No. 638,328. Patented Dec. 5, 1899.

D. GENESE.

ACETYLENE GAS GENERATOR.

(Application filed June 22, 1898.)

(No Model.)

Fig. 1.

Fig. 3.

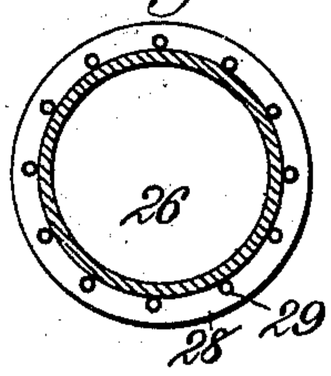


Fig. 4.

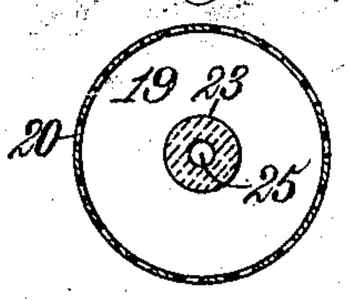


Fig. 5.

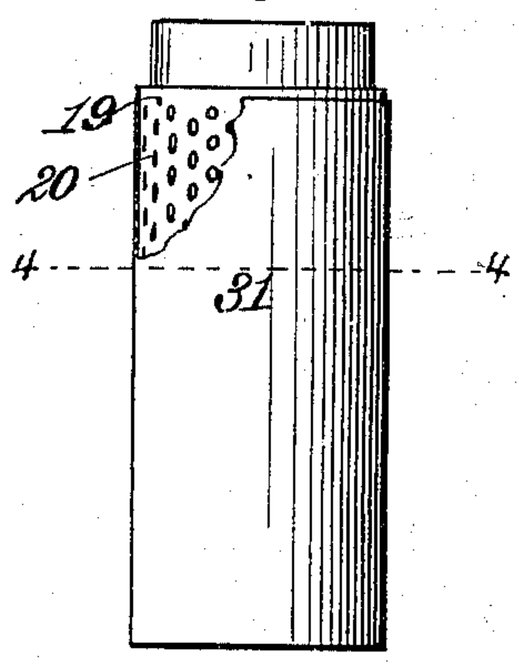
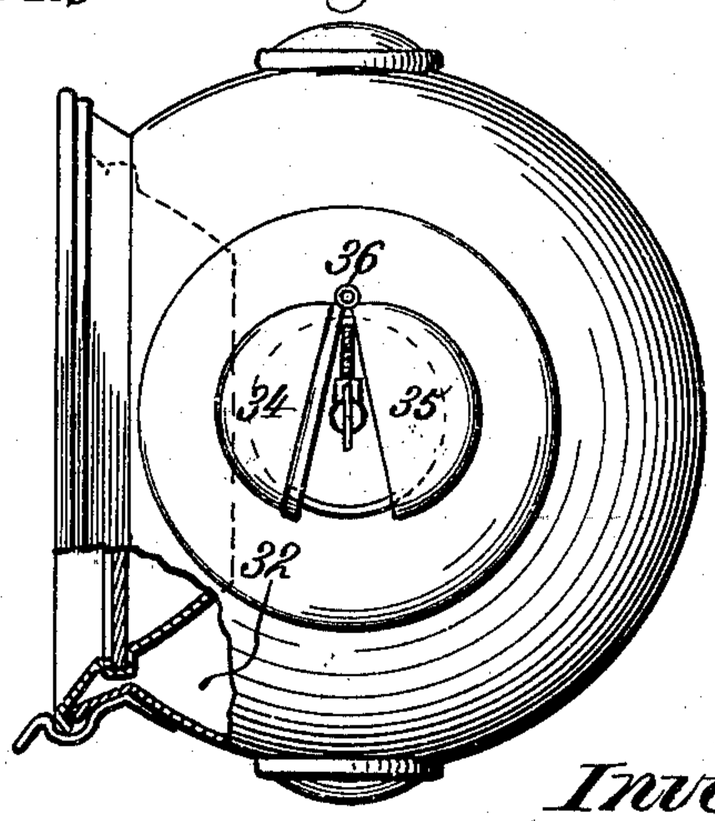


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 638,328, dated December 5, 1899.

Application filed June 22, 1898. Serial No. 684,157. (No model.)

To all whom it may concern:

Be it known that I, DAVID GENESE, a citizen of the United States, residing at Baltimore city, State of Maryland, have invented new and useful Improvements in Acetylene-Gas Generators and Burners, of which the following is a specification.

My invention relates to improvements in acetylene-gas generators and burners for illuminating purposes in which the gas is consumed immediately after being generated and designed more particularly for use in bicycle-lamps.

