W. W. HARRIS.

ACETYLENE GAS GENERATOR.

APPLICATION FILED OCT. 30, 1907. RENEWED SEPT. 1, 1910.

972,855.

Patented Oct. 18, 1910.

Fig. 1.

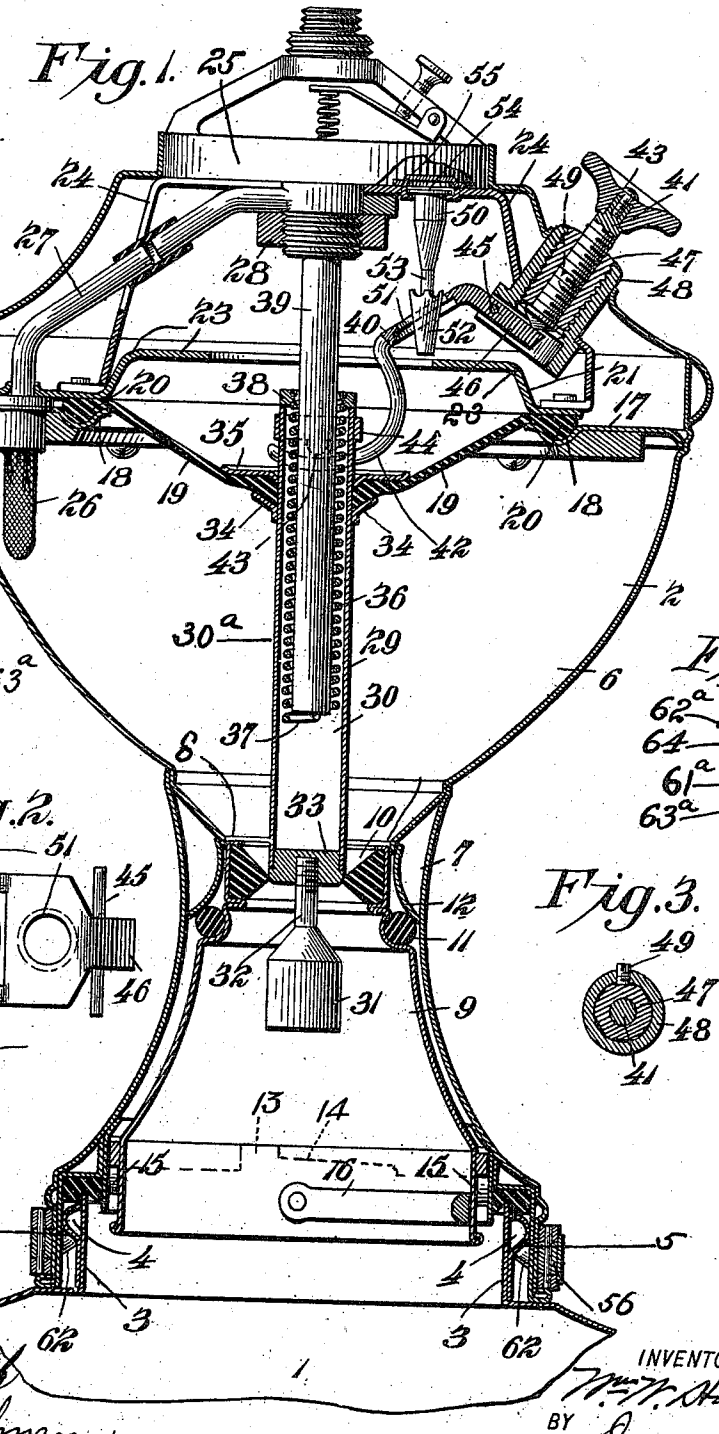

Fig. 4.

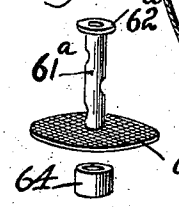

Fig. 5.

Fig. 2.

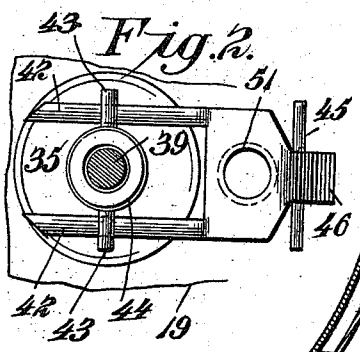

Fig. 3.

