No. 649,272. Patented May 8, 1900.

W. F. COOPER.

ACETYLENE GAS GENERATOR.

(Application filed June 29, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

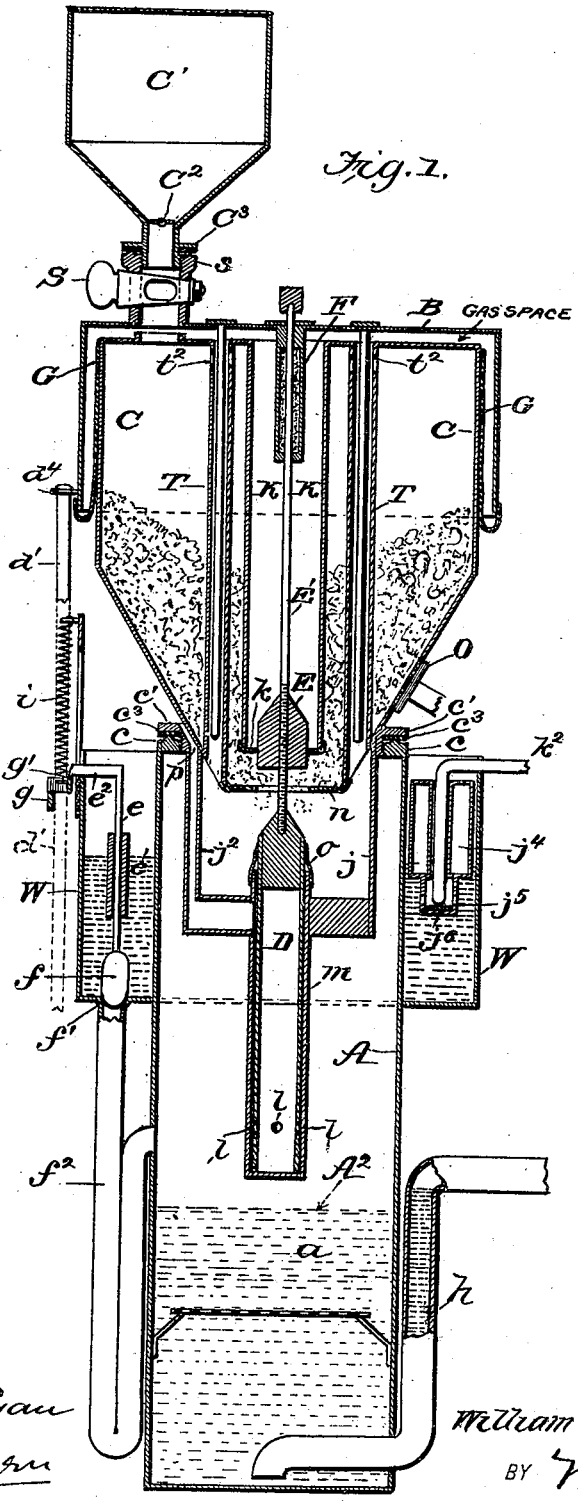

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Fig. 2.

