No. 676,628. Patented June 18, 1901.

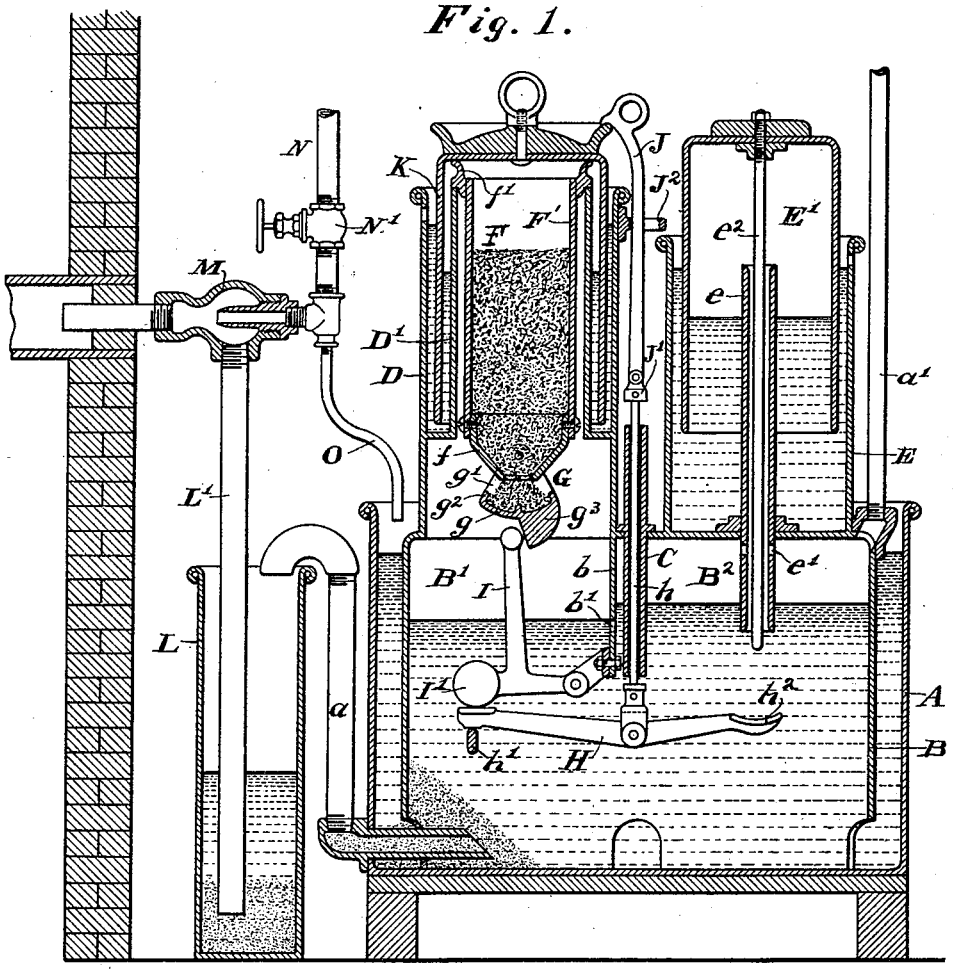
F. H. MERRILL & F. HICKMAN.

ACETYLENE GAS GENERATOR.

(Application filed Aug. 3, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
H. L. Reynolds,
Chas. J. Rathjen

Inventors
Frank H. Merrill.
By their Attorneys Francis Hickman
Gifford & Bell

No. 676,628. Patented June 18, 1901.

F. H. MERRILL & F. HICKMAN.

ACETYLENE GAS GENERATOR.

(Application filed Aug. 3, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

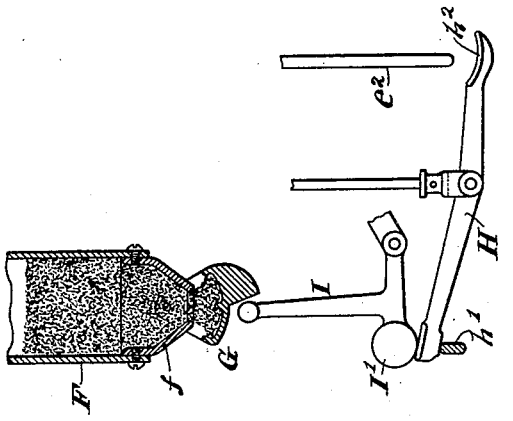


Fig. 4.

