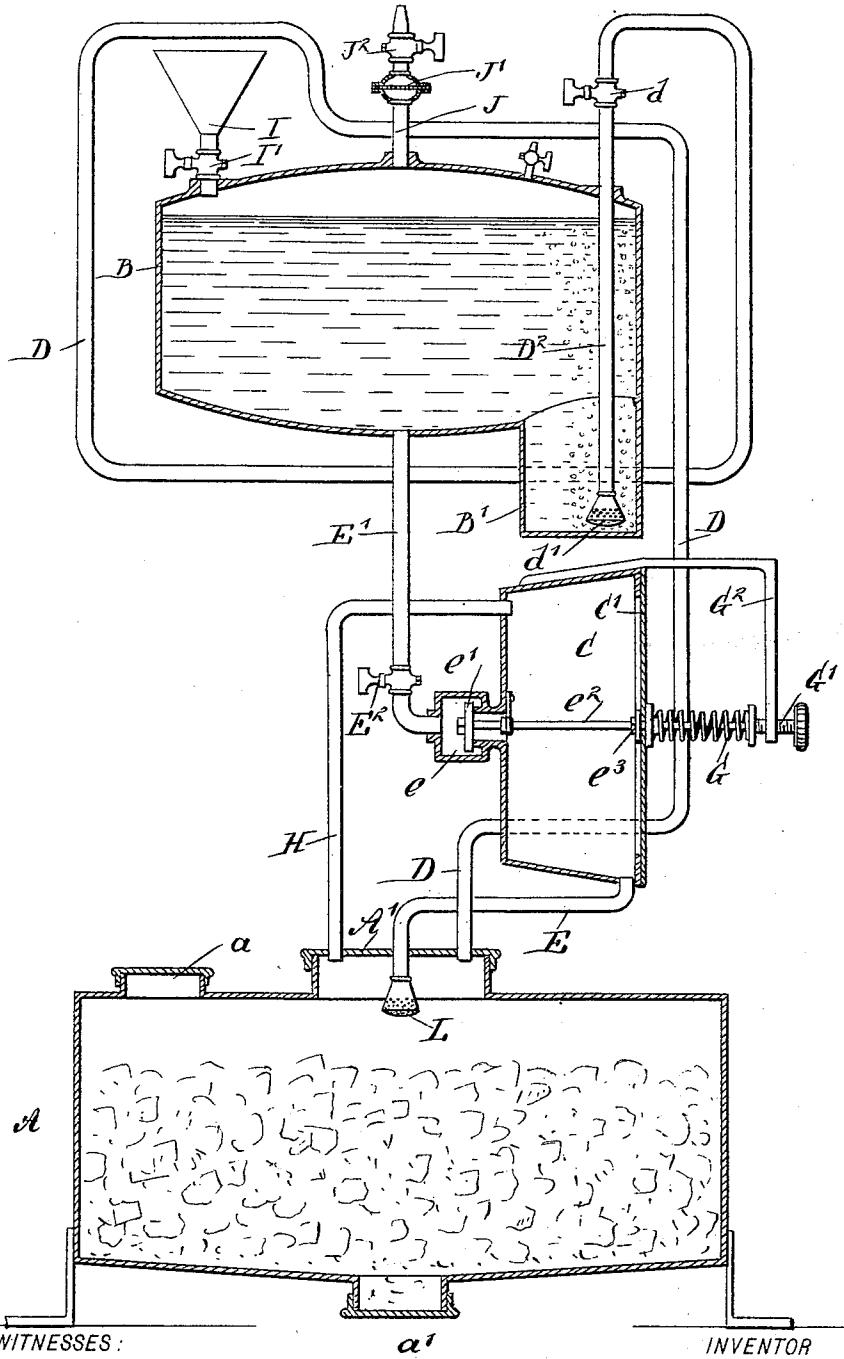
No. 618,299. Patented Jan. 24, 1899.

M. E. SPRAGUE.

ACETYLENE GAS GENERATOR.

(Application filed Nov. 11, 1897.)

(No Model.)



WITNESSES:

H. Walker

H. L. Reynolds.

INVENTOR

M. E. Sprague.

BY Munn & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MYRON E. SPRAGUE, OF PLYMOUTH UNION, VERMONT.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 618,299, dated January 24, 1899.

Application filed November 11, 1897. Serial No. 658,174. (No model.)

To all whom it may concern:

Be it known that I, MYRON E. SPRAGUE, of Plymouth Union, in the county of Windsor and State of Vermont, have invented a new and Improved Acetylene-Gas Generator, of which the following is a full, clear, and exact description.

My invention relates to an improvement in acetylene-gas generators, and has for its object to simplify their construction, to render their action automatic, so that the supply of gas is regulated by the amount consumed, and to increase their safety.

