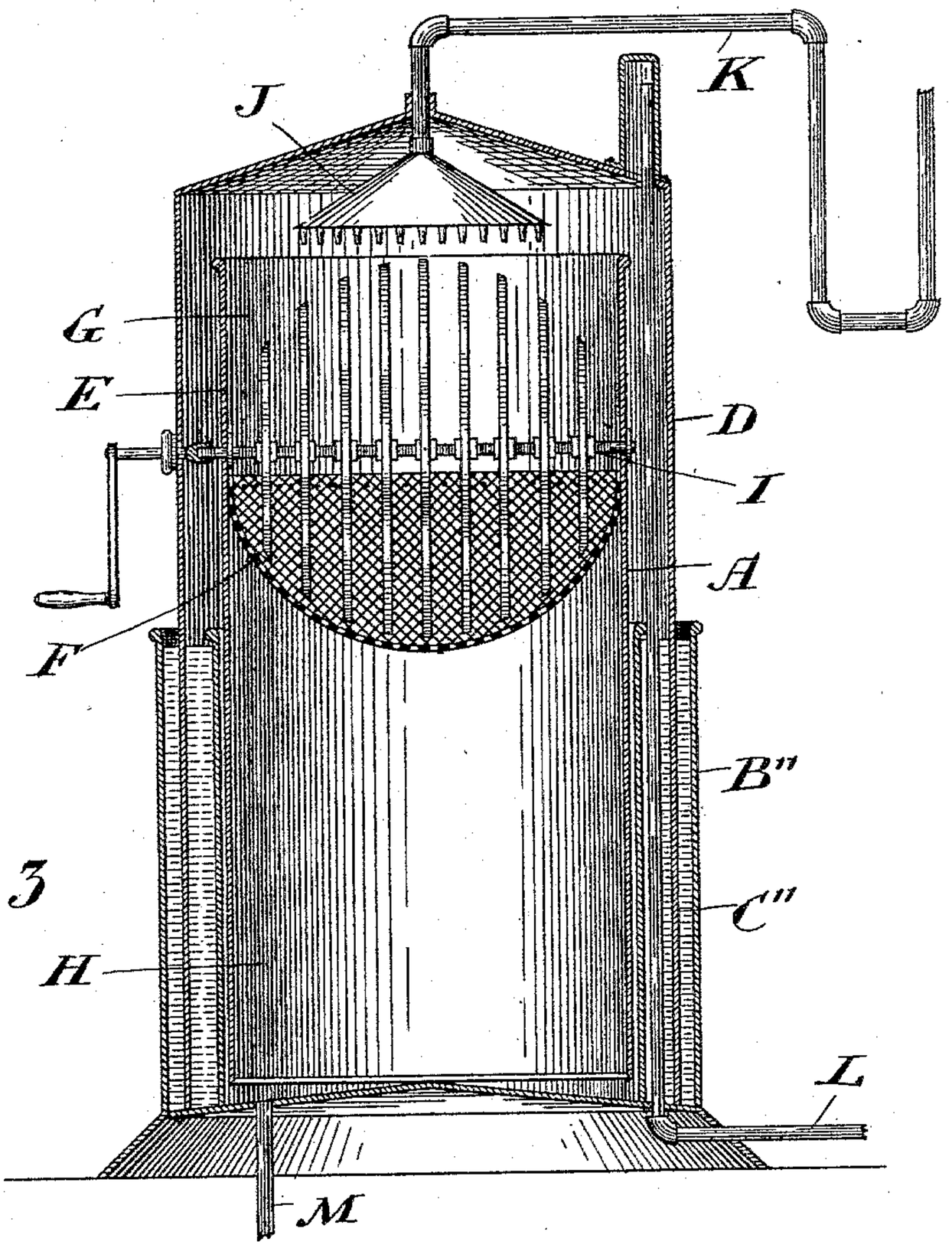

Fig. 3

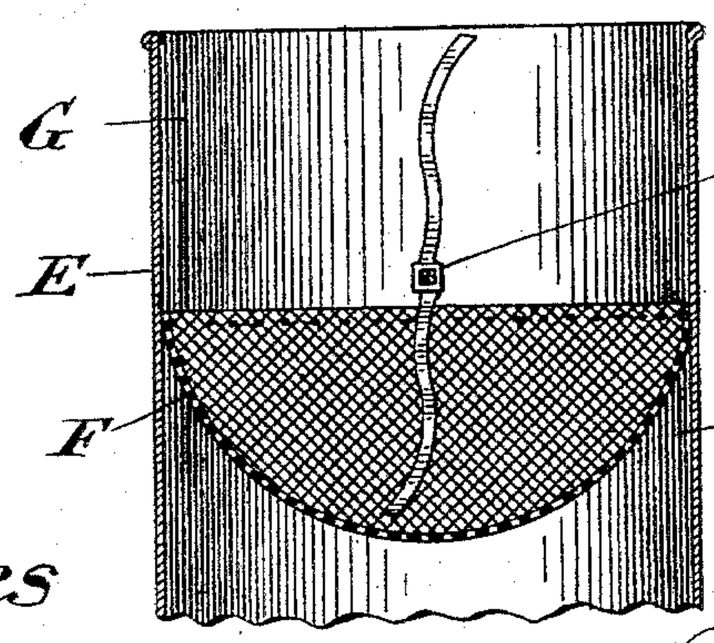

Fig. 4

Witnesses

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UNITED STATES PATENT OFFICE.

RICHARD F. CARTER, OF NIAGARA, CANADA.

APPARATUS FOR PRODUCING ACETYLENE GAS.

SPECIFICATION forming part of Letters Patent No. 598,048, dated January 25, 1898.

Application filed January 16, 1897. Serial No. 619,447. (No model.) Patented in England January 28, 1897, No. 2,284.

To all whom it may concern:

Be it known that I, RICHARD FREDERICK CARTER, of the town of Niagara Falls, in the county of Welland and Province of Ontario, Canada, have invented a certain new and Improved Apparatus for the Production and Storage of Acetylene Gas, (for which I have obtained English Patent No. 2,284, of January 28, 1897,) of which the following is a specification.

The object of my invention is to devise a simple and reliable apparatus for the production and storage of acetylene gas; and it consists, essentially, of a generator adapted to contain a large charge of calcium carbid and provided with an agitator by means of which the carbid may be stirred up to cause the lime formed to fall through a perforated diaphragm and of means whereby a given quantity of water may be automatically thrown on the carbid when the supply of gas in the holder falls too low.

My invention further consists in such details of construction as are hereinafter more particularly described and then definitely claimed.

Figure 1 is a sectional view of my apparatus. Fig. 2 is a sectional detail showing the construction of the chambers in the water-feeding device. Fig. 3 is a sectional view showing a preferable form of carbid chamber and agitator. Fig. 4 is a sectional detail of a carbid-chamber, taken at right angles to the section in Fig. 3.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is the generator, B the gas-holder, and C the water measuring and feeding device.

In the generator A, B″ is a hollow cylinder open at its upper end.

C″ is an inner wall concentric with the sides of the cylinder B″ and secured to its bottom, so as to form an annular water-space.

D is a hollow cylinder open at its lower end. When this cylinder is placed with its lower portion within the annular water-space above referred to, a gas-tight chamber is formed.

