No. 688,611. Patented Dec. 10, 1901.

H. ELDRIDGE.

ACETYLENE GAS GENERATOR.

(Application filed Nov. 3, 1900.)

(No Model.)

FIG. 1.

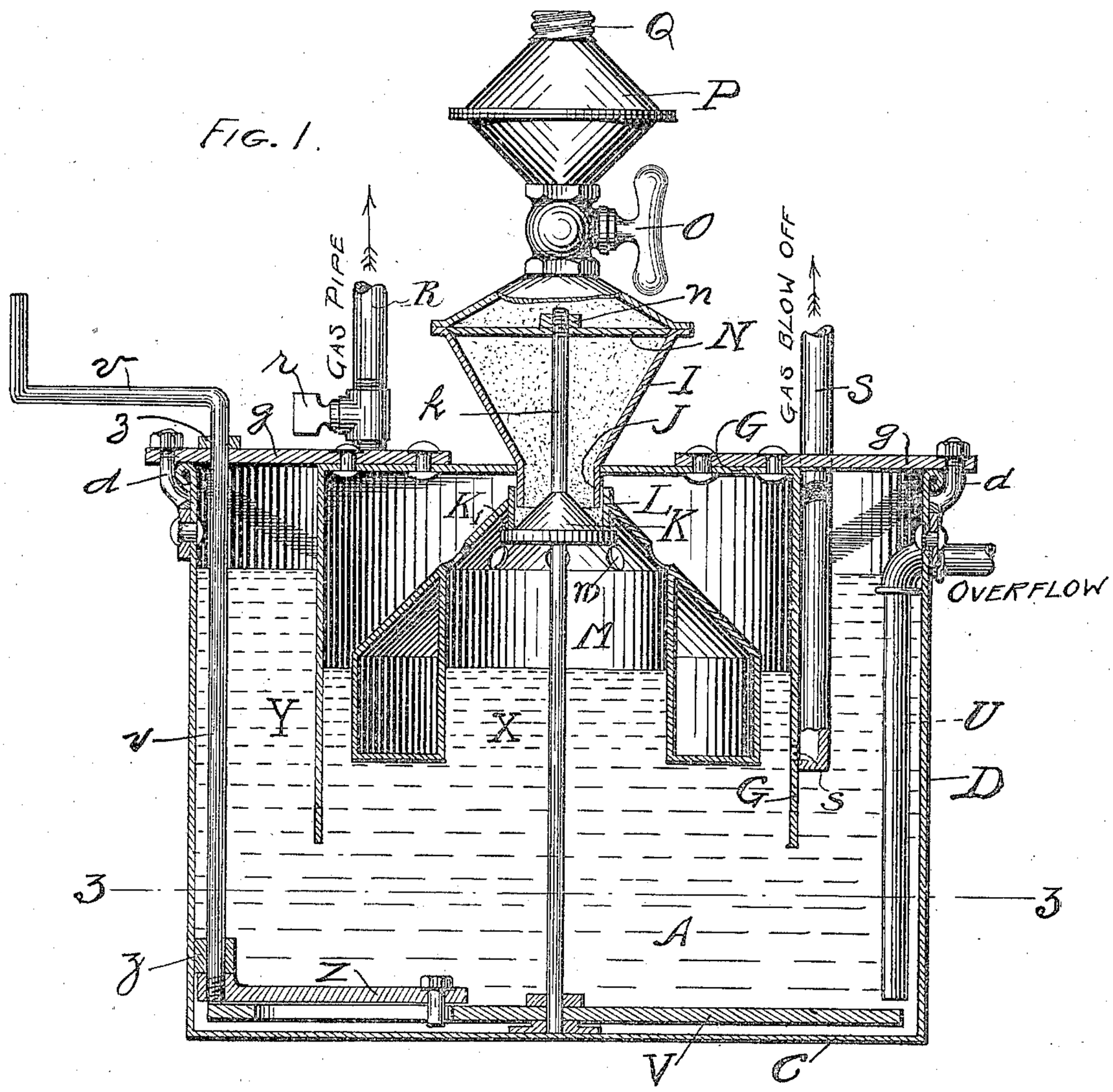
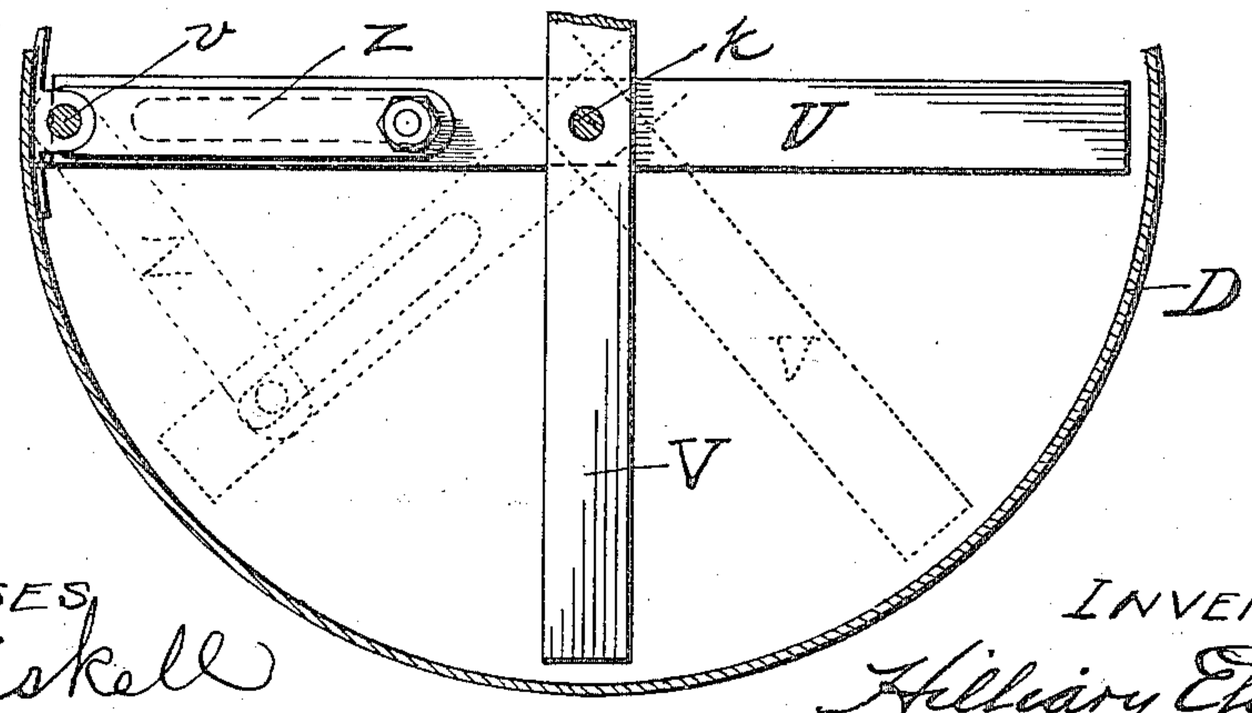