The invention consists in certain improved constructions, which will be hereinafter described, and particularly pointed out in the claims.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure represents a sectional elevation of the device.

The gas-generator proper, or the chamber which contains the calcium carbid and within which the gas is formed, is placed at the bottom of the device. This chamber A may be made in any suitable shape and is provided at the top with a filling-opening through which the carbid may be introduced, said opening having a removable cover *a*. A second opening, having a removable cover *a'*, is located at the bottom of the chamber A, through which opening the lime resulting from the decomposition of the carbid may be removed. The generator has a number of pipes entering the top thereof and serving to introduce the water necessary for the production of the gas and for carrying away the gas after being produced. These pipes are preferably introduced through a removable cover A'.

The pipe E is provided upon the end within the generator with a sprinkler-head L and is the pipe through which water is introduced upon the carbid. This pipe E is connected to the lower part of an intervening chamber C, which is the diaphragm or valve chamber. The chamber C has a small chamber *e* upon one side thereof and projecting horizontally. The side C' of the chamber C opposite to the small chamber *e* is a flexible diaphragm, the gas and spring pressures on the diaphragm controlling the admission of water into the carbid-chamber A. Within said chamber *e* is located a valve *e'*, which is connected to a stem e^2, passing through and fastened tightly to the flexible diaphragm C' upon the side of the chamber C opposite the chamber *e*.

Outside the chamber C is a spring G, coiled on the outside end of the stem e^2 and bearing against the diaphragm C' on the chamber C and against a screw G' in an arm G^2, attached to the chamber C. The spring G acts upon the diaphragm C', and thus upon the stem e^2, in such a manner as to open the valve *e'* when there is no pressure of gas on the diaphragm. The pressure of the spring G may be regulated by means of the screw G', which receives the pressure of the outer end of the spring. The spring G may be set at any tension that the required pressure of gas calls for. A pipe H connects the chamber C with the chamber A for the purpose hereinafter explained.

To the outer end of the chamber *e* is attached a pipe E', which communicates with the lower part of a water-tank or gasometer B. This pipe E' is preferably provided with a valve E^2, by which the flow of water through the chamber *e* and valve *e'* may be prevented when desired. It will be seen that when the valve E^2 is opened the water from the tank B will flow through the open valve *e'* into the chamber C and pass thence through the pipe E to the generator until enough gas has been formed to press the diaphragm outward against the pressure-spring G, the diaphragm pulling the attached valve-stem e^2 with it and closing the valve and stopping the flow of water until the pressure of gas decreases, when the spring presses the diaphragm inward, opening the valve and letting in more water. The pipe D, which enters the upper portion of the generator, is carried entirely about the tank B, passing over the top of the same and beneath its bottom, and then enters the tank at the top and is provided with a downwardly-extending leg D^2. As shown in the drawing, the tank B is provided with a well B', which is of greater depth than the body of the tank. The pipe D extends into said well and terminates at the end of the leg D^2, at or near the bottom of said well, in a perforated nozzle *d'*, through which the gas from the generator passes into the water con-

tained in the tank. The gas then passes up through the water in the tank in a series of small bubbles and is by this action cooled and purified.

The object in carrying the pipe D entirely around the tank is to prevent the possibility of water flowing through said pipe from the tank if the apparatus should be upset. Without some safeguard of this sort, if the apparatus be upset there is a possibility of the water flowing into the generator in such large quantities as to cause a rapid generation of gas, which would burst the generator and cause an explosion.

The object of the downwardly-extending leg D^2 is twofold: first, to cool and purify the gas by passing it through the water in the tank, and, second, to prevent fire following an explosive mixture of gas and air back to the generating-tank A. As the gas is drawn off from the tank B the pressure is reduced in the generator, and consequently the pressure in the diaphragm-chamber C and pipe D and pipe H will fall. As the pressure is relieved from the tank B the pressure acting on the flexible diaphragm C′ on the chamber C to close the valve *e′* is reduced until finally the spring G is able to overcome this pressure on the diaphragm, which moving inward opens the valve and admits water into the chamber C. As soon as admitted into the chamber C the water will enter the generator through the pipe E and the generation of gas will commence again. This action will continue until a sufficient amount of gas has been introduced to the chamber C to increase the pressure a sufficient amount on the diaphragm to close the valve *e′*. As soon as the water thus introduced has been entirely consumed in the manufacture of gas the action will stop, and no more gas will be produced until the pressure within the tank has dropped to such a point as to open the valve *e′*. It will thus be seen that the action of the device is entirely automatic, the generation of gas depending entirely upon the consumption thereof and being fast or slow according as the gas is used rapidly or slowly.

To more fully guard against a variation in pressure between the chamber C and the generator A and also to prevent interference with the flow of water through the pipe E by the flow of gas therethrough, the additional pipe H is provided, connecting the generator with the chamber C.