WITNESSES

H. G. Dieterich

C. H. H. Kaufmann

INVENTOR

Wm. W. Harris

BY Dawes & Davis

his ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM W. HARRIS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO ACETYLENE LAMP COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ACETYLENE-GAS GENERATOR.

972,855. Specification of Letters Patent. **Patented Oct. 18, 1910.**

Application filed October 30, 1907, Serial No. 399,907. Renewed September 1, 1910. Serial No. 580,084.

To all whom it may concern:

Be it known that I, WILLIAM W. HARRIS, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of the lamp, the main portion of the base or water holder being broken away; Fig. 2 a plan view of the valve-lifting fork or lever; Fig. 3 a transverse sectional view of the valve-operating screw; Fig. 4 a detail perspective view of the parts of the filter separated; and Fig. 5 a detail vertical sectional view of the filter assembled.

This invention relates to improvements in that class of acetylene gas lamps wherein carbid is fed to a body of water in quantities automatically controlled by the pressure of the gas generated, and it relates particularly to improvements on the form of lamp shown in the Patent No. 790,275, issued to Charles W. Beck, May 23, 1905.

The main objects of the invention are to provide such a lamp of very simple construction which will be efficient in operation and wherein the operating parts, except the valve and the diaphragm, will be entirely free from contact with the gas. It is of special importance that the operating spring used for operating the diaphragm be kept from contact with the gas, for the reason that considerable moisture is carried by the gas, and it is obviously desirable to prevent the condensation of said moisture on the spring. It is further of importance to prevent the lime and dust carried by the gas from being deposited on the spring and within the valve tube.

A further object of the invention is to provide a guiding means for the reciprocating valve and to locate said guiding means outside of the gas space so that it will not come in contact with gas. The result of this will be that there will be no condensation on said guiding means, and no dust or lime from the gas will be deposited thereon. This is important for the reason that the guiding means will be clean at all times, thus insuring a uniform operation of the generator. It will be readily understood that if lime and dust were deposited on the guiding means, the working condition would vary according to the amount of dust and lime so deposited, and said guiding means would require frequent cleaning to maintain it in its most efficient condition. I also form the valve of a tube of uniform diameter within the carbid holder, said tubular part being closed at its lower end. Located in this tube is a spring for depressing the diaphragm; and projecting therein is the guiding means, said guiding means engaging the spring. By forming that portion of the valve which operates within the carbid holder of uniform diameter the necessity of providing a housing or protector for it is obviated. It will be readily understood that where the valve within the carbid holder is of different diameters a housing must be provided to protect it from the carbid, otherwise the carbid would lodge in the reduced portions of the valve and make it practically impossible to readily reciprocate the same in response to changes in gas pressure.

Another object of the invention is to provide a simple and easily adjusted operating screw by which the valve-controlling lever may be operated.

Other objects of the invention are to provide a simple and automatic safety lock.

The lamp as shown is composed of two parts or members; the lower one constituting the lamp base and water holder 1 is shown as broken away in Fig. 1, but it will be understood that said water holder is constructed substantially as shown in Patent No. 790,275, hereinbefore referred to. The upper part 2 constitutes the carbid receptacle and carries the feed mechanism and the means for clamping together the two parts. The upper part of the water holder 1 is contracted and is formed with an upward extending short cylindrical part 3 through which access is had to the interior of the water holder. At the top of this cylindrical part 3 is formed an outward extending horizontal bead or flange 4 which is inwardly and downwardly inclined on its lower side to form the exterior annular cam surface 5.

The upper member of the generator comprises a carbid holder 6 which is formed with the depending contracted standard or waist portion 7. This standard portion serves as a filling funnel into which the carbid is poured when the members of the generator are separated and the upper part

inverted for the purpose of filling the carbid holder. The lower contracted end of the carbid holder 6 is open to provide a feed aperture 8. Within the standard 7 is removably secured a valve-carrying cup 9. This cup carries an annular or ring-like valve seat 10 at its upper end; and is provided with a gasket 11 which is adapted to fit closely against the annular shoulder 12 to form a gas tight joint therewith. It also is provided near its lower end with two diametrically opposite vertical slots 13 and cam surfaces 14; and the standard portion of the lamp is provided with two interior studs 15. These slots 13 are brought into register with the studs 15 when it is desired to secure the valve cup in place, and by a slight rotation of the cup the studs are brought to bear on the cam surfaces 14 and the gasket 11 forced against the shoulder 12. Pivoted to the lower end of the cup is a bail 16 by means of which the cup may be readily inserted and removed from the standard 7. The object of providing the removable valve-carrying cup is to permit of the removal of the valve seat when it is desired to fill the carbid holder.