FIG. 2.



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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 688,611, dated December 10, 1901.

Application filed November 3, 1900. Serial No. 35,375. (No model.)

To all whom it may concern:

Be it known that I, HILLIARY ELDRIDGE, a citizen of the United States, residing at Memphis, Shelby county, State of Tennessee, have invented certain new and useful Improvements in Acetylene-Generators, of which the following is a specification.

My invention relates to improvements in acetylene-gas generators, and more especially to that class which are known as "carbid-feed" generators, in which a small quantity of carbid is dropped into an excess of water. In this class of generators the entire amount of carbid fed is reduced to quicklime, and its contents of acetylene gas is released before the generation ceases, and the quicklime, being in contact with a large mass of water, is thoroughly slaked and remains in a semifluid state, so that it can be removed by drawing off the water by gravity. In this class of generators the regulation of the amount of carbid fed is effected by feeding carbid whenever the gas is sufficiently consumed to permit, and in many cases where the carbid fed is regulated closely to the amount of gas used there is trouble in keeping the pressure constant, especially where the carbid is carried in the pressure-bell or where rotary or complicated valves are used, with the corrosion and consequent sticking of same. Much difficulty has been experienced in filling these machines without loss of gas or introduction of air. The carbid-feed type is the only type in which the amount of gas made can be closely regulated to the amount consumed and in which there is no waste from gas blowing off after consumption ceases.

