No. 714,238. Patented Nov. 25, 1902.

N. A. RENSTROM.

ACETYLENE GAS GENERATOR.

Application filed Jan. 7, 1902.

(No Model.)

Fig. 1.

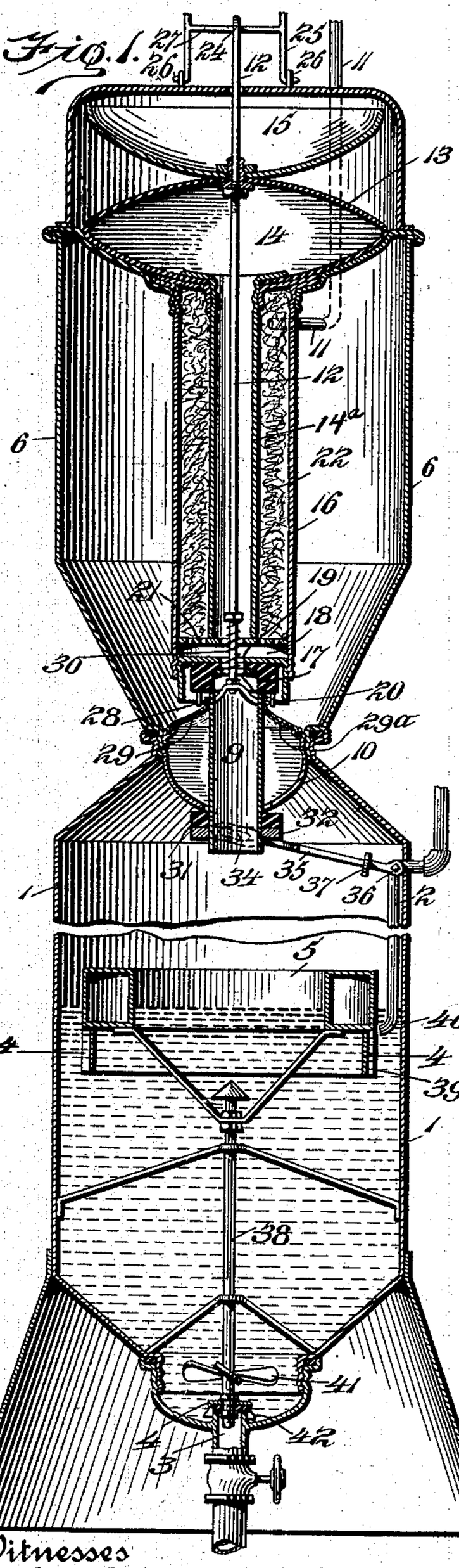


Fig. 2.