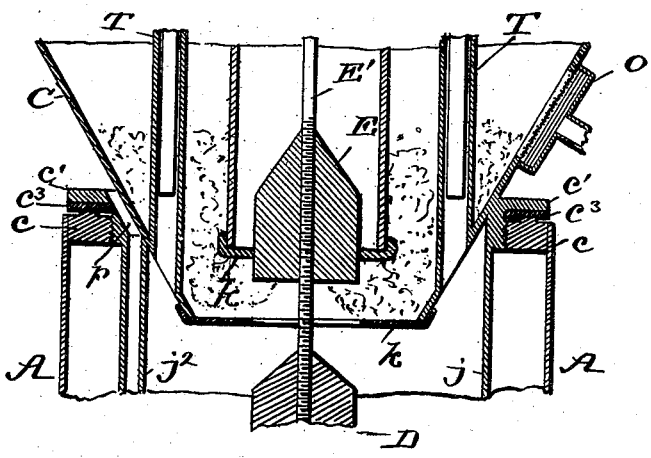
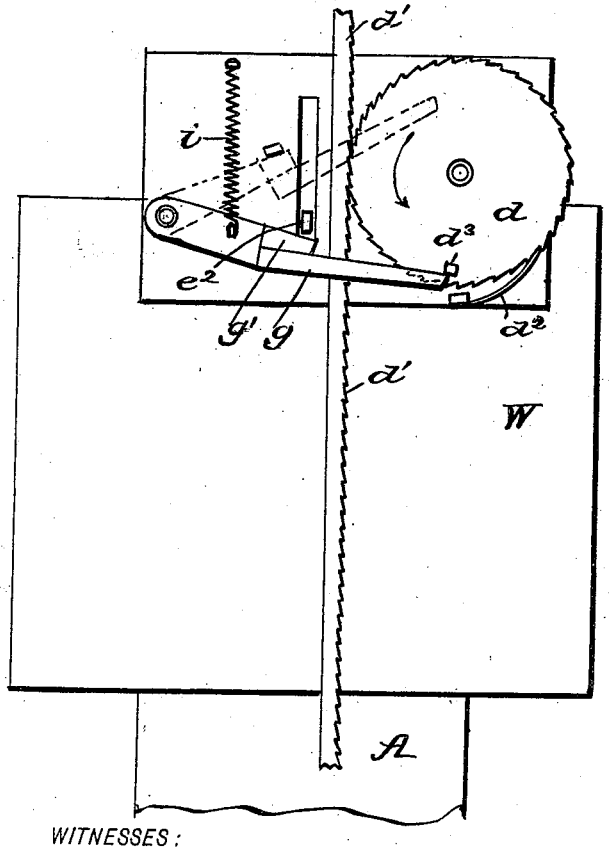


Fig. 3.



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WILLIAM F. COOPER, OF MERIDEN, CONNECTICUT.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 649,272, dated May 8, 1900.

Application filed June 29, 1899. Serial No. 722,271. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. COOPER, of Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Acetylene-Gas Generators, of which the following is a specification.

My invention is in the nature of an improved automatic acetylene-gas generator designed to feed the calcium carbid from time to time to a subjacent body of water and to automatically renew that body of water and discharge the slush into a sewer or other convenient receptacle; and it consists in the peculiar construction and arrangement of the parts of the device for carrying out these results, as will be hereinafter fully described with reference to the drawings, in which—

Figure 1 is a vertical central section of the entire device. Fig. 2 is an enlarged sectional detail of the lower end of the carbid-chamber. Fig. 3 is a detail in side view of the water-supplying devices.

In the drawings, A is the water-chamber, B is the bell of the gasometer, and C is the carbid-chamber, which extends upwardly into the bell B when the latter is down and has a funnel-shaped lower end with a screw-threaded neck having a flange c' and gasket c^3, by which it is tightly connected to the screw-threaded top c of the water-chamber.

G is a skirting of fabric connected at the top to the top of the carbid-chamber C and at its bottom to the lower edge of the bell and rolling up and down as the gasometer rises and falls, the pressure of the gas being inside the fold of the fabric, so that there is no frictional rubbing between the walls of the fabric as it rolls up and down, as is more fully described and claimed in my previous application, Serial No. 710,762, filed March 28, 1899.

D, E, and E′ are parts of the carbid-feed valve, of which E′ is a rod extending up through a packed tube F to the outside of the gasometer, to which said tube is attached and with which it rises and falls, and is also capable of a frictional sliding movement up and down through the packed tube F. To the lower end of the rod E′ there are attached, by a screw-thread, a plug E and a long tubular valve D, with conical upper end and cylindrical sides, open at the bottom. By means of the screw-thread the plug E is brought closer to or farther from the part D, so as to adjust the space between them and regulate the carbid feed.