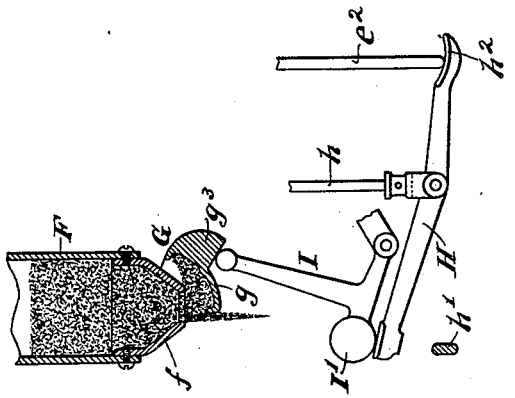


Fig. 3.

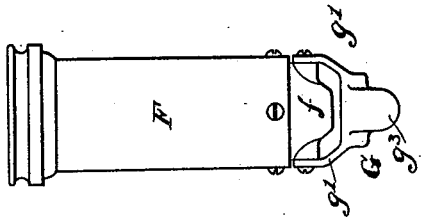
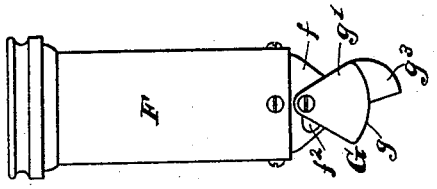


Fig. 2.



Witnesses:
H. L. Reynolds.
Chas. J. Rathjen

Inventors
Frank H. Merrill
Francis Hickman
By their Attorneys
Gifford & Pell

UNITED STATES PATENT OFFICE.

FRANK H. MERRILL, OF PLAINFIELD, AND FRANCIS HICKMAN, OF BOUNDBROOK, NEW JERSEY.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 676,628, dated June 18, 1901.

Application filed August 3, 1900. Serial No. 25,787. (No model.)

To all whom it may concern:

Be it known that we, FRANK H. MERRILL, of Plainfield, Union county, and FRANCIS HICKMAN, of Boundbrook, Somerset county, State of New Jersey, have invented a new and useful Improvement in Acetylene-Generators, of which the following is a specification.

Our invention relates to improvements in acetylene-generators, and comprises certain novel features, which will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a sectional elevation of our device. Figs. 2 and 3 are elevations taken from points at right angles to each other of the carbid-holder removed from the generator. Figs. 4 and 5 show the carbid-holder in section, together with the carbid-feeding means, the parts being in different positions in the two figures.

Our apparatus is of that class of acetylene-generators in which an excess of water is used—that is, a tank is supplied into which the carbid is dropped as the supply of gas is required, the feed of the carbid being regulated by the rise and fall of a gasometer-bell.

The device as herein shown is a form of construction which is now preferred by us; but it is evident that many of the features of construction might be varied without departing from the spirit of the invention. We do not, therefore, wish to be limited to the exact construction herein shown.

The generating-chamber and the gasometer are both mounted upon a hollow base or bell B, the gasometer being of the usual form, consisting of a water-tank E and a bell E′, which fits within the said water-tank so that it may freely rise and fall therein, the water forming a seal to prevent the escape of gas. To properly guide the bell, a rod or bar e^2 is centrally secured within the bell and passes through a tube *e*, which extends above the level of water in the outer tank E and downward into the hollow base or bell B. The rod e^2 slides freely within the tube *e*, and the same tube is also used to convey the gas from the base B to the gasometer-bell E′. The lower end of the tube *e*, which projects within the base B, is preferably provided with lateral openings *e′* close beneath the upper wall of the base, so that the gas may have free entrance, even if the level of water in the base should vary. The chamber D, the lower portion of which, with a portion of the base B, forms the generating-chamber, is preferably made circular and freely connecting with the hollow base B. In the upper portion of the shell D, forming the outer wall of this chamber, is an additional shell D′, forming between the two shells an annular tank, which, in connection with the bell or cover K, forms a water seal. The cover K is provided with a weighted upper end, which partially at least compensates for the pressure of gas within the apparatus.