The objects of my invention are to provide a carbid-feed generator which will be simple in construction, constant in pressure, and positive in action, which will regulate the feed of carbid and the consequent supply of gas exactly by the amount of gas used, which will support the carbid entirely independent of the pressure-bell, and thereby give a constant pressure, and which may be filled with carbid and with water while the machine is in operation without waste of gas or introduction of air. I accomplish these objects in the manner hereinafter more fully set forth in the specification, drawings, and claims.

In the drawings, Figure 1 shows a sectional elevation of my generator, taken on the center line, with the carbid-valve closed. Fig. 2 shows a partial cross-sectional plan taken on the line 3 3 of Fig. 1.

Referring now to the drawings, in which like letters of reference indicate like parts in both views, the arrows show direction of flow of gas.

A is a cylindrical water-chamber consisting of a simple cylindrical open-topped tank with sides D and bottom C, which serves as a generating-chamber, a pressure-chamber, and a water seal for the gas and pressure bell G. The upper part of this water seal and pressure-chamber is divided into two chambers X and Y of equal area, and the top of the chamber X is closed by the bell G, the chamber Y, on the contrary, being left entirely open. This bell G when once placed is fastened to the outside shell D by means of outwardly-extending arms *g* and studs *d*, attached to the cover, and becomes thus an integral part of the machine, not a floating or loose one, as is ordinarily used. This bell G extends, as before stated, only a portion of the way to the bottom of the chamber A, leaving the said lower portion as an undivided generating-chamber and permitting free circulation of the water in same.

I is a carbid-hopper which is fastened on the gas-bell G and supported thereby, though it may of course be supported by a separate frame, if so desired, it being necessary in any case to make a gas-tight joint between the hopper and the gas-bell G.

J is a cylindrical projection which extends downward inside the gas-bell.

K is a cone-shaped shield which is supported by the hopper I and is fixed relatively to it. An annular ledge K′ extends outward from the bottom of this cone and forms a shelf, on which a short cylinder L rests. This cylinder surrounds the cylindrical projection J and forms the carbid-valve. The ledge K′, if so desired, may be omitted, in which case the cone K is extended until it comes beneath the short cylinder L to form a seat for same. This valve is carried by a float M, which is an annular hollow chamber floating on the water in the pressure-chamber X and extends upward, so that carbid dropping will not fall on its upper surface. Perforations *m* permit the gas to pass freely around this float. The

valve L is shown closed in the drawings—that is, it is resting on its seat on the cone K and preventing the carbid from dropping into the water below.

N is a bar extending across the hopper I, which bar supports the cone K by means of the nut *n* and rod *k*. It is made as narrow as possible in order to obstruct the passage of the carbid through the hopper I as little as possible.

O is a gas-tight valve which is shown open in the illustration.

P is a carbid-filling hopper, and Q a screw-cap closing same, which screw-cap may be used, since it is only used while the valve O is open to fill the lower hopper I, and there is no especial need for same to be absolutely gas-tight.

R is a gas-pipe leading from the gas-bell G to the burners.

S is a blow-off pipe which comes into use when the pressure is sufficient in the gas-bell to force the water in the chamber X below an opening *s*, which leads through the shell of the bell G into the lower end of the pipe S.

U is the water-outlet and leads from near the bottom of the water-chamber A to the desired level of the water in the chamber Y, and in connection with the height of valve L above the water-level in the chamber X is the controlling factor in the regulation of pressure in the gas-bell above the said chamber X. It is absolutely necessary that this pipe should remain constantly open, since the carbid dropping into X would raise the level of the water, and thereby alter the difference in level of the chambers X and Y and the pressure of the gas. This pipe U carries off that part of the water most charged with quicklime and at the same time is entirely sealed by the water in the chamber A to prevent accidental escape of gas.

In machines where running water is to be had a constant flow of water may be maintained through the water-chamber A.

V is a stirrer to agitate the quicklime in the water-chamber A and cause same to flow out through the pipe U when fresh water is poured into the machine. *v* is the handle for operating same and extends upward through the open chamber Y to the top of the machine.