Within the carbid holder at the top thereof is secured a horizontal supporting ring 17 which is formed with an annular groove or channel 18 in its upper surface near its inner edge. Secured to the supporting ring is a flexible, preferably rubber, circular diaphragm 19, which, together with the supporting ring, forms a complete gas-tight wall across the top of the carbid holder. This diaphragm is formed near its edge on its inner side with an annular rib or flange 20 which fits within the channel 18 of the supporting ring. Resting on the top of this diaphragm at the edge thereof is an annular protecting plate 21, said protecting plate being secured to the supporting ring by means of screws or other fastening means which pass through apertures 22, and serve as a means for clamping the diaphragm in place. The projecting plate is bent upward, as at 23, to form a support for the diaphragm when it is in its inflated position; and it is provided with a central circular opening through which the operating parts of the feed mechanism may work. Secured to the protecting plate is an arch piece 24 which carries the pressure regulating valve 25. To the upper end of this pressure regulating valve the gas burner is to be secured. The gas filter 26 is carried by the supporting ring 17 and is clamped in place by the protecting plate, said filter being connected to the pressure regulator by the tube 27. The filter extends into the carbid holder and leads the gas from within said holder through the tube 27 to the pressure regulator and thence to the burner. The pressure regulator is rigidly clamped to the arch 24 by means of the nut 28 screwed on the lower end of the pressure regulator below the arch, as shown clearly in Fig. 1.

To the center of the flexible diaphragm 19 is secured a valve 30 formed of an upper hollow cylindrical part or valve rod 30^a, and the lower valve part 31 connected to the lower end of the part 30^a by means of a short reduced shank 32. Both parts of the valve are, substantially, of the same diameter and are adapted to fit closely within the ring valve seat 10 and to close the same, the upper part or rod serving to close the said ring when the gas is exhausted from the lamp and the lower part being adapted to close said ring when the diaphragm is raised. Carbid will be fed from the carbid holder to the water holder whenever the valve is in a position intermediate between its upper and lower positions, the reduced shank 32 permitting the carbid to pass between the upper and lower valve parts 30^a and 31. The lower end of the tubular valve part 30^a is sealed by the plug 33, to prevent gas passing into it; and the upper end of said part is secured to the diaphragm 19 by means of a flange 34 on the said part, and a clamp plate 35 which clamps the diaphragm to said flange. The upper part of the valve extends a considerable distance above the clamp plate 35 and is normally open to the atmosphere at its upper end, and for this reason it is necessary to prevent access of gas to its interior. Within this tubular part of the valve is arranged a coil spring 36 whose lower end is closed by a bar 37, or other suitable means. The upper end of this spring is rigidly connected to a collar 38 which rests upon the upper end of the tubular valve part, as shown clearly in Fig. 1. Depending from the pressure regulator is a rigid guide rod 39 whose lower end engages the cross bar 37, or other closure means at the lower end of the spring, and normally holds the diaphragm 19 depressed and the valve part 30^a seated in the valve ring.

The tubular part 30^a of the valve is of a uniform diameter within the carbid holder, that is to say, between the diaphragm and the lower end of said valve part. The object of this is to provide a valve which will reciprocate readily through the carbid and which will not require a housing. It is manifest that such a valve as I have shown will reciprocate readily through the carbid and will be sensitive to changes in gas pressure. This is essential in a lamp or generator adapted to work under a low gas pressure.

By locating the spring 36 and the guiding means 39 within the tubular valve and closing said valve to prevent access of gas to the interior thereof, the guiding means and the spring will be thoroughly protected from the moisture and dust and lime carried by

the gas. This is of great importance. The spring and the guiding means will be clean at all times, and their efficiency, therefore, will remain constant and will not be varied or affected by moisture and dust.