The carbid-holder F is removable from the device. This holder consists of a cylinder F′, having a conical lower end *f*, provided with a central discharge-opening, and also having a ring *f′* at its upper end, adapted to engage the upper end of the inner shell D′ of the generating-chamber. This ring *f′* is also engaged by the inner surface of the head of the cover K. To the lower end of the carbid-holder is pivoted a valve G, which consists of three principal parts, a sector-shaped bottom portion *g* and two side plates *g′*, the latter extending on opposite sides of the cone *f* and pivoted thereto. The curved portion *g* is curved to correspond with the segment of a circle struck from the pivot-point. This hangs at a slight distance below the opening in the corbid-holder and so that it will not touch the same when it is swung backward or forward. This valve is of sufficient area that the carbid, which should be of a small granular character, in falling through the discharge-opening will pile up on the valve without running over its edge unless the valve is swung to one side of its central position. In the position of the valve shown in Figs. 1 and 5 there will therefore be no feeding of carbid into the water beneath, and consequently no generation of gas. It is preferred that the curved portion *g* of the valve be provided with corrugations or slight ribs extending transversely of the same—that is, transversely of the direction of swing of the valve—so that there will be less probability of the carbid being jarred off of the valve except when it is tilted.

The conical portion f, which closes the lower end of the carbid-holder, is provided with a stop f^2, which is adapted to engage the valve and prevent its swinging past the central position in one direction. To insure that the valve will return to this position when unrestrained, a counterweight g^3 is secured to the opposite side of the valve. One surface of this counterweight also forms a bearing for one end of the bell-crank lever I, by means of which the valve is swung. This bell-crank lever is pivoted upon a bracket, which is secured to a partition b, which separates the upper portion of the hollow base B into two chambers. The lever I, if necessary, is provided with a counterweight I′ to insure its return to the position in which the valve closes the discharge-opening of the carbid-holder. Motion is communicated to the lever I to open the valve by means of a lever H, which has one end beneath the bell-crank lever and the other end provided with a plate or flattened portion h^2, located beneath the lower end of the rod e^2, which is connected with the gasometer-bell. When the gasometer-bell falls to such a point that the lower end of the rod e^2 will engage the lever H, it will depress that end of the lever and elevate the opposite end, thus swinging the bell-crank lever I and the valve G to one side, or toward the position shown in Fig. 4, thus permitting the carbid which has been held back by the valve to be discharged over one edge thereof into the water in the main tank. As soon as the generation of gas has caused the bell E′ to rise the valve will swing back toward its central or closed position, as shown in Fig. 1.

A bar h' is shown as extending across the base B and engaging one end of the lever H, so as to prevent it and the lever I from swinging too far in one direction. The bar h' thus supports the two levers while the bell E′ is raised.

The partition b divides the upper portion of the base into two separate chambers. This partition is provided with a series of holes b', through which the gas may pass from the generating-chamber B′ to the chamber B^2, which is connected with the gasometer. The base B is placed within a tank A, and the level of water in said tank is carried at such a point that the water within the chamber B^2 is at a slight distance above the holes b' through the partition.

It is preferred that the base B should not be of circular outline in plan, but that it shall be more of a rectangular shape, having a width sufficient to accommodate the generating-chamber and the gasometer and a length sufficient to accommodate both of these. This will make the base substantially twice as long as it is wide. It is also preferred that the tank A should be of circular outline, the object of this difference in construction being that the tank A should have a surface area considerably greater than the area of the chamber B′, which is connected with the generator.