The invention has for its object to provide novel means whereby the gas generated is afforded a clear passage to the burner without coming in contact with the water-supply and without liability of carrying with it any free water to the burner, which would operate to extinguish the illuminating-flame.

The invention also has for its object the provision, in an apparatus of the character specified, of means for preventing the escape of gas when the flame is extinguished and a storage-chamber for collecting such gas as may be generated after the illuminating-flame has been extinguished, whereby there will always be a certain quantity of gas ready for immediate illuminating purposes when the apparatus is again to be used.

The invention also has for its object a novel means of supporting the calcium carbid within the generating-chamber.

To these ends the invention consists in the novel construction, combination, and arrangement of parts hereinafter described, and particularly set forth in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved lamp. Fig. 2 is a plan view of the same, showing my improved open top. Fig. 3 is a sectional plan view of a collar, taken on the line 3 3 of Fig. 1. Fig. 4 is a sectional plan view on the line 4 4 of Fig. 5. Fig. 5 is a perspective view of my improved shell for supporting the carbid within the generating-chamber, a part being shown broken away.

The reference-numeral 1 indicates a cylindrical casing inclosing a generating-chamber 2, designed to receive the carbid. At its lower end said casing is screw-threaded, as shown, to permit of the attachment of a cap or closure 3. At its upper end the casing is provided with an interior annular flange 4 and is exteriorly screw-threaded.

The numeral 5 indicates a storage-reservoir which has the shape of a hollow truncated cone, the base of which is provided with interior screw-threads and with an exterior annular flange 6 and an interior annular flange 7.

The storage-reservoir 5 is designed to be screwed upon the upper end of casing 1, a suitable washer 8 being interposed between the flanges 4 and 7 to render the connection between the casing and reservoir air and liquid tight.

The bottom of the reservoir 5 is open, as shown, and said reservoir forms a continuation of the generating-chamber 2. Secured in an aperture of the upper closed end of the reservoir 5 is a tubular filter 9, open at its lower end and which is filled with asbestos or other suitable filtering material, which will operate to purify the gas passing through the same to the burner 10, which communicates with said filter through the medium of a valve-casing 11, secured in the upper end of said filter and having a needle-valve 12.

Surrounding the storage-reservoir 5 is a water-tank 13, the lower edge of which rests upon the flange 6 and is soldered or otherwise firmly united to the reservoir 5. The upper end of the tank 13 projects over the upper end of reservoir 5 and is secured to the upper end of the filter 9, which projects above the reservoir 5, as shown.

The numeral 14 indicates the filling-orifice for the tank 13.

The means for supplying the water to the carbid comprises a small tube 15, the outer end of which is secured in the wall of the reservoir 5, near the bottom thereof, its other end extending inward, where it is provided with a downward-tapered extension 16, having a reduced orifice whereby to insure that the water shall issue therefrom in drops and not in a continuous stream. The outer end of tube 15 communicates with the water-tank 13, as shown, and is provided with a flared opening to receive the tapered end of a needle-valve 17, which works in a screw-threaded aperture of a nipple 18, secured in the wall of the water-tank.

I will now describe the means for support-

ing the carbid in the generating-chamber 2 and for conveying the water to the carbid.

The numeral 19 indicates the container for the carbid, which is in the form of a cylindrical shell the wall of which is provided with numerous perforations 20. Said shell is of such diameter that it may be readily inserted into the generating-chamber, but will normally be out of contact with the wall of the casing. In other words, an annular space is left between the shell 19 and the inner surface of the casing. The numeral 21 indicates a permeable or porous disk designed to be inserted in the lower end of the shell 19 for confining the carbid therein. In the opposite or upper end of the shell 19 is inserted my improved means for confining the carbid in the shell and for conveying the water to the carbid. This comprises a relatively thick disk 22, having depending from its under side an integral tubular extension 23, the lower end of which will in practice rest upon the disk 21. In the upper surface of the disk 22 is provided a recess 24, communicating with which is a passage 25, which extends longitudinally through and nearly to the bottom of the tubular extension. As will be seen, the shell 19 does not extend to the top of the generating-chamber. The intervening space is occupied by a metallic collar 26, having an upper annular flange 27, designed to seat beneath the flange 4, and a lower annular flange 28, which rests upon the upper edge of the shell 19. The flanges 27 and 28 are each provided with a series of perforations 29, which afford gas-passages, as presently explained. The disk 22 is provided with a reduced portion which extends well up into the collar 26 and which affords a shoulder lying flush with the top of the shell 19 and upon which rests the lower inner edge of the collar 26.