To manually raise the valve 39, and the attached diaphragm 19, or to lower it, I provide a controlling-lever 40 and the operating-screw 41. The controlling lever is formed with arms 42 which engage pins 43 carried by a ring 44 secured to the upper end of the valve rod 30 above the diaphragm. This lever is pivoted at 45, in a suitable support carried by the arch 24, and the shorter arm 46 thereof is engaged by the inner end of the operating screw. It will thus be readily seen that by running in the operating screw the valve will be lifted and the spring 36 extended, and that by withdrawing the operating-screw the spring will be permitted to depress the valve and the diaphragm.

To provide means for readily adjusting the operating screw to its proper position with respect to the shorter arm of the controlling lever I mount said operating screw in a threaded sleeve 47, said sleeve being threaded in a suitable support 48. When said sleeve has been adjusted to its proper position it is locked in place by means of the set screw 49 threaded through its support as shown clearly in Fig. 3.

Suspended from the top bar of the arch 24 is a freely swinging safety locking dog 50 which extends downward through an aperture 51 in the controlling lever. This dog is formed with a head 52 which is connected to the main body of the dog by a central reduced stem 53. The dog is provided at its upper end with a flange 54 by which it is loosely suspended from the bar of the arch piece. The dog is held in place by the pressure regulator 25, but is free to swing on its support.

In the normal operation of the lamp the lever 40 moves up and down freely without contact with the locking dog, said dog extending down through the opening 51 in said lever. When the lamp is inclined beyond a predetermined point the locking dog will tend to swing to a vertical position and its head 52 will engage the under side of the lever 40 when it is near the limit of its upward movement and lock it in its upper position and thereby prevent the further feeding of carbid until the lamp has been again brought to its upright position and the locking dog released from the lever. The locking dog is mounted to move freely in any direction and will, therefore, engage the lever at all times when said lever is at or near its uppermost position and the lamp is tipped to a certain degree of inclination.

The upper and lower parts of the lamp may be connected together by any suitable form of clamp. In Fig. 1, I have indicated a portion of such a clamp at 56, said clamp carrying inwardly extending lugs indicated at 62, which engage under the flange 5. As this clamp forms no part of my present invention, I do not consider it necessary to further describe it herein.

The filter is preferably formed of an open-ended tube 61^a having a flange 62^a secured to its upper end. Over this tube is secured a muslin cover 63^a, a short sleeve 64 being slipped down over the tube and clamping the edges of the muslin in position around the tubing and close to the flange 62^a. I prefer to use a disk of muslin of the proper diameter and a sleeve whose interior diameter is slightly larger than the exterior diameter of the tube 61^a. The disk of muslin is arranged with its center directly over the free end of the tube and then the sleeve is slipped over the tube shaping the muslin around the tube and finally clamping its edge in position as the sleeve is brought to rest against the flange 62^a. This is an extremely simple and effective way of forming the filter and avoids the use of any fastening means other than the sleeve 64.

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

1. An acetylene gas generator comprising a water holder, a carbid holder, means within the carbid holder adapted to be reciprocated in response to changes in gas pressure, a tubular valve rod carrying a valve at its lower end, and connected to said reciprocable means, said valve rod being closed below the reciprocable means to prevent access of gas to its interior, and means within said tubular valve rod to depress the reciprocable means when the gas pressure is reduced.

2. An acetylene gas generator comprising a water holder, a carbid holder, a diaphragm secured within the carbid holder, a tubular valve rod connected to said diaphragm, said valve rod being hermetically sealed below said diaphragm to prevent access of gas to the interior thereof, and means within said valve rod to normally depress the diaphragm and the valve.

3. An acetylene gas generator comprising a water holder, a carbid holder above the water holder, means within the carbid holder and exposed to the gas pressure therein and adapted to be reciprocated by changes in gas pressure, a tubular valve rod connected to said reciprocating means and extending downwardly through the carbid holder, said valve rod being of uniform cross sectional area throughout its length below the reciprocating means, a rigid valve carried by said valve rod at the lower end thereof, the lower end of said rod being closed to prevent access of gas therein, and a guiding means rigidly supported above the reciprocating

means and extending downwardly into the valve rod a suitable distance.

4. An acetylene gas generator comprising a water holder, a carbid holder above the water holder and exposed to the gas pressure therein, a valve rod connected to the diaphragm and extending downwardly through the carbid holder and adapted to contact with the carbid therein, said rod being of uniform cross sectional area below the diaphragm, a rigid valve connected to the lower end of said rod, a stationary guiding means arranged centrally above the diaphragm and extending into the valve rod a suitable distance, the lower end of said valve rod being closed to prevent access of gas therein.

