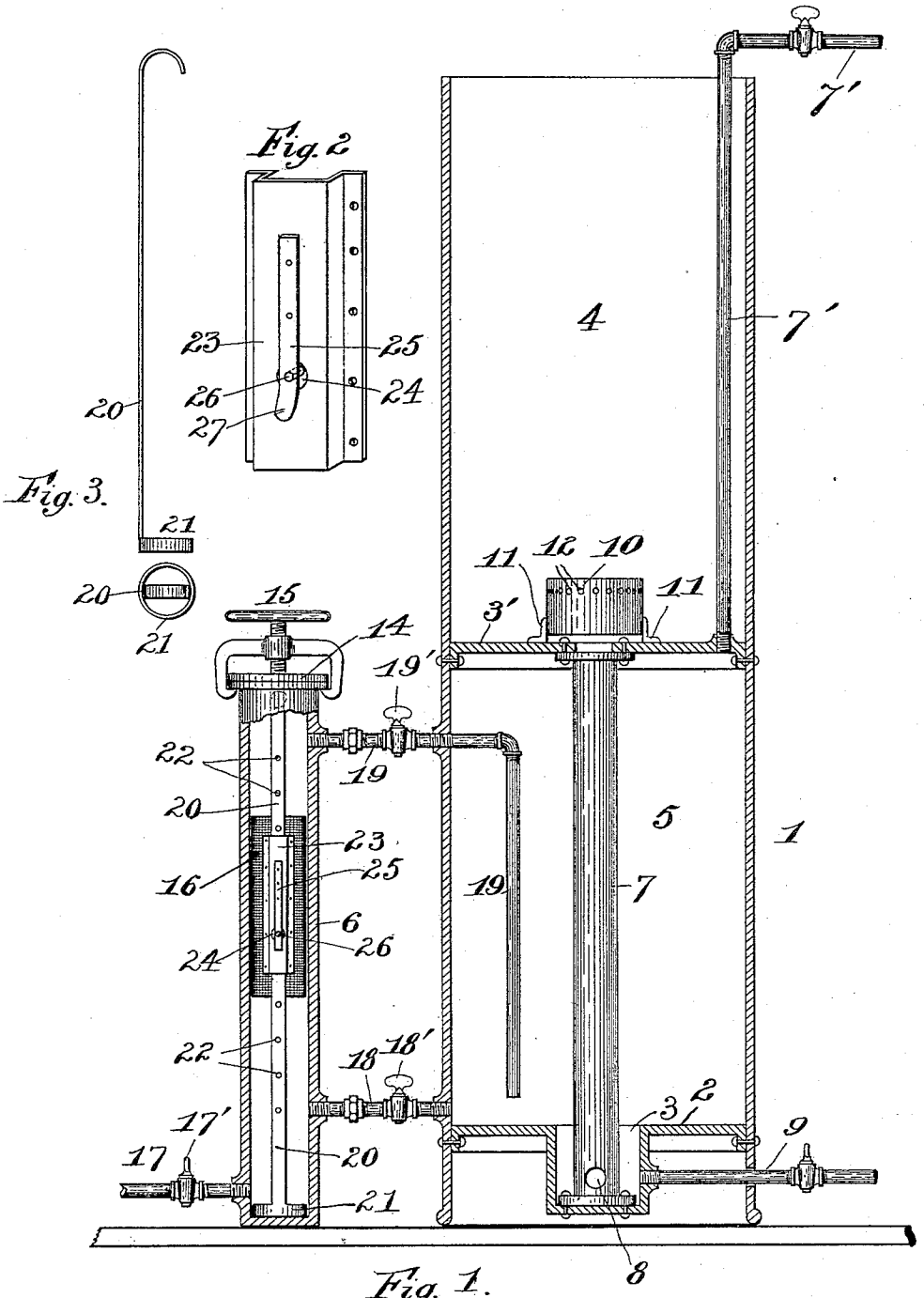
(No Model.)

A. S. BUCHER.

ACETYLENE GAS GENERATOR.

No. 569,273. Patented Oct. 13, 1896.



WITNESSES:

A. M. Wood

Mary C. Logan.

INVENTOR

Alfred S. Bucher,

BY

Allwardson

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALFRED S. BUCHER, OF DECATUR, GEORGIA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 569,273, dated October 13, 1896.

Application filed July 15, 1896. Serial No. 599,310. (No model.)

To all whom it may concern:

Be it known that I, ALFRED S. BUCHER, a citizen of the United States of America, and a resident of Decatur, in the county of De Kalb and State of Georgia, have made a certain new and useful Improvement in Acetylene-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to devices for generating gas from the reaction resulting from the mixture of a liquid with a solid capable of producing gas by their reaction, reference being particularly had to the mixture of water and calcium carbid, the gas resultant from such reaction being known as "acetylene."

The object of the invention is to produce a device for said purpose which shall be automatic in all of its actions, adjustable as to the tension of gas sustained, and absolutely safe against explosion by reason of too great a generation as compared to its storage capacity.