E is a hollow cylinder open at each end and centrally divided by a perforated or wire-gauze diaphragm F, so as to form a carbid-chamber G and the lime-pit H.

I is an agitator provided with suitable arms and having its spindle journaled at the lower end in the supporting-bars of the diaphragm F and its upper end journaled in the top of the cylinder D. The upper end of the spindle may be provided with a suitable crank or other means for imparting a rotary motion to it.

In Figs. 3 and 4 the diaphragm F is shown of a curved shape in cross-section, preferably of hemispherical form, though a semicylindrical form would also answer the purpose. When the diaphragm is of this shape, the agitator is preferably journaled with its spindle horizontal, as shown. I find that the carbid may be shaken up and the lime got rid of more readily by using this construction than by the use of that shown in Fig. 1.

J is a perforated diaphragm or spray-nozzle supported by the sleeve *a* or in any other suitable manner so as to overlie the open top of the cylinder E.

K is the water-supply pipe, extending through the cylinder and adapted to discharge its water through the perforated diaphragm or spray-nozzle.

Outside the generator the tube is suitably bent to form a water seal and its end provided with a suitable funnel.

L is a pipe connecting the upper portion of the generator with the interior of the gas-holder. In order that the cylinder D may be readily removed, the pipe L extends through the bottom of the generator or is carried outwardly through the walls of the same, so near the bottom as to require but a short slot *b* to be made in the cylinder D to slip over the horizontal portion of the pipe.

M is a condensation pipe and trap, which may, if necessary, be provided with a special safety-valve. The pipe L is also preferably provided with a similar condensation pipe and trap.

The gas-holder B comprises the usual water chamber or tank N and the gas-dome M′. The walls of the water-chamber N carry suitable guides, on which run guide-wheels con-

nected to the gas-dome. A counterbalancing weight or weights are preferably provided, as in ordinary gas-holders.

O is the gas-exit pipe, extending from the gas-space in the dome M′ and extending below its lower edge through the side of the water-chamber N and thence to the burners.