5. An acetylene gas generator comprising a water holder, a carbid holder above the water holder, a diaphragm adapted to be moved in one direction by gas pressure, means operating on the diaphragm in opposition to the gas pressure, a two-part valve connected to said diaphragm and adapted to reciprocate therewith, said parts being of uniform cross sectional area and connected together by a reduced part, the upper part of the valve extending through the carbid holder and being of uniform cross-sectional area throughout, whereby said valve may be readily reciprocated through the carbid in said holder and the inner protecting housing dispensed with.

6. An acetylene gas generator comprising a carbid holder, a water holder, a flexible diaphragm in the carbid holder, a tubular valve rod connected to said diaphragm and adapted to move therewith, said valve rod being hermetically sealed below the diaphragm, whereby access of gas to the interior thereof is prevented, a spring within said tubular valve rod and connected thereto at one of its ends, a stationary part engaging said spring and adapted through said spring to normally depress the diaphragm and the valve rod connected thereto.

7. An acetylene gas generator comprising a water holder, a carbid holder, a diaphragm secured within the carbid holder and adapted to be subjected on its under side to gas pressure, a tubular valve rod connected to said diaphragm, a spring within said valve rod and connected thereto at its upper end, and a stationary part engaging the lower end of said spring and through said spring normally holding the valve rod and the diaphragm depressed.

8. An acetylene gas generator comprising a carbid holder, a diaphragm therein adapted to be moved in one direction by gas pressure, a tubular part connected to said diaphragm and adapted to move therewith, a spring within said tubular part and connected thereto at one end, and a stationary guide rod extending into the tubular part and engaging one end of the spring therein and serving through said spring to normally hold the diaphragm depressed.

9. An acetylene gas generator comprising a carbid holder provided with a feed aperture at its lower end, a diaphragm across the upper part of said holder, a tubular valve rod connected to said diaphragm, said valve rod extending above the diaphragm and being hermetically sealed below the diaphragm to prevent access of gas to its interior, a coil spring within said valve rod and connected to the upper end thereof, and a rigid guide rod extending into the valve rod and engaging the lower end of the spring and through said spring normally holding the diaphragm and the valve rod depressed.

10. An acetylene gas generator comprising a carbid holder, a supporting ring secured therein, a diaphragm supported by said ring, a tubular valve rod connected to said diaphragm, its upper end extending above the diaphragm, a coil spring within said tubular valve rod, and connected to the upper end thereof, a protecting plate securing the diaphragm to the supporting ring, an arch part secured to the protecting plate, a guide rod connected to said arch part and extending down into the valve rod, its lower end engaging the lower end of the coil spring and through said spring normally holding the diaphragm and the valve rod depressed.

11. An acetylene gas generator comprising a carbid holder, a supporting ring therein, a diaphragm, a protecting plate clamping the diaphragm to the supporting ring, a tubular valve rod connected to the diaphragm, the upper end of said valve rod being open, said valve rod being hermetically sealed below the diaphragm, a coil spring within the tubular valve rod, a collar secured to the upper end of said spring, said collar engaging the upper edge of the valve rod, an arch part connected to the protecting plate, a guide rod supported by said arch part and extending into the valve rod, its lower end engaging the lower end of the coil spring.

12. An acetylene gas generator comprising a carbid holder, a supporting ring therein, a diaphragm carried by said supporting ring, a filter extending through said supporting ring into the carbid holder, a protecting plate clamping the diaphragm and the filter to the supporting plate, an arch part carried by the protecting plate, a regulating valve casing supported by said arch, a tube connecting the filter to the regulating valve casing, a tubular valve rod connected to the diaphragm, said valve rod being closed below the diaphragm and open above the diaphragm, a coil spring within said valve rod and connected to the upper end thereof, a stationary depending guide rod extending into the valve rod, its lower end

engaging the lower end of the spring and through said spring normally depressing the diaphragm and the valve rod.

13. An acetylene gas lamp comprising a carbid holder, a flexible diaphragm secured across the upper end thereof, a tubular valve part connected to said diaphragm, a coil spring arranged within said tubular valve part, a stationary part extending into the valve part and engaging the spring to normally depress the diaphragm through said spring, and manually operable means for moving the diaphragm and the valve in opposition to the spring tension.