K is a tube attached to the top of the carbid-holder C and surrounding the valve-stem E′. This tube K relieves the valve and its rod of much frictional contact with the carbid as it passes through the same. It is desirable to generate gas at a low pressure of, say, three inches water-pressure, and hence it is important that there should be the utmost sensitiveness in the movement of the valve and as much freedom as possible from frictional resistance. Otherwise the variation in pressure in the generator would be noticeable at the burners. At the bottom of the tube K there is an annular collar k, of rubber, whose central hole fits closely the plug E and long valve D. This prevents large pieces of carbid from being lifted into the tube K and wedging between the said tube K and the long valve D when the latter rises into the tube from the ascent of the gasometer. A second rubber collar n is secured to the bottom opening of the carbid-chamber and has a hole through it of a size to fit the plug E and long valve D. When the valve-rod E′ is in its lowest position, the plug E closes the opening in n. When raised slightly, as shown, the carbid feeds down through the space between E and D and through the opening n into the water. When the gasometer is raised higher, the long valve D passes through the opening in n and up into the tube K, thereby cutting off the feed of carbid. When the space between E and D comes opposite the opening in n, the carbid can again pass out, and if there is any tendency for the large grains of carbid to arch over the opening and not pass through this is overcome by the plug E positively forcing it down through the opening in n. If the carbid be used in larger grains, the plug E might be dispensed with. The object of the rubber collar n is to make a flexible edge for the feed-outlet and reduce the sliding friction on the feed-rod and to enable me to use larger grains of carbid, which is important, as the larger grains decompose with very little generation of aqueous vapor. The larger the

percentage of vapor in the upper portion of the water-reservoir the greater the tendency to clog the feeding of the carbid. It is also desirable to use as large grains of carbid as possible on account of the difficulty of crushing, handling, and keeping the pulverized carbid.

m is a tube or sheath covering the long cylindrical valve D and rigidly fixed in place beneath the same, so that the valve D slides up and down in the same. This sheath is connected by supports *j* with the carbid-holder C, and a flexible collar-packing *o* on the top of sheath *m* closely fits the long valve D. This sheath *m* prevents the carbid which is dropped from sticking to the valve D and then being drawn upward and stopping the opening in the bottom of the carbid-holder, for the vapor would condense on the valve D and the carbid would adhere to the same and clog the opening but for the collar-packing *o* and sheath *m*.

At the bottom of the large valve D there are openings *l* from the inside of the same, which at the extreme upward movement of the valve pass above collar *o* and open communication with the hollow space in one of the supports j^2 for the sheath *m*, which hollow space communicates at *p* with the air and allows the surplus gas to escape, thus forming a safety-valve.

O is a filter (see Fig. 2) placed over the outlet of the carbid-holder to the burners. It is placed anywhere on or in the lower part of the carbid-chamber, so that the gas after generation will pass up the guide-tubes T to the gasometer and also through lateral holes t^2 at the top into the carbid-chamber and then pass down through the carbid, being thereby thoroughly dried, and thence passes out through the filter O to the burners. This filter consists of a sheet of fine-wire gauze next to the carbid, with several sheets of cloth or cotton-batting packed between that and the outlet.

I will now describe the means for automatically flushing the water-receptacle.