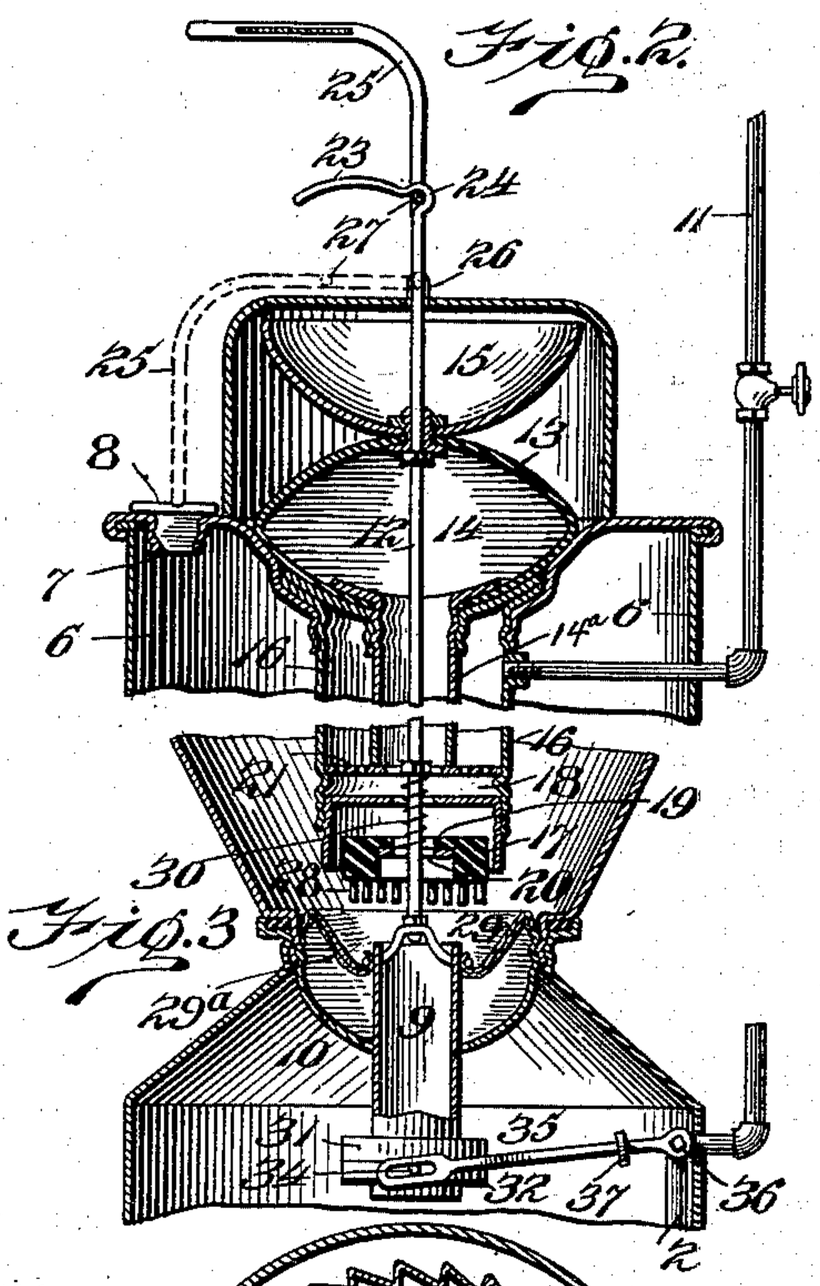


Fig. 3.

Fig. 4.

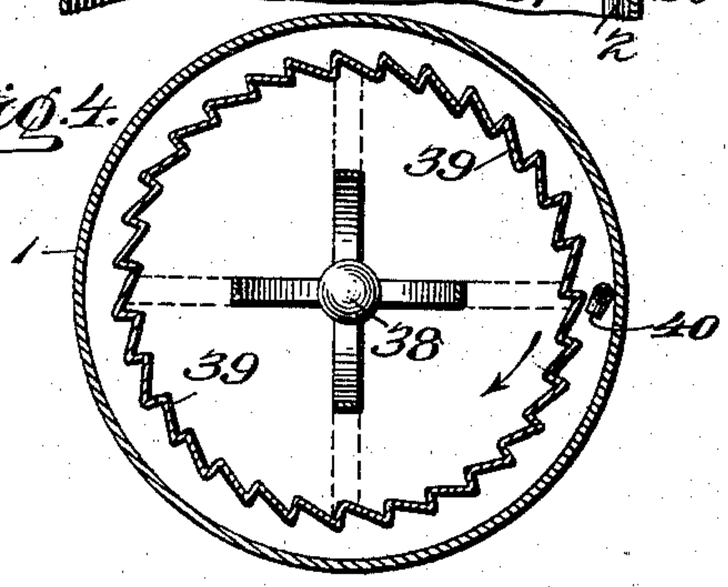


Fig. 5.

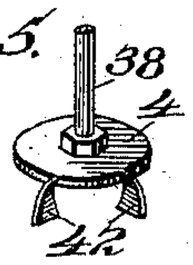
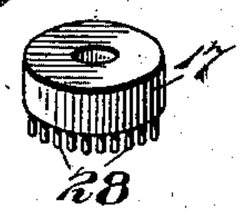


Fig. 6.



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UNITED STATES PATENT OFFICE.

NILS A. RENSTROM, OF OMAHA, NEBRASKA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 714,238, dated November 25, 1902.

Application filed January 7, 1902. Serial No. 88,773 (No model.)

To all whom it may concern:

Be it known that I, NILS A. RENSTROM, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Acetylene-Gas Machines, of which the following is a specification.