The rod *k* is shown extended to the bottom, and when so extended serves as a center post or support for the carbid-hopper I, &c., and also as a center for the stirrer V, which stirrer, it will be noted, is operated from the open top of the chamber Y, (A.) I have shown in these figures a form of stirrer made possible by this open-top construction, in which the stirrer-handle *v* is extended upward through the open top of the chamber Y. The stirrer-handle *v* has bearings Z Z, one of which I have shown in one of the cross-arms *g*, and has an arm Z fastened to its lower end, which arm when rocked back and forth vibrates the stirrer-arms V. However, the details of the stirrer are not essential, the dominant feature being the operation through the open top of the chamber Y, (A.)

To fill the generator, water is poured into the water-chamber A until the water runs out through the overflow-pipe U. The surplus air having been allowed to blow off through the gas-pipe R, the cock *r* is closed. The filling-chamber P is next filled with granulated carbid and the caps replaced and screwed tight. This carbid is allowed to pass through the valve O into the carbid-hopper I. (The function of the filler P is simply that of a funnel to fill the hopper I.) The water-levels in the chambers X and Y being the same, the float M is raised and the valve L open. Carbid will therefore pass around the cone K and drop into the water. This generation of gas will therefore put a pressure on the water in the chamber X and will force the water-level in it down, the excess of water escaping through the overflow-pipe U until the pressure of gas and the height of water outside shall have established an equilibrium, at which time the water in the chamber X will be lowered sufficiently to allow the valve L to rest on the cone K and cut off the supply of carbid. The pressure of the gas can thus be regulated by the height the pipe U is above the level of the water in the chamber X when the valve L is just seating, and this is determined by measurements made on the machines, the pressure being of course equal to that due to the difference in level of the water in the chambers X and Y. The generator having thus been filled, it is necessary to blow off the surplus air in the generator; but this has to be removed only at the first filling of the generator, as no air is allowed to enter thereafter. The generator having been put in use and gas being drawn off from the chamber X, the water rises in that chamber and in rising raises the float M and the valve L attached, thus allowing carbid to again be fed to the water and gas to be generated. As the movement of the valve L is very slight a very small amount of carbid, only a few grains, is dropped at one time and the quantity of gas generated at each charge is very small. The charges thus follow each other very rapidly indeed, and where large amounts of gas are used become practically continuous. In any case the change of level in the chambers X and Y is so minute that the fluctuations in pressure are not perceptible.

The charge of carbid in the hopper I is preferably proportioned to the amount of water in the chamber A, so that when one is filled the other should also be cleaned and filled. When, therefore, the supply of carbid in the hopper I has become exhausted or, what is better, at stated intervals the machine should be filled and cleaned. To do this, the water is poured in while the stirrer V is agitated, the water charged with lime being thus forced out through the pipe U by the fresh water. When the discharge from the pipe U becomes

clear, the generator is clean. It will be noted here that the generator may be kept in use during filling, since no gas can escape, and the overflow-pipe U being open no change can take place in the water-level of the chamber A. Carbid is put in the filler P and from there into the hopper I, as in the first case.

The right is expressly reserved to further modify such of the details herein described as may be desired, and it is expressly understood that I do not confine myself to the exact form of them as herein shown.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent in the United States, is—

1. An acetylene-generator, comprising an open-topped water-tank which serves as a seal and generating-chamber, a fixed gas-bell supported above said water-chamber as a pressure-chamber and having its sides extending downward in said chamber, to seal said pressure-chamber, and to divide said water-chamber into two substantially equal parts, a carbid-chamber supported by said gas-bell and gas-tight therewith, a fixed cone at the mouth of said carbid-chamber, an annular valve surrounding said cone and an annular float having its inner edge extended up as an unbroken surface and connected with said annular valve above its working edge, whereby no shoulder is left to accumulate carbid, and the latter is prevented from scattering outside the gas-bell, substantially as shown and described.

2. An acetylene-gas generator, comprising an open-topped water-chamber to serve as a seal and generating-chamber, a fixed gas-bell supported above the water-chamber, having its sides extending downward in said chamber to seal the gas-bell and divide the said water-chamber into two equal parts, a carbid-chamber supported above said gas-bell and having a short cylindrical mouth extending into said gas-bell, a cone-shaped piece fixed just below said mouth, a ledge around the lower edge of said cone, an annular valve surrounding said cylindrical mouth and cone, and of slightly less diameter than said ledge, an annular float having its inner cylinder extended upward and connected to said annular valve by a conical piece leading from the top of said inner cylinder to said annular valve above its lower edge, whereby no shoulder is left to accumulate carbid and openings through said cone-shaped parts, substantially as shown and described.