In practice and in the initial charging of the device with carbid the combined disk and tube is inserted in position in the shell 19, the carbid, which is indicated by the numeral 30, is packed in said shell around the tube 23, and the disk 21 inserted at the bottom of the shell. The shell 19, with the supply of carbid packed and retained therein, as described, I term a "cartridge" and will refer to the same by that designation in the further description of my invention. The collar 26, the flanges of which fit snugly the inner surface of the casing 1, is now inserted in the casing from the bottom and pressed upward until its upper flange bears against the flange 4. The cartridge is then inserted and the cap 3 screwed on the bottom of the casing. The adjustments of the parts are such that the cap 3 when screwed on the casing will press the shell 19 firmly against the under side of the collar 26. The cartridge is thus held in firm fixed relation within the casing. When the cartridge is in position, the recess 24 will be directly under the dropping-orifice of tube 15. This recess serves to confine within it any water which may be delivered into the generating-chamber and which may not immediately pass down in the passage 25 or be absorbed by the disk 22, and it also serves to direct the water into said passage, and thereby prevents any water from flowing into the gas-passages and being caught up by the gas and conveyed to the burner, where it would operate to extinguish the flame. Said recess, together with the collar 26, also prevents any surplus water from flowing over the sides of the shell and passing down the sides thereof, where it would enter the openings 20 and, contacting with the carbid, cause an undue generation of gas.

In order to provide for the expansion of the carbid on its decomposition, the shell 19 in practice is only partially filled with the carbid.

The operation of the device as thus far described is as follows: The parts being in the position shown in Fig. 1, the needle-valve 17 is turned to permit water from the tank 13 to enter tube 15, from the curved end 16 of which it falls in drops upon disk 22 and within the recess 24. The disk 22 and its tubular extension 23 being, like the disk 21, made of a permeable or porous substance, a portion of the water will at once be absorbed thereby and a portion will run down the passage 25. The frequency of the drops can of course be regulated by the distance the needle-valve 17 is moved from the outer end of pipe 15. As the water continues to drop it will run down to the bottom of passage 25, and being absorbed readily by the substance of which the tubular extension 23 is made will quickly be brought in contact with the carbid and gas will immediately be generated, which will pass through the perforations 20 in the shell 19 into the annular space afforded between said shell and the wall of casing 1 and thence through the apertures 29 in the flanges of collar 26 into the storage-reservoir 5. From the storage-reservoir it passes through the filtering material in the filter 9 and thence through the valve-casing 11 to the burner 10, where it may be ignited. In order to prevent the carbid sifting through the perforations in the shell, I prefer to inclose said shell 19 in a close-fitting jacket of paper or similar material, as indicated by the numeral 31 in Fig. 5, which jacket, if desired, may be removed when the cartridge is inserted in the lamp. Should it be discovered by observing the flame that gas is being generated too rapidly, the valve 17 can be turned nearer the tube 15, so that water will drop from the tube 15 at less frequent intervals and the quantity of gas generated be thereby decreased. Further, the supply of gas delivered to the burner can be regulated by the needle-valve 12. When it is desired to extinguish the flame, the valve 17 is turned into close engagement with the mouth of tube 15 to shut off the supply of water and the valve 12 is turned to prevent the escape of the gas. The generation of gas will

still continue for some little time, however, and this gas will be stored in the reservoir 5. Thus a supply of gas will always be on hand, and after the initial operation above described it will not be necessary in the subsequent use of the lamp to wait for the generation of the gas to commence before being able to light the gas.

After the carbid in one cartridge is spent a new cartridge will of course be inserted in the manner previously described.

It will be seen that by my construction of lamp water can only enter the generating-chamber through the medium of tube 15. Hence should the lamp fall, be unduly shaken, or inverted no harm can possibly accrue by reason of any excess of water being thrown upon the carbid.

I may here mention that all the joints in any way connected with the generating-chamber are perfectly air or fluid tight, so that access of moisture from without is rendered impossible. I would also state that the walls of the casing 1 and of the storage-reservoir 5 are of sufficient strength to render the generating-chamber and storage-reservoir capable of sustaining, say, three times the pressure of gas which would be generated by the entire charge of carbid in a cartridge, so that there is absolutely no danger in providing my lamp with the storage-chamber described.

The numeral 32 indicates the combustion-chamber and 33 the reflector, both of which may be constructed in the ordinary manner, the combustion-chamber in this case being shown supported on the water-tank 13.

In Figs. 1 and 2 I have shown a novel construction of lamp-top. In this form the top of the lamp is made in two sections 34 35, which are hinged to the lamp at 36. These sections may be swung laterally outward to open the top of the lamp, whereby to light the gas or to allow the more ready escape of the products of combustion in case the lamp becomes too hot. In their closed position one section 34 is designed to overlap the other section 35.