The lever H, by means of which motion is communicated to the valve by the gasometer-bell, is supported on a rod h, which extends through the upper wall of the base and depends within the base a sufficient distance to form an efficient water seal, and thus to prevent escape of gas through the same. To the upper end of the rod h is connected an extension J, which is preferably hinged thereto, said extension passing through a guide J^2 and at its upper end being provided with a hook adapted to engage the upper end of the cover K of the carbid-chamber. When it is desired to examine the carbid-holder, either to refill it or to determine how much carbid remains therein, it is first necessary to unhook the extension-bar J from the cover, which will result in the bar dropping slightly until the collar J′, which is secured to the upper end of the rod h, rests upon the upper end of the tube C. This drops the lever H to such a point that it will not be affected by the fall of the gasometer-bell, and it will therefore be impossible for the gasometer, if it should fall, to throw the lever I into any other than its normal position, as shown in Fig. 1. The cover K may then be removed from the generating-chamber with impunity and the carbid-holder removed. This will result in the water-level in the chamber B′ rising due to the removal of the gas-pressure therefrom. As the outer tank A is of large area compared with the area of the chamber B′, the fall of water-level in the outer tank will be comparatively slight, and the water-level within the chamber B^2 will therefore not fall a sufficient amount to permit the gas passing backward through the openings b'. It is therefore possible to open the generating-chamber and to recharge the carbid-holder without turning off the supply of gas. The removal of the carbid-holder increases the gas-containing capacity of the generating-chamber an amount which approximately compensates for the difference in pressure. There will therefore be little, if any, escape of gas by removing the cover of the generating-chamber.

The gas is conveyed from the device by means of a pipe a'. A pipe a enters the bottom of the tank and has its inner end adjacent to the point where the carbid is deposited. This pipe outside of the tank extends upward to a level corresponding with the level of water desired within the tank. It is preferably provided with a return-bend or other device by which it may discharge into a separate receptacle L. A pipe L′ is herein shown as extending to near the bottom of this receptacle L and at its upper end connecting with a jet-pump or hydraulic discharging device M, of ordinary construction. The water for operating this device is supplied through a pipe N, which is provided with a regulating-valve N′. A pipe O of ca-

pacity approximately equal to the capacity of jet discharging into the ejector or hydraulic discharging device M discharges into the upper part of the tank A.

When it is desired to remove the sludge from the tank A, the valve N′ is opened. One jet is thus discharged into the ejector M, which sucks the water and other contents of the receptacle L upward through the pipe L′ and discharges them into the sewer or to any other convenient point. Another jet is discharged through the pipe O into the tank, which stirs up the sludge in the bottom of the tank and raises the level of water sufficiently to cause an overflow through the pipe A into the receptacle L.

It is designed that the capacity of the ejector M shall be at least sufficient to carry away water as fast as it is discharged into the tank through the pipe O in order to prevent the receptacle L from overflowing.

In some cases our device would be placed in a pit, and when this pit is formed in very loose, sandy, or gravelly soil it is practicable to discharge the sludge directly into the pit. In soils of this kind the lime which is formed by the decomposition of the carbid will pass off with the water through the pores of the soil and will not accumulate in the pit. In such a case the ejector, as herein illustrated, would not be necessary.

We have found that the construction herein illustrated and described is very sensitive and reliable. The capacity of gasometer required is very slight, as a slight fall of the gasometer is sufficient to cause the carbid to be fed and more gas to be produced. The friction of the apparatus is very little, as there are no rubbing parts, and as the valve is suspended at some little distance from the edges of the discharge-opening it is impossible for it to become stuck and fail to work. In case, as sometimes happens, the vapors of the water in the tank act upon the carbid contained on the valve and exposed thereto, this carbid will decompose, forming acetylene and lime. The lime will thus pile upon the valve until it is sufficient to seal the discharge-opening, when the slaking action will cease. This lime being very friable offers very little resistance to the swinging of the valve, and if the valve were swung after the device has been out of operation and lime has thus formed it will first discharge the lime, but will not close until carbid flows in sufficient amount that the gas generated thereby causes the gasometer-bell to rise.