A ratchet-bar d' is attached to the bell of the gasometer by a projection d^4 and extends down to and engages with a ratchet-wheel *d*, Fig. 3, journaled outside a water-supply tank W, which surrounds the upper part of the water-chamber A. A trapped pipe f^2 connects the bottom of supply-tank W with the water-chamber and has in tank W a float-valve *f*, stopping the mouth of said pipe f^2. This valve *f* has a soft-rubber ring f' to form a tight joint on its seat. A vertical rod *e* is attached to valve *f* and slides through the guide *e'* and has an arm e^2 projecting outside the tank W. A lever *g* is pivoted at one end and is normally held up by spring *i* until depressed by a lug d^3 on the ratchet-wheel *d*. As the gasometer rises and falls its attached ratchet-bar d' turns ratchet-wheel *d* and its lug d^3 depresses lever *g*, and after it passes said lever the spring *i* quickly pulls up the said lever. This lever has an inturned lug g', which strikes the arm e^2 and lifts the valve *f* and allows a volume of water to pass from supply-tank W down pipe f^2 and into the water-chamber A. The water-level stands normally at A^2, about three inches below the upper end of discharge-pipe *h*, and when a charge of water enters A the level rises and the slush or ash passes out through pipe *h* and off into the sewer or other place of discharge. To prevent the ratchet-wheel from turning backward, a spring-pawl d^2 is applied to its periphery. The arm e^2 has a beveled face, so that the lug g' of lever *g* will pass over it on the downward movement and will then spring under and lift it as it rises by the tension of the spring *i*. This, it will be seen, causes the valve *f* to be opened suddenly by a quick hammer-like blow that prevents sticking of the valve and insures a positive and perfect action. When the float-valve *f* is thus raised, its buoyancy causes it to be held up until the level of the water falls sufficiently to allow the weight of the float-valve to close again from gravity.

The supply-tank W is filled automatically through an inlet-pipe k^2. On a leg of the pipe in tank W is arranged a float j^4, connected to a cap-valve j^6, having lateral outlets and a rubber washer j^5. When the water-level in W falls, the float j^4 drops and carries the valve j^6 from the open end of pipe k^2, and water then flows in. When the water-level rises sufficiently, float j^4 is lifted and pulls up cap-valve j^6, so as to close the open end of pipe k^2 in a manner similar to that employed in supplying water-closet tanks.

In the lower part of water-chamber A is a plate *a* for the calcium carbid to rest upon instead of falling down into the slush. This insures quick decomposition.

S is a stop-cock arranged in a threaded nipple *s*, through which carbid is fed to the carbid-chamber C. To permit it to be charged without stopping the generator, a hopper-chamber C', closed at the top, is provided, which has a damper-valve C^2 in its throat portion and a flange C^3 with gasket surrounding its screw-threaded mouth, which latter is screwed into the top of the nipple *s*. Chamber C' being filled and its damper C^2 in closed position, it is screwed onto *s*, and the damper-valve C^2 and plug-valve S being then opened the carbid is transferred to the holder C without loss of gas or stopping the generator.

In starting the generator the feed-valve rod E' is in the position shown and the carbid passes between E and D and through the opening in *n*, and the discharge is regulated in an automatic manner by the rise and fall of the gasometer. To stop the generation, the plug-valve D is pulled up by rod E' until it passes into openings in *n* and *k*.

An additional advantage which the reservoir water-chamber W has is that the cool water surrounding the walls of the upper end of the generating-chamber A condenses the aqueous vapor on the inside, and in taking

care of this moisture prevents the carbid from becoming sticky and clogging at the feed-valve, and it also keeps down the heat in the generator-chamber by cooling the sides of the same.

In carrying out my invention I may dispense with the flexible skirt G for closing the bell air-tight and use in place thereof a liquid seal. With reference to the flexible skirt and its combination with the attached parts I make no claim to this in the present case, as it is more broadly set forth and claimed in another application filed by me July 12, 1899, Serial No. 723,586.

In pointing out the distinctive features of the flushing devices invented by me I would state that I am aware that a stream of water has been admitted to the gas-generator and allowed to rise in an annular space in the generator and escape at the top, the water being admitted by the same devices that fed the carbid, both of which feeds were effected contemporaneously by the movement of the gasometer. I make no claim to any such arrangement. My device precipitates into the generator a large flushing volume of water, whose flow when started continues from an elevated reservoir independent of any subsequent motion of the gasometer, and my discharge-pipe opens directly from the bottom of the generator and rises to a point outside in a relatively-small cross-section. This makes the issuance of a forceful flow of water to take place from the bottom of the generator, so that the ash or slush which accumulates there is positively and fully carried out in an automatic manner. There is, furthermore, no valve in my discharge-pipe whatever, for being a stand-pipe the water standing in it seals it against the escape of gas, and yet allows it always to remain open for automatic discharge.