The combined disk and tube 22 23 and the disk 21 to insure the most successful results must be non-combustible, porous, easily permeated by the water, and at the same time capable of only slight expansion under the action thereof or under the action of heat. In practice I make these parts of a compound made by mixing a phosphate rock, known as "South Carolina" rock, with marble-dust and plaster-of-paris, which compound, I have discovered, is practically inert and possesses the qualities mentioned.

By having the carbid surround the tubular extension 23 I insure that the water shall be conveyed to all parts of the carbid at practically the same time, whereby a uniform generation of gas will be secured, insuring a uniformly steady and brilliant flame.

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

1. A cartridge for supplying carbid to the generating-chamber of an acetylene-lamp comprising a shell having perforated sides and adapted to have the carbid packed therein and removable, porous fireproof retaining means at top and bottom of said shell for confining the carbid within the same, substantially as described.

2. A cartridge for supplying carbid to the generating-chamber of an acetylene-lamp comprising a shell adapted to contain the carbid and having perforated sides, a removable porous fireproof retaining-disk at the top of said shell having an integral depending tubular extension embedded in the carbid and having a closed lower end, and a removable, porous retaining-disk at the bottom of said shell, substantially as described.

3. In a lamp for generating and burning acetylene gas, the combination with a generating-chamber having in its upper portion an inner annular flange, of a cartridge for supplying carbid located in said generating-chamber, and means for securing said cartridge within the generating-chamber comprising a collar having a lower flanged edge bearing on the upper edge of said cartridge and an upper flanged edge engaging beneath the flange of the generating-chamber and a cap removably secured on the lower end of the generating-chamber and bearing against the lower edge of the cartridge, substantially as described.

4. In a lamp for generating and burning acetylene gas, the combination with a generating-chamber having in its upper portion an inner annular flange, of a cartridge for supplying carbid located in said generating-chamber and means for securing said cartridge within the generating-chamber comprising a collar having a lower perforated flange bearing on the upper edge of said cartridge and an upper perforated flange engaging beneath the flange of the generating-chamber, said perforations affording gas-passages, and a cap removably secured on the lower end of the generating-chamber and bearing against the lower edge of the cartridge, substantially as described.

5. In a lamp for generating and burning acetylene gas, the combination with a generating-chamber and means for supplying water thereto, of a cartridge for supplying carbid to said generating-chamber, comprising a shell adapted to contain the carbid, and having perforated sides, a porous retaining-disk inserted in the upper end of said shell and projecting above the same, a collar adapted to receive said projecting portion and to afford a confining-rim around said disk, said collar having an upper perforated flange adapted to bear against the upper portion of the generating-chamber and a lower perforated flange bearing on the upper edge of said shell, and

a removable cap secured on the lower end of said generating-chamber and bearing against the lower edge of the cartridge, substantially as described.

6. In a lamp for generating and burning acetylene gas, the combination with a generating-chamber and means for supplying water thereto, of a cartridge for supplying carbid to said generating-chamber comprising a shell adapted to contain the carbid and having perforated sides, a porous retaining-disk inserted in the upper end of said shell and projecting above the same and having an integral depending tubular extension embedded in the carbid, a collar adapted to receive said projecting portion and to afford a confining-rim around said disk, said collar having an upper perforated flange adapted to bear against the upper portion of the generating-chamber and a lower perforated flange bearing on the upper edge of said shell and a removable cap secured on the lower end of said generating-chamber and bearing against the lower edge of the cartridge, substantially as described.

7. In a lamp for generating and burning acetylene gas the combination with a generating-chamber having at its upper end an inner annular flange, a collar having at its upper and lower ends, respectively, a perforated annular flange, said collar being inserted in the generating-chamber and having its upper flange bearing against the flange of the generating-chamber, a foraminous metallic shell having carbid packed therein and having its upper edge bearing against the lower flange of said collar, a porous disk inserted in the upper end of said shell and projecting above the same and into said collar, said disk having in its upper side a recess and on its under side an integral depending tube embedded in the carbid and having therein a passage communicating with the recess, a disk inserted in the lower end of the shell and a cap removably secured on the lower end of the generating-chamber and bearing on the lower edge of the said shell, and means for supplying water in drops to said upper disk, substantially as described.

8. As a new article of manufacture a porous, fireproof disk for carbid-cartridges having a recess in its upper surface and provided with an integral depending tubular extension closed at its outer end, the bore of said tubular extension extending through the disk and communicating with said recess, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DAVID GENESE.

Witnesses:
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MARGARET V. COOPER.