We claim—

1. In an acetylene-generator, the combination with a water-tank, a gasometer and a carbid-holder having an opening adapted to discharge into said tank, of a swinging valve adapted to normally swing beneath and to stop the flow of carbid from said opening, a fixedly-pivoted lever engaging said valve to swing it back, a lever coacting therewith, a vertically-movable pivotal support for said last-mentioned lever and means for operating said levers by the gasometer-bell.

2. In an acetylene-generator, the combination with the water-tank, a gasometer and a carbid-holder having an opening to discharge into said tank, of a swinging valve adapted to normally swing beneath and to stop the flow of carbid from said opening, a fixedly-pivoted lever engaging said valve to swing it back, a lever coacting therewith, a limit-stop for the connecting ends of both levers, a vertically-movable pivotal support for one of said levers and means for operating said levers by the gasometer-bell.

3. In an acetylene-generator, the combination with a water-tank, a gasometer and a carbid-holder having an opening adapted to discharge into said tank, of a swinging valve adapted to normally swing beneath and to stop the flow of carbid from said opening, a lever connected with said valve to swing it, a supporting-rod for said lever extending outside the tank where it may be manually operated without unsealing the tank, means for adjusting the rod to carry the lever at different levels and means for swinging said lever by the fall of the gasometer.

4. In an acetylene-generator, the combination with a water-tank, a gasometer and a carbid-holder adapted to discharge into said tank, of a swinging valve adapted to control the discharge of carbid, a lever connected with said valve to swing it, a supporting-rod for said lever extending through the top of the tank where it may be manually operated without unsealing the tank, a water-sealed tube surrounding said rod, means for supporting the rod at different levels and means for swinging said lever by the fall of the gasometer.

5. In an acetylene-generator, the combination with a water-tank, a gasometer and a carbid-holder adapted to discharge into said tank, of a swinging valve adapted to control the discharge of the carbid, a lever connected with said valve to swing it, a supporting-rod for said lever extending through the top of the tank where it may be manually operated without unsealing the tank, a water-sealed tube surrounding said rod, means exterior to the tank for supporting said rod at different levels and a rod carried by the gasometer-bell and adapted to engage said lever by the fall of the bell.

6. A carbid-feed valve for acetylene-generators comprising a sector-plate pivoted to swing beneath a carbid-discharge opening and having ribs upon its concave surface extending transversely of its direction of swing.

7. A carbid-feed valve for acetylene-generators comprising a counterweighted sector-plate pivoted to normally swing beneath a carbid-discharge opening and a stop adapted to engage said plate to limit its swing in one direction.

8. In an acetylene-generator, the combination with a carbid-holder, a gasometer and a

hollow or bell base having a partition dividing it into two chambers connected respectively with the carbid-holder to receive the discharge therefrom and with the gasometer; said partition having gas-conveying openings beneath the normal level of the water, of a water-tank of relatively large capacity adapted to receive said base.

9. In an acetylene-generator, the combination of a hollow or bell base divided into two chambers connected by a passage beneath the working water-level, a gasometer connected with one of said chambers, a carbid-holder removably insertible in the other chamber, means for controlling the discharge of carbid by the position of the gasometer-bell and a relatively large water-tank receiving said base.

10. In an acetylene-generator, the combination of a generator having a removable carbid-holder, a gasometer and a hollow or bell base common to gasometer and generator, with a water-tank receiving said base, the base having a partition depending into the water and forming a water seal between the generator and the gasometer; said tank having a relatively large water-surface compared with that of the generator in the base.

11. The combination with an acetylene-generator, of a cleaning or discharge pipe connected therewith, a receptacle receiving the discharge from said pipe, a suction discharge-pipe leading from said receptacle, a water-actuated ejector to draw water from said receptacle through said discharge-pipe and a water-supply pipe having a connection common with said ejector and discharging into the generator.

12. The combination with an acetylene-generator, of a hydraulic ejector for discharging the contents thereof and a pipe having a water-supply common with said ejector and discharging into the generator-tank.

In testimony whereof we have signed our names to this specification in the presence of the two following witnesses.

FRANK H. MERRILL.
FRANCIS HICKMAN.

Witnesses:
WILLIAM SWIFT,
HENRY C. SUYDAM.