14. An acetylene gas lamp comprising a carbid holder, a diaphragm therein adapted to be subjected to gas pressure on its under side, a tubular valve part connected to said diaphragm, said tubular part being closed below the diaphragm to prevent gas entering said valve part, a coil spring within said valve part and connected thereto at its upper end, a stationary guide rod extending into the valve part and engaging the lower end of the spring and through said spring normally holding the valve part and diaphragm depressed, and a manually operable means for moving the valve part and diaphragm in opposition to the spring tension.

15. A carbid holder for an acetylene gas lamp provided with a diaphragm in its upper part, a tubular valve part connected to said diaphragm, said part being closed below the diaphragm and open above it, a coil spring within said tubular valve part, a collar connected to the upper end of said spring and adapted to engage the upper edge of the valve part, a vertical stationary guide rod extending into the valve part and through the coil spring therein, its lower end engaging the coil spring and normally depressing the diaphragm through said spring, and manually operable means for lifting the valve part and diaphragm against the tension of the spring.

16. An acetylene gas lamp comprising a carbid holder, a diaphragm therein, a tubular valve part connected to said diaphragm, a spring within said tubular part and connected thereto at one end, a stationary part extending into said valve part and engaging the spring, a lever engaging the valve part above the diaphragm, and a screw adapted to engage and move the other end of said lever, whereby the diaphragm and the valve may be lifted against the tension of the spring.

17. An acetylene gas lamp comprising a carbid holder, a diaphragm across the upper end of the carbid holder, a tubular part connected to said diaphragm, a coil spring therein, a collar connected to the upper end of said spring, said collar loosely engaging the upper end of the valve part, said valve part being closed below the diaphragm, a stationary vertical guide rod connected to the carbid holder above the diaphragm, the lower end of said rod engaging the lower end of the spring and through said spring normally holding the valve and the diaphragm depressed, a lever connected to one end to said valve part, and a screw adapted to engage the other end of said lever to lift the valve part against the spring tension.

18. An acetylene gas lamp comprising a carbid holder, a feed mechanism therein operating in response to changes in gas pressure comprising a diaphragm and a valve connected thereto, a lever connected to said valve, a screw adapted to swing said lever on its pivot and an adjustable sleeve carrying said screw, whereby the relation of the screw to the lever may be varied.

19. An acetylene gas lamp comprising a carbid holder, a feed mechanism therein operating in response to changes in gas pressure, comprising a diaphragm and a valve connected thereto, a lever connected to said valve rod, a screw adapted to swing said lever on its pivot and a freely swinging locking-dog adapted to engage the lever when the valve is closed and the lamp is inclined beyond a predetermined point.

20. An acetylene gas lamp comprising a carbid holder, a feed mechanism operating in response to changes in gas pressure and comprising a reciprocable valve, a lever connected to said valve, means for swinging said lever on its pivot to operate the valve, and a freely swinging locking dog adapted to engage the lever when the valve is closed and the lamp is inclined beyond a predetermined point and to hold said lever in position to maintain the valve closed.

21. An acetylene gas lamp comprising a carbid holder a feed mechanism therein operating in response to changes in gas pressure and comprising a reciprocable valve, a lever connected to said valve, a screw adapted to swing said lever on its pivot, and an adjustable sleeve carrying said screw whereby the screw may be adjusted with respect to the lever without rotating said screw.

22. An acetylene gas generator comprising a water holder, a carbid holder, means within the carbid holder adapted to be reciprocated by changes in gas pressure, a tubular valve rod connected with said reciprocating means, said valve rod being open above the reciprocating means and closed below it to prevent access of gas to the interior of said valve rod, and a stationary guiding means extending into the upper open end of said valve.

23. An acetylene gas generator comprising a water holder, a carbid holder above the water holder, means within the carbid holder exposed to the gas pressure therein and adapted to be reciprocated by changes in gas pressure, a tubular valve rod connect-

ed to said reciprocating means and extending through the carbid holder, said valve rod being of uniform cross-sectional area within the carbid holder and adapted to contact with the carbid therein, and yieldable means engaging the upper end of said tubular rod to depress the reciprocable means and oppose the gas pressure in the carbid holder, and a stationary guiding means extending into the tubular valve rod, the valve rod being closed to prevent access of gas therein.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 26 day of October 1907.

WILLIAM W. HARRIS.

Witnesses:
R. C. MALONE,
J. HORTON PACKARD.