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

1. In an acetylene-gas generator having a water-chamber holding a body of water to receive the carbid, and a superposed carbid-feed device; the automatic water-flushing devices for charging fresh water into the chamber and displacing the slush, said devices comprehending an annular tank surrounding the upper part of the generator-chamber and having a flushing-valve, said valve being connected to and operated by the movement of the gasometer as described.

2. The combination with the generator-chamber A, and the carbid-feed device, and gasometer arranged above the same; of the annular tank W with connecting-pipe f^2, float-valve f with rod e, and arm e^2, the lever g with spring i, the ratchet-wheel d with lug d^3, and the toothed bar d' connected to the gasometer as described.

3. In an acetylene-gas generator, the combination with the carbid-chamber, having a feed-opening at its bottom, and a rising-and-falling gasometer; of a feed-valve attached thereto constructed in elongated form to pass into and close said opening, and a subjacent stationary sheath to receive and keep clean said feed-valve when in its lower position as described.

4. In an acetylene-gas generator, the combination with the carbid-chamber having a feed-opening at its bottom and a rising-and-falling gasometer; of an elongated feed-valve attached to the gasometer and having a gas-vent in the same, a subjacent support for the elongated valve having a passage-way in it leading to the outer air and adapted to communicate with the interior of the gas-chamber through the gas-vents in the elongated feed-valve substantially as and for the purpose described.

5. An acetylene-gas generator having a water-chamber in the lower portion of the same, a superposed flushing-reservoir connected to the water-chamber of the generator, a discharge-pipe constructed as a normally-open stand-pipe having one end opening into the bottom of the water-chamber, and the other end rising to or above the level of the water in the water-chamber, a valve for maintaining a given water-level in the flushing-reservoir, a flushing-valve for controlling the flow from the reservoir to the generator-chamber, and means for operating the flushing-valve by the movement of the gasometer substantially as described.

6. An acetylene-gas generator having a water-chamber in the lower portion of the same, a superposed flushing-reservoir, a trapped pipe connecting the reservoir to the water-chamber, a discharge-pipe constructed as an open stand-pipe having one end opening into the bottom of the water-chamber, and the other end rising to or above the level of the water in the water-chamber, a flushing-valve controlling the flow of water in the trapped pipe, and means for starting the flushing-valve by the movement of the gasometer substantially as described.

7. In an acetylene-gas generator, the combination of the carbid-chamber having a feed-opening at its bottom with a flexible margin and a pendent stationary tube K extending down to a point near said feed-opening and having a flexible lip at its lower end, a rising-and-falling gasometer-bell arranged on top of and inclosing the upper end of the carbid-holder, and a feed-valve attached to the bell and elongated vertically and arranged to pass through said feed-opening and the lower end of the tube, and maintain them closed throughout the entire upward movement of the bell substantially as and for the purpose described.

8. In an acetylene-gas generator, the combination with the carbid-chamber having a feed-opening at its bottom with a flexible margin; of a rising-and-falling gasometer-bell and a feed-valve attached to the same and constructed of a screw-threaded central

stem, an enlarged portion E, and an enlarged and elongated portion D, the said parts E and D being made adjustable toward each other substantially as and for the purpose described.

9. The combination with an acetylene-gas generator; of a carbid-filler for introducing carbid without the escape of gas, consisting of a screw-nipple containing a cut-off valve and mounted on the generator, and a detachable and completely-closed filler-chamber having a neck with a screw-coupling fitting the nipple of the generator, and having also a cut-off valve located in the neck of said closed chamber substantially as and for the purpose described.

10. The combination with a stationary carbid-chamber having an opening in its upper end; of a rising-and-falling gasometer-bell inclosing the upper end of said carbid-chamber, and having mounted on it a screw-threaded nipple with a cut-off valve in it, and a detachable and entirely-closed filling-chamber having a screw-neck fitting the nipple of the gasometer, and also a cut-off valve in said neck substantially as and for the purpose described.

WILLIAM F. COOPER.

Witnesses:
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R. A. SQUIRE.