To these ends the invention consists of the device hereinafter described.

In the accompanying drawings the invention is illustrated as follows:

Figure 1 is the vertical section of the device. Fig. 2 is a perspective detail of the slide of the basket; and Fig. 3 shows details respectively in side elevation, a plan of the basket-adjustable rod.

In the figures like reference-characters are uniformly employed in the designation of corresponding elements of construction.

Figure 1 is a cylindrical vessel made of sheet-iron of the requisite gage, said vessel being provided with a bottom 2, which has in its center a depressed portion 3, and at about its middle is divided into two compartments by a diaphragm 3′, the compartment 4 being the water-reservoir and the compartment 5 being the reservoir for storage gas as it is generated.

6 is the generator, which is situated alongside the compartment 5.

7 is the discharge-pipe for gas and passes upwardly from the upper end of the compartment 5 and in the construction shown passes therefrom through the diaphragm 3, passing therefrom upwardly through the compartment 4. A hole is cut in the center of the diaphragm and a pipe 7 is secured to the under side of said diaphragm, covering said hole, and passing thence to the bottom of the depression 3, where it is flanged and secured to the bottom thereof, a hole 8 being cut in the side of said pipe just at the lower end thereof, opening communication into the interior of said pipe from the compartment 5. This hole should be considerably smaller in area than the pipe 7, for a purpose hereinafter set forth. It is obvious that the pipe 7, being secured as it is to the diaphragm 3 and to the bottom plate 2, acts as a stay for said diaphragm and plate and prevents their bulging from pressure or long-continued use.

9 is a blow-off pipe which forms a means for discharging the water and sediment resulting from the process.

Situated over the upper opening of the pipe 7 is an inverted-cup-shaped vessel or cap 10, which is supported on legs 11, and is provided around its lower edges with notches, or, as shown, its lower edge may be set a short distance above the diaphragm 3. In the sides of this cap near its upper end are holes 12, which serve to distribute as the cap serves to catch and cause the distribution of any bubbles of gas which may pass upwardly through the pipe 7, said bubbles being thus discharged upwardly out of the water without causing any forcible ebullition thereof, which might otherwise cause said water to escape and run over the sides of the device.

The small bubbles will not, if ignited, cause an explosion, as might be the case were large bubbles to escape and come into contact with a flame. By reason of the fact, as hereinbefore stated, that the opening 8 is smaller in area than the pipe 7 the danger of large bubbles will be lessened without materially affecting the circulatory function of the said pipe.

The generator 6 consists of a cylindrical vessel about as high as the compartment 5, and at its upper end flanged, whereon fits a cover 14, a screw-clamp 15 serving to press the same to a sealing-joint, either with or without the interposition of a packing-gasket.

It is through this upper end that the calcium carbid is introduced in charging the generator. In the cylinder 6 is a wire-gauze basket 16, which is secured as will be presently described, and in this basket the calcium carbid is sustained while undergoing the process of reaction, and through the bottom thereof falls the released portion of the particles of slaked carbid, falling to the bottom of the cylinder, where a pipe 17 is provided for its removal, governed by a valve 17′. Part of the slaked carbid passes through the pipe 18 into the receiver 5, thence to the depression 3 and out by way of the pipe 9 when opened for that purpose, and the remainder is held in the basket and may be simply dumped therefrom on the withdrawal thereof from the generator in recharging same with new calcium carbid. The pipe 18 connects the generator 6 with the compartment 5 near the lower end of both, and the pipe 19 connects same at their upper ends, valves 18′ and 19′, respectively, governing the said pipes. The pipe 19 passes into the compartment 5, where it is turned down to a point near the bottom of same, by which means the gas evolved will pass downwardly through same and will, after flowing from the end of the same, percolate upwardly through the water in the compartment 5 and be thoroughly washed and cooled. If it is desired, the said water may be impregnated with a chemical and thereby still further purify the gas. This device is automatic in its action, inasmuch, as herein stated, when the level of the water in the compartment 5 shall have been lowered to the point below the carbid said carbid will not then be subject to the action of said water. Obviously the lowering of the water-level in the compartment 5 raises the water-level in the compartment 4, increasing the water-head and consequently increasing the pressure of gas in the service-pipe and also in the compartment 5 by a progressive proportion due to the increase of the distance between the water-floor in the compartment 5 and the water-level in the tank 4. Hence in order to keep the water-floor in the compartment 5 at approximately any position all that is necessary to be done is to have the bottom of the mass of the calcium carbid located at about that point. Hence if the basket 16 is made adjustable the location of the water-floor in the compartment 5 will also be adjustable, any change in the level of said water-floor producing a change in pressure double in amount, inasmuch as the water-head is also changed in the reversed direction. For this reason I have made the basket 16 adjustable vertically within the cylinder, it being also removable therefrom. In order to support said basket 16 in position and to have that position adjustable, I have provided a rod 20, which is curved at its top to form a handle for use in removing the basket, and its bottom is provided with a foot 21, which should fit within the cylinder and prevent lateral displacement of the rod or of the basket. Holes 22 are punched in this rod 20, and on the side of the basket 16 is a guide 23, formed of sheet metal and having a hole 24 cut through its face.