The object of my invention is to construct an acetylene-gas generator of small dimensions in proportion to the capacity of the machine, to simplify the construction of such an apparatus, to reduce the cost of a plant by doing away with the use of a gasometer, and to insure a sufficiently uniform action to provide a constant and steady supply of gas to the service-pipe.

My invention consists in certain novel principles of construction to be hereinafter more fully described, and particularly pointed out in the claims, reference being made to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a central vertical section of a complete generator constructed in accordance with my invention. Fig. 2 is a vertical section, on an enlarged scale, of the upper portion of the machine and in a different plane from Fig. 1. Fig. 3 is a vertical section, on an enlarged scale, of the intermediate portions of the machine, showing the carbid-feeding device in discharging position. Fig. 4 is a horizontal section on the line 4 4, Fig. 1, on an enlarged scale. Fig. 5 is a detail perspective view of the valve for closing the flushing-outlet with its blades for displacing obstructions that would otherwise prevent seating of the valve. Fig. 6 is a perspective view of the follower which limits the flow of carbid into the discharge-spout.

1 represents the generating-chamber, having a water-inlet pipe 2 and a flushing-outlet 3, the latter being closed by a valve 4, controlled by a float 5. When the water-level in the generating-chamber is increased by the admission of fresh water, float 5 raises valve 4 and permits escape of water through the flushing-outlet sufficient to carry off the slaked carbid.

6 represents the carbid-holder, which is loaded through an opening 7, closed by cap 8, and discharges through a tube 9, which works up and down through the bottom 10 of the holder. As tube 9 descends carbid, which is employed in finely-divided state, flows into the open top of tube 9 and passes through said tube into the generating-chamber, where gas is generated and passes back through the tube and escapes from the machine by way of service-pipe 11 in a manner to be described.

In order that tube 9 may be lowered to supply carbid as gas is exhausted and raised to cut off the feed of carbid after a charge is delivered, it is provided with a lifting-rod 12, that connects with the movable wall 13 of an elastic expansion-chamber 14.

15 represents a receptacle for weights, by which the expansion-chamber may be loaded to overcome the resistance to depression of tube 9, due to friction of the parts or gas-pressure, and to cause the feed to operate before the gas-supply is entirely exhausted, so that the delivery of gas into the service-pipe will be continuous.

To insure stoppage of the flow of carbid as the discharge-tube rises, a protecting body or member 16 is located within the carbid-holder over the opening in the bottom of the holder, so that the discharge-tube rises beneath it and the carbid is prevented from entering the tube. This member 16 is preferably tubular, so that the discharge-tube can rise within its lower end and also to serve as a gas-passage. When in the uppermost position, the tube makes a gas-tight connection with tubular body 16 through the medium of a follower 17 of rubber or other suitable packing substance, which seats against a head 18, near the lower end of body 16, perforations 19 20 being formed in the head and follower for the passage of gas and to permit the working of lifting-rod 12. This gas-tight connection permits the recharging of the carbid-holder without admitting air to the gas-passage or permitting escape of gas or interrupting the supply of gas to the service-pipe.

In order to insure the closure of the direct gas-passage above referred to when reloading the holder, the lifting-rod 12 is provided with a lifting-arm 23, extending at an angle from rod 12 and formed with a locking-seat 24, and a locking-lever 25, fulcrumed at 26, must assume one of two positions—viz., either in en-

gagement with the cap 8, which closes the holder, or in locking relation to the lifting-rod 12, with which it engages through the medium of a bar 27 entering the seat. Before removing cap 8 it is necessary to raise lever 25, and the latter will not remain in raised position except its bar 27 be seated in the seat 24, at which time the discharge-tube must be in gas-tight connection with tubular body 16.

Tubular body 16 serves the further purpose of providing a drying, purifying, or renovating chamber, for which purpose it is provided with a perforated bottom 21, above which is confined cotton fiber or other suitable material 22 for treatment of the gas passing through it. A central tube 14ª provides a direct communication to the expanding-chamber 14 and accommodates the rod 12.