3. An acetylene-gas generator, comprising an open-topped water-chamber, to serve as a seal and generating-chamber, a fixed gas-bell supported above the water-chamber, having its sides extending downward in said chamber to seal the gas-bell and divide the said water-chamber into two equal parts, a carbid-chamber supported above said gas-bell and having a short cylindrical mouth extending into said gas-bell, a cone-shaped piece fixed just below said mouth, a ledge around the lower edge of said cone, an annular valve surrounding said cylindrical mouth and cone, and of slightly less diameter than said ledge, an annular float having its inner cylinder extended upward and connected to said annular valve by a conical piece leading from the top of said inner cylinder to said annular valve above its lower edge, whereby no shoulder is left to accumulate carbid, openings through said cone-shaped part, and an overflow-pipe leading from near the bottom of said generating-chamber to a point sufficiently above the water-level in the inner compartment to preserve the desired gas-pressure, all substantially as shown and described.

4. An acetylene-gas generator, comprising an open-topped water-chamber, to serve as a seal and generating-chamber, a fixed gas-bell supported above the water-chamber, having its sides extending downward in said chamber to seal the gas-bell and divide the said water-chamber into two equal parts, a carbid-chamber supported above said gas-bell and having a short cylindrical mouth extending into said gas-bell, a cone-shaped piece fixed just below said mouth, a ledge around the lower edge of said cone, an annular valve surrounding said cylindrical mouth and cone, and of slightly less diameter than said ledge, an annular float having its inner cylinder extended upward and connected to said annular valve by a conical piece leading from the top of said inner cylinder to said annular valve above its lower edge, whereby no shoulder is left to accumulate carbid, openings through said cone-shaped part, and an overflow-pipe leading from near the bottom of said generating-chamber to a point sufficiently above the water-level in the inner compartment to preserve the desired gas-pressure, all substantially as shown and described.

5. An acetylene-gas generator, comprising an open-topped water-chamber to serve as a seal and generating-chamber, a fixed gas-bell supported above the water-chamber, having its sides extending downward in said chamber to seal the gas-bell and divide the said water-chamber into two equal parts, a carbid-chamber supported above said gas-bell and having a short cylindrical mouth extending into said gas-bell, a cone-shaped piece fixed just below said mouth, a ledge around the lower edge of said cone, an annular valve surrounding said cylindrical mouth and cone, and of slightly less diameter than said ledge, an annular float having its inner cylinder extended upward and connected to said annular valve by a conical piece leading from the top of said inner cylinder to said annular valve above its lower edge, whereby no shoulder is left to accumulate carbid, openings through said cone-shaped parts, an overflow-pipe leading from near the bottom of the water-chamber to a point sufficiently above the water-level in the inner compartment to preserve the desired gas-pressure, and means of agitating the water in the generating-chamber to permit its being emptied through the over-

flow-pipe, all substantially as shown and described.

6. An acetylene-gas generator, comprising an open-topped water-chamber to serve as a seal and generating-chamber, a fixed gas-bell supported above the water-chamber, having its sides extending downward in said chamber, to seal the gas-bell and divide the said water-chamber into two equal parts, a carbid-chamber supported above said gas-bell and having a short cylindrical mouth extending into said gas-bell, a cone-shaped piece fixed just below said mouth, a ledge around the lower edge of said cone, an annular valve surrounding said cylindrical mouth and cone, and of slightly less diameter than said ledge, an annular float having its inner cylinder extended upward and connected to said annular valve by a conical piece leading from the top of said inner cylinder to said annular valve above its lower edge, whereby no shoulder is left to accumulate carbid, and openings through said cone-shaped part, an overflow-pipe to preserve the water-level of said chamber and a stirrer operated through said open top to agitate the water in the said generating-chamber to permit its removal through the overflow-pipe, all substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HILLIARY ELDRIDGE.

Witnesses:
J. R. FLIPPIN,
W. M. KYLE.