The water measuring and feeding device C is constructed substantially as follows:

O′ is a water-chamber provided at its lower end with a valve P, adapted to fit a suitable valve-seat. From the lower end of the chamber O′ the pipe Q extends to a point above the funnel on the generator water-supply pipe K.

R is a water-supply tank from which the pipe Q′ extends to connect with the water-chamber O′. This pipe is provided with a cock S, to the stem of which is connected the lever T. The valve is so arranged that when the lever is in the raised position shown the valve is open and will then run at a rate preferably of about a pint in five minutes.

U is a horizontal pipe connecting the water-chamber O′ with the chambers A′ B′. (See Fig. 2.) It will be readily seen that these three chambers are practically equivalent to a single chamber, and such a chamber might be used, but the form shown, however, is preferable, as a single large chamber would hold far too much water if a rise and fall sufficient to operate the cock S by means of the float C′ be allowed for.

Within the chamber B′ is located a float C′, which is connected with the end of the lever T by a cord or chain passing over a sheave located at the top of the chamber and is of sufficient weight to maintain the lever T in its raised position when the chamber B′ is empty of water. When, however, the chamber is filled, the weight of the float is carried by the water and the lever drops of its own weight, thus closing the cock S.

The valve P is connected with the top of the gas-dome M′ by means of a cord or chain passing over a sheave at the upper end of the chamber. The length of this cord is such that if the gasometer drops below a desired level the valve P will be raised and the water in the chamber O′ and its connections allowed to escape by means of the pipes Q and K to the generator.

The operation of my device is substantially as follows: The cylinder D is removed from the generator and a charge of carbid placed within the carbid-chamber G. The cylinder is then replaced, the upper end of the spindle of the agitator passing through the sleeve *a* as the cylinder is lowered. (See Fig. 1.) A sufficiency of water to commence the process of gas-generation may then be introduced through the pipe K. This water is distributed by the diaphragm or spray-nozzle J over the surface of the carbid. As soon as sufficient gas has been accumulated in the dome M′ the dome will rise to such a height as to close the valve P. The water then accumulates in the water-chamber O′ and its connections till the float C′ has risen sufficiently to close the cock S. As no more water is being fed to the generator, the dome M′ will gradually fall as the gas is used till at length it drops sufficiently low to raise the valve P. The water in the chamber O′ and its connections then flows down to the generator, resulting in the immediate production of a quantity of gas which in a few seconds raises the gas-dome sufficiently to again close the valve P.

D′ is a pipe extending through the bottom of the chamber A′ and movable therein, so that the pipe may be slid up and down. This affords a means of regulating the amount of water contained in the three chambers O′ A′ B′, as the pipe D′ forms an overflow and thus prevents the water-level rising above its open upper end. I consider this automatic water measuring and feeding device an important point of my invention. From a given quantity of water it is impossible to produce more than a given amount of acetylene gas by its action on the calcium carbid, and thus no danger exists of an overproduction of gas through the introduction of too much water to the generator, and at the same time a sufficiency of production is assured, for as soon as the gas produced by the introduction of a given quantity of water into the generator is consumed the dropping of the gas-dome immediately causes the introduction of a further similar quantity, so that the production of gas is continuous and regular. It will be noticed that while the valve P is open the cock S is also open, owing to the dropping of the float C′. This causes a direct flow of water from the water-supply tank W to the generator, but as the cock S runs very slowly and the valve P is open for an exceedingly short time this source of water-supply does not add materially to the measured quantity flowing from the water-chamber and its connections. The carbid in the chamber G by the action of water becomes coated with lime. Whenever this occurs and the production of gas becomes too slow, the mass may be stirred up and the lime shaken off by revolving the agitator I. The lime formed drops through the perforated diaphragm F into the lime-pit H, whence it may be removed at suitable intervals.

I find in practice that in order to permit the gasometer to drop low enough to drop its contents it is desirable to connect the cord from the valve P to the end of the weighted lever H′, which is pivoted to the top of the dome. The weight of this lever is such as to lift the valve P; but after the valve has been raised to its highest point the lever D rises to a horizontal position and permits the gasometer to sink to the desired level without injuring the valve P or breaking the cord.

To guard against a surplus of water enter-

ing the generator in case the valve P becomes leaky, I prefer to insert a flexible joint E′ in the pipe Q, so that the end of the pipe may be bent to one side.

F′ is a cord which is attached at one end to the dome and passes around the sheave G′ and is attached at its other end to the pipe Q. From this construction it will be seen that if the gasometer rises above a certain point, owing to the continued introduction of water to the carbid, the end of the pipe will be drawn to one side and the surplus water will fall to the ground instead of entering the generator.