A funnel I is mounted upon the upper side of the tank B and is provided with a valve I′, by means of which water may be introduced to the tank as desired. This tank serves a double purpose, acting as a reservoir for storing water and as a gasometer or holder for the gas. It also incidentally serves still another purpose, as a purifying-chamber for the gas. A cock for an air-vent to open when filling with water is placed near the top of the tank B.

A pipe J is attached to the tank B for conducting the gas to any point where its use is desired. To prevent the possibility of explosion due to mixture of air with the gas at the time the apparatus is first set in use, I provide the pipe J, at some point between the tank and the burner, with a chamber containing a piece of fine wire-gauze J′, which extends entirely across the chamber and will prevent flame from passing from one side to the other. The pipe J is also provided with a suitable valve J^2, located at any convenient point, and by means of which the pipe may be closed. The pipe D is also provided with a valve *d*, similar to the valve J^2.

It will be seen that by the adjustment of the spring G the action of the apparatus may be readily controlled. By reducing the pressure of the spring the pressure in the diaphragm-chamber C must drop lower before the valve *e′* will open. The gas is thus used at a small pressure. It is thus possible by this simple device to thoroughly control the operation of the device and maintain any desired pressure in the pipes.

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

1. A gas apparatus, comprising a generator, a tank located above the generator for containing water, a gas-discharge pipe leading from the generator to said tank and discharging into the lower portion of said tank, a valve-chamber, the side of which chamber opposite the valve is a flexible diaphragm, between the generator and tank, a pipe connecting the valve or diaphragm chamber with the tank, a valve contolling the entrance of water from the tank and opening against the pressure of water, a stem upon said valve extending to the flexible diaphragm on the side of the valve-chamber opposite the valve and firmly fixed to the flexible diaphragm, a spring pressing on said diaphragm and acting to open the valve when there is no pressure in the generator, means for adjusting the tension of the spring, and a pipe connecting the lower part of the chamber with the generator, whereby water admitted to the chamber will be discharged upon the carbid in the generator, substantially as described.

2. A gas apparatus, comprising a generator, a water-reservoir located above the generator, a gas-discharge pipe leading from the generator to said tank and discharging into the lower portion of said reservoir, a valve or diaphragm chamber between the generator and tank, a pipe connecting the valve-chamber with the tank, a valve, operated by the movements of the flexible diaphragm, the movements being made by the increase or decrease of the pressure of gas in the generator and by the pressure of the spring on the diaphragm, said valve controlling the entrance of water from said tank and opening against the pressure of water, a stem upon said valve extending through the diaphragm outside the chamber, a spring pressing on the diaphragm

where the valve-stem is fastened to the diaphragm and serving to open the valve, means for adjusting the tension of the spring, a pressure-equalizing pipe connecting said chamber and the generator, and a water-conveying pipe connecting the lower part of the chamber with the generator, whereby water admitted to the chamber will be discharged upon the carbid in the generator, substantially as described.

3. In a gas apparatus, the combination with a generator, a tank above the generator, and a pipe leading from the generator to the tank, of a chamber intermediate of the generator and tank and communicating with the generator, the said chamber having one side in the form of a diaphragm and provided at the side opposite the diaphragm with a valve-chamber, a pipe leading from the tank to the valve-chamber, a valve in said chamber and having its stem secured to and passing through the diaphragm, an arm, a screw in the arm and a spring surrounding the valve-stem between the screw and diaphragm, substantially as described.

4. In a gas apparatus, the combination with a generator, and tank above the generator and connected therewith by a pipe, of a chamber between the tank and generator and having one side in the form of a diaphragm, the bottom of the said chamber being connected with the generator by a pipe, a valve-chamber at one side of the said chamber and connected with the bottom of the tank by a pipe, a valve in the valve-chamber and having its stem secured to the diaphragm of the said chamber, and a spring bearing upon the said diaphragm, substantially as described.

5. A gas apparatus, consisting of a generator, a tank above the generator and provided with a well, a pipe leading from the generator into the tank, the said pipe being provided with a leg extending down into the well of the tank, a chamber between the tank and generator and having one side in the form of a diaphragm, a pipe connecting the bottom of the chamber with the generator, a valve-chamber on the side of the chamber opposite the diaphragm, a pipe connecting the valve-chamber with the bottom of the tank, a valve in the valve-chamber and having its stem secured to and passing through the diaphragm, an arm, a screw in the arm, a spring on the projecting end of the valve-stem between the screw and diaphragm, and a pipe leading from the upper part of the diaphragm-chamber to the generator, substantially as herein shown and described.

MYRON E. SPRAGUE.

Witnesses:
RANSOM E. HATHORN,
RODEN H. HUMPHREY.