Follower 17 serves a further purpose in that it descends a limited distance after tube 9 and restricts the flow of carbid into the discharge-tube in such a manner as to insure an even and gradual feed of the finely-divided carbid rather than permit it to descend in a large body. The gradual descent of the tube is also conducive to the gradual and uniform entry of carbid at first, the latter flowing evenly over the upper edge as the tube is lowered. The follower prevents the large body of carbid moving down in mass when the tube is down, and to better adapt the follower to penetrate the body of carbid and restrict its flow it is provided with downward projections 28, preferably in the form of pins inserted in the follower.

The relative diameters of the tube 9 and protecting-body 16 are such that the tube 9 is amply protected from the main vertical column of carbid and flow of carbid is cut off when the tube is up, and this is the principle upon which these parts are constructed. Hence I do not limit myself to any particular section or shape or location of these parts. The principle would be present in a measure in corresponding parts of square or other section and also with the location of these parts at one side of the holder and whether the carbid surrounded the discharge-tube or entered from one side only.

The follower is of greater diameter than the discharge-tube, so that its pins can restrict the inward flow of carbid.

To further insure the gradual inward flow of carbid to tube 9, a flexible diaphragm or false bottom 29 extends from the upper end of said tube to the surrounding wall of the holder, with sufficient fullness to permit of the necessary movement of the tube. The diameter of the holder at the point of attachment of diaphragm 29 is preferably so proportioned to the protecting-body 16 that the diaphragm supports little or none of the vertical column of carbid in the holder. As the tube 9 moves upward the diaphragm 29 stirs up the carbid immediately adjacent thereto, and as the tube moves down the diaphragm bags and forms a receptacle for a portion of the carbid which flows over the edge of the tube as the latter reaches a certain limit. The follower 17 then moves downward and restricts the flowing in of additional carbid, as before explained. To strengthen the diaphragm 29, it is preferably formed of an additional thickness or armor 29ª, besides the upper thickness 29, said additional thickness or armor being made of small metallic links or other suitable construction that will sustain the upper tight diaphragm against injury.

In order that the follower 17 may descend a limited distance, it is supported by a spring 30, which is compressed when the follower is moved upward by the discharge-tube and returns the follower to the position shown in Fig. 2 when the discharge-tube is moved downward.

31 represents a packing on the lower end of the tube 9, which engages beneath the bottom 10 to make a gas-tight connection when the tube 9 is in the position shown in Fig. 1. It is to be understood that in the ordinary operation of the machine the tube 9 does not move up as far as shown in Fig. 1, but simply vibrates up and down sufficiently to cause the flow and stoppage of carbid, as already described.

32 represents a collar fixed to the lower end of the tube 9 for supporting the packing 31. This collar also carries a pin 34 on either side, (shown on one side in dotted lines in Fig. 1 and on the opposite side in Fig. 2,) which pins receive the slotted forks of a lever 35, that controls the valve 36 of a water-inlet pipe 2.

37 is a drip-collar on lever 35 to prevent water which leaks from valve 35 running down to the end of the carbid-tube.

38 represents the stem of valve 4, which projects upward and makes connection with the float 5. Said float is provided with a downwardly-projecting wheel 39, formed with steps or buckets in any suitable manner, such as illustrated merely by way of example in Fig. 4, which receive water from a jet-nozzle 40, which is connected with the pipe 2. These parts may be arranged in any suitable relation, so long as the inlet of fresh water to the generating-chamber will impart a rotation to shaft 38, which forms the stem of valve 4. Rotation of this shaft drives an agitator 41, which stirs up the precipitate in the lower part of the generating-chamber. At the same time wings 42 on the valve 4 prevent the lodgment of obstructions around the flushing-outlet 3. As fresh water is added to the contents of the chamber the float 5 rises and lifts the valve 4, so that the stirred-up precipitate or hydrate resulting from the slaked carbid passes from the generating-chamber. Should any obstruction lodge upon the seat of valve 4 while the latter is raised, the wings 42 will dislodge it and leave the seat free to receive the valve and stop the flow of water as soon as the level has lowered.

While I have described in detail an embodiment of the various novel principles in-

volved in my invention, the scope of my invention is not limited to any particular details of construction, but extends to any structure within the language of the claims, wherein the scope of my invention is defined.

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

1. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube to prevent escape of carbid when it is raised up and a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube.

2. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent escape of carbid when it is raised up, a gas-outlet communicating with said tubular body, and a gas-purifying medium within said tubular body.

3. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube to prevent escape of carbid when it is raised up, and a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, said follower forming a packing between the tubular body and the upper end of the discharge-tube, when the latter is in its uppermost position.

4. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent escape of carbid when it is raised up, and a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, and means for limiting the downward movement of the follower, arresting it at a point above the lower limit of the upper end of the discharge-tube.

5. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent escape of carbid when it is raised up, a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, and downwardly-projecting pins on said follower which retard the flow of carbid.

6. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent escape of carbid when it is raised up, a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, said follower entering the lower end of the tubular body when moved upward to permit the carbid to flow inward around the tube.

7. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent the escape of carbid when it is raised up, a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, the tubular body having a perforated transverse wall within its lower end and the follower having a corresponding perforation and forming a packing and establishing a gas-tight communication between the tubular body and the upper end of the discharge-tube, when the latter is in its uppermost position.

8. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-holder communicating through an opening in its bottom with the generating-chamber, a discharge-tube working upward and downward in the bottom opening of the holder, and permitting the escape of carbid when down, a tubular body within the holder, over and protecting the discharge-tube, to prevent escape of carbid when it is raised up, a follower above the discharge-tube, moving downward above the same to regulate the flow of carbid to the discharge-tube, the tubular body having a perforated transverse wall within its lower end, and the follower having a corresponding perforation and forming a packing and establishing a gas-tight communication

between the tubular body and the upper end of the discharge-tube, when the latter is in its uppermost position, and the discharge-tube having a packing engaging at the same time beneath the bottom of the holder, whereby a gas-tight passage from the generating-chamber to the tubular body may be maintained when the carbid-holder is opened for reloading.

9. In an acetylene-gas generator, the combination of the holder, the discharge-tube working up and down in the bottom of the holder, the diaphragm connecting the tube with the walls of the holder, and the flexible armor protecting said diaphragm.

10. In an acetylene-gas generator, the combination of the carbid-holder, the discharge-tube working vertically in the bottom of said carbid-holder, the controlling-rod extending upward from said carbid-holder, the tubular body within the holder with which the discharge-tube makes gas-tight connection when in its uppermost position, and the locking device movable from a position in locking relation to the rod to a position in locking relation to the loading-opening of the carbid-holder.

11. In an acetylene-gas generator, the combination of the carbid-holder having a tubular body therein, a discharge-tube working in the bottom of said carbid-holder and movable into gas-tight relation to the tubular body when in its uppermost position, a lifting-rod connected with said discharge-tube and terminating in the lifting-arm projecting at an angle therefrom, and the hinging-lever engaging beneath the lifting-arm when moved in one direction and resting upon the cap of the loading-opening of the carbid-holder when moved in the other direction.

12. In an acetylene-gas machine, the combination with the carbid-holder having a loading-opening and the closure therefor; of the tubular body within the carbid-holder, the discharge-tube working in the bottom of said carbid-holder, the lifting-rod connected to the discharge-tube, and raising the latter in gas-tight communication with the tubular body, the lifting-arm projecting at an angle from the lifting-rod and having the locking-seat and the hinging-lever engaging above the closure of the carbid-holder, and having a bar engaging beneath the lifting-arm of the lifting-rod to raise the holder, and entering the locking-seat for the purpose set forth.

13. In an acetylene-gas generator, the combination of the carbid-holder, the generating-chamber, the discharge-tube working through the bottom of the carbid-holder and delivering carbid into the generating-chamber, means for imparting vertical movement to the discharge-tube, a pipe supplying water to the generating-chamber and the cut-off having communication with the vertically-moving discharge-tube whereby water is admitted to the generating-chamber as the discharge-tube moves.

14. In an acetylene-gas generator, the combination of a generating-chamber, a carbid-chamber above the generating-chamber, the discharge-tube working through the bottom of the carbid-chamber and delivering carbid into the generating-chamber, the pipe supplying water to the generating-chamber, a valve in said pipe, and connections through which the valve is opened after the delivery of carbid has taken place and the discharge-tube is moving upward.

The foregoing specification signed this 7th day of January, 1901.

NILS A. RENSTROM.

In presence of—
EDWIN S. CLARKSON,
HERVEY S. KNIGHT.