What I claim as my invention is—

1. In an apparatus of the class described, a generator containing a hollow cylinder, a perforated diaphragm dividing said cylinder in two parts and thus forming a carbid-chamber in the part on one side of said diaphragm and a lime-receptacle in the part on the other side, in combination with an agitator journaled in the carbid-chamber and having its spindle extending outside of the generator, substantially as described.

2. In apparatus of the class described, a generator comprising a hollow cylinder open at its upper end and provided with an inner concentric wall forming an annular water-space, in combination with a hollow cylinder open at its lower end and adapted to extend within the said annular water-space; a hollow cylinder divided by a perforated diaphragm to form a carbid-chamber and a lime-receptacle, in combination with an agitator journaled within the receptacle, and having its spindle extending outside the generator, substantially as and for the purpose specified.

3. In apparatus of the class described having a generating-chamber and a gas-dome, the chambers O′, and B′, and the pipe U, connecting the same; the outlet-valve P, and mechanism for operating the valve by the rise and fall of the gas-dome, in combination with a pipe connecting the said chambers with a suitable water-supply; a cock controlling the passage of water in the pipe and mechanism for automatically opening and closing the said cock by the fall and rise of water in the said chambers, substantially as and for the purpose specified.

4. In apparatus of the class described having a generating-chamber and a gas-dome, the chambers O′ and B′, connected by the pipe U; the outlet-valve P; and a cord or chain passing over a suitable guide and connected to the gas-dome, in combination with a pipe connecting the said chambers with a suitable water-supply; a cock controlling the passage of water in the pipe; a lever connected to the stem of the cock; and a float located within the chamber B′, and suitably connected with the said lever to operate the same by the rise and fall of the water within the cylinder, substantially as and for the purpose specified.

5. In apparatus of the class described having a generating-chamber and a gas-dome, a water-measuring device comprising the chambers O′, A′, and B′ connected by the pipe U; the outlet-valve P, and a cord or chain passing over a suitable guide and connected to the gas-dome, in combination with a pipe connecting the said chamber with a suitable water-supply; a cock controlling the passage of water in the pipe; a lever connected to the stem of the cock; a float located within the chamber B′ and suitably connected with the said lever to operate the same by the rise and fall of the water within the chamber; and a pipe D′, extending through the bottom of the chamber A′, and vertically movable therein, substantially as and for the purpose specified.

6. In apparatus of the class described, a water-measuring device connected with the generator; in combination with mechanism controlled by the decrease of gas in the apparatus for causing the water in the measuring device to flow into the generator; a water-supply to the said measuring device; automatic mechanism for refilling the water-measuring device after it has been emptied; and a tube vertically movable through the bottom of said chamber to regulate the height of the water therein, substantially as and for the purpose specified.

7. In apparatus of the class described having a generating-chamber and a gas-dome, a water-measuring device provided with an outlet-valve and mechanism for operating the valve by the rise and fall of the gas-dome, in combination with a pipe connecting the said chamber with a suitable water-supply; a cock controlling the passage of water in the pipe, mechanism for automatically opening and closing the said cock by the fall and rise of water in the said chamber; and a tube vertically movable through the bottom of said chamber to regulate the height of the water therein, substantially as and for the purpose specified.

8. In apparatus of the class described, a generator and gas-dome in combination with a water-measuring device provided with an outlet-valve and an adjustable overflow, and mechanism for operating the valve by the rise and fall of the gas-dome, in combination with a pipe connecting the said chamber with a suitable water-supply; a cock controlling the passage of water in the pipe, mechanism for automatically opening and closing the said cock by the fall and rise of water in the said chamber; and a tube vertically movable through the bottom of said chamber to regulate the height of the water therein, substantially as and for the purpose specified.

9. In apparatus of the class described having a generating-chamber and a gas-dome, a water-measuring device provided with an outlet-valve and an adjustable overflow, and a pipe to the generator; a cord or chain passing over a suitable guide and connected to the gas-dome, in combination with a pipe connecting the said water-measuring device with a suitable water-supply; a cock controlling the passage of water in the pipe; a lever connected

to the stem of the cock; and a float moved by the rise and fall of water in the said water-measuring device and adapted to operate the said lever, substantially as and for the purpose specified.

10. In apparatus of the class described, a water-measuring device provided with an outlet-valve having a cord or chain connected thereto and passing over a suitable guide, in combination with a weighted lever pivoted at one end to the gas-dome and having the said cord connected thereto, whereby the said dome may drop without endangering the cord or valve, substantially as and for the purpose specified.

Toronto, December 31, 1896.

RICHARD F. CARTER.

In presence of—

A. M. NEFF,

FREDK. CLARKE.