25 is a spring which is secured to the outer side of the guide 23, and 26 is a pin secured to said spring and passing through the hole 24 into the desired one of the holes 22. The free end of the spring 25 should be bent backwardly, as best shown in Fig. 2, so that it may contact with the side of the cylinder 6 and hold the pin 26 in place firmly in engagement with one of the holes 22, so that there may be no danger of disruption of said engagement.

The operation of this device is as follows: The compartment 4 is filled with water, which flows into the compartment 5 through the pipe 7 until said compartment 5 is filled therewith, the valves 18 and 19 being closed. By the water flowing into the compartment 5 all air is driven therefrom. The cover 14 is then removed and the basket 16 filled with calcium carbid and placed in the cylinder, said basket 16 having been previously adjusted on the rod 20, so that its bottom will be in the desired position. The cover 14 is then secured in place, and the valve 19 opened, whereupon the water passes in slowly through the pipe 19, dripping down upon the carbid until the generation of gas is started, the compression of the small amount of air in the cylinder 6 allowing said small amount of water to enter. The evolution of gas in said cylinder drives the air into the compartment 5 through the pipe 19, whereupon the valve 18 is opened, which allows the water to flow into the lower end of the chamber 6, and coming in contact with the lower side of the carbid start a free evolution of gas. This continues until the level of the water in the compartment 5 is depressed to a point below the level of the basket 16, whereupon the carbid will no longer be submerged and the free generation of gas will stop. As the water leaves the compartment 5 it passes upwardly into the tank 4, increasing the pressure twofold. The change in level as it does so is such that a considerable time is required for the slow evolution of gas from the submerged carbid to lower the level of the water in the compartment 5. However, should said level be depressed sufficiently low a bubble of gas will pass out through the opening 8, up through the pipe 7, and be separated into small bubbles in passing out into the water in the tank 4 through the perforations 12 in the inverted cup 10, so that only small bubbles will discharge from the upper side of the said water, and not a large bubble, which would be likely to cause an explosion if ignited. When the pressure of the gas shall be sufficiently reduced by use thereof in the consuming-circuit, the level of the water in the compartment 5 will be slightly raised, and the water

coming into contact with the lower side of the calcium carbid contained in the basket 16 in the cylinder 6 the free generation of gas will be again started and the compartment 5 may by the repetition of the process be kept automatically charged with fresh carbid at any time, no matter what the pressure of gas is in the compartment 5, by simply closing the valves 18 and 19, opening the upper end of the cylinder, removing the basket 16, filling and returning same, and then resealing the end of the generator as before.

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

1. In an acetylene-gas generator, a receiver and a discharge-pipe for gas, a water-tank and a pipe connecting said tank with said receiver and extending to near the bottom of the latter, and a gas-generator connected to said receiver and an inverted cup perforated at its top end and set over and near the opening of said pipe into said tank substantially as and for the purpose specified.

2. In an acetylene-gas generator, a cylinder, a bottom therein having a cylindrical depression downwardly from its center, a diaphragm dividing said cylinder into two compartments, a perforation in said diaphragm, a pipe flanged at its ends and secured at said diaphragm and to the bottom of said diaphragm and to the bottom of said depression, a hole in the lower end of said pipe, smaller than the internal area thereof, a cup perforated around its sides near its top and seated near to and over the upper end of said pipe, a blow-off pipe leading outwardly from said depression, a gas-discharge pipe leading from the upper interior of the lower compartment, two valve-governed pipes leading from the sides of said lower compartment, a valve in each of said pipes, an open-topped cylinder lying alongside of said compartment and interiorly connected with said pipes, a drain-pipe leading from the bottom of said cylinder, a valve governing same a perforated basket in said cylinder nearer the lower pipe, and a closure for the open upper end of said cylinder, all combined, arranged, and operated substantially as and for the purpose specified.

3. In an acetylene-gas generator, a holder, means for introducing water under pressure into the same at its bottom and a gas-generator provided with means for the suspension of calcium carbid therein, consisting of a basket having a guide secured to its side, a rod provided with a longitudinally-extending series of perforations, a pin adapted to secure said rod in any set position in said guide, pipes connecting said generator respectively at its bottom and top with said holder for the purpose specified.

4. In an acetylene-gas generator, a holder, means for introducing water under pressure into the same at its bottom and a gas-generator provided with means for the suspension of calcium carbid therein, consisting of a basket having a guide secured to its side, a rod provided with a longitudinally-extending series of holes, a spring secured to said guide, a pin thereon passing through said guide and adapted to enter one hole of said series and secure said rod in any set position, and pipes connecting said generator respectively at its bottom and top with said holder, for the purpose specified.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

ALFRED S. BUCHER.

Witnesses:
A. P. WOOD,
MARY C. LOGAN.