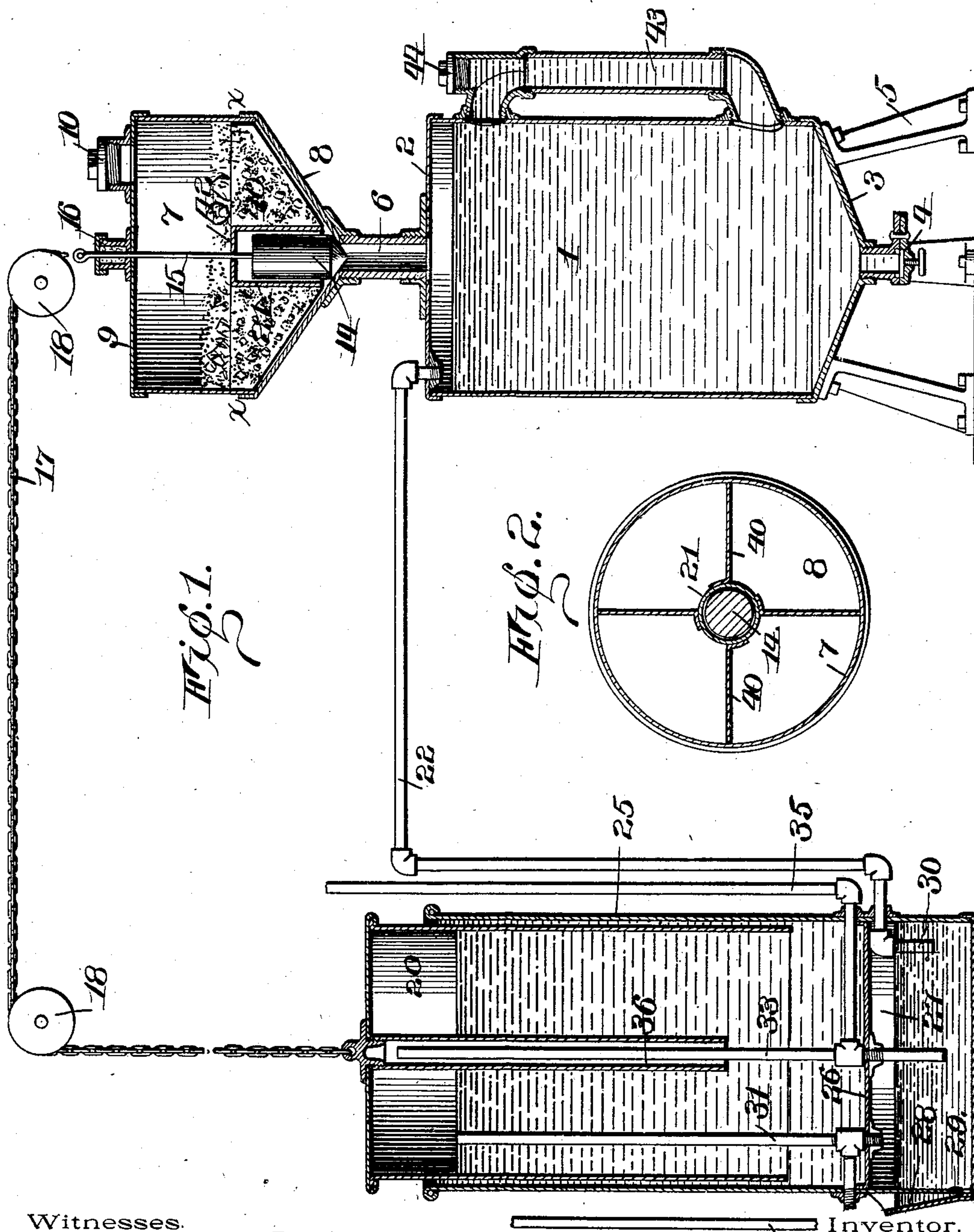


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J. K. RUSH.
ACETYLENE GAS GENERATOR.
APPLICATION FILED JULY 5, 1901.

NO MODEL.



Witnesses.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 720,180, dated February 10, 1903.

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To all whom it may concern:

Be it known that I, JOSEPH K. RUSH, of Canandaigua, in the county of Ontario, State of New York, have invented certain new and useful Improvements in Acetylene-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to generators for the production of acetylene gas from calcium carbide; and it has for its object to provide means for feeding the carbide in quantities into a relatively large body of liquid, and which shall be controlled by the volume of gas produced and consumed.

My invention has for its further object to arrange a device for cooling and washing the gas, which is conveniently arranged relative to the storage-tank or gasometer, and also to provide means for circulating the liquid in the generator, whereby it may be maintained at an even temperature throughout.

To these and other ends my invention consists in certain improvements in construction and combination of parts, all as will be fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a vertical sectional view through a generator and gasometer constructed in accordance with my invention; and Fig. 2 is a cross-sectional view through the carbide-holder, taken on the line *x x* of Fig. 1.

Similar reference-numerals in the two figures indicate similar parts.

A generator constructed in accordance with my invention embodies a liquid receptacle or tank 1, having a top 2 and a bottom 3, which latter is preferably conical in shape and provided with an outlet-valve 4, through which the contents may be drawn off when desired, the receptacle being supported above the floor, as shown, by the legs 5.

Mounted on the generator and connected thereto by means of a pipe 6 is the carbide-receptacle 7, having the conical-shaped bottom 8, leading into the pipe 6. The top 9 of the carbide-receptacle is provided with an ap-

erture normally closed by a cap 10, through which the carbide may be supplied. Centrally arranged in the receptacle and above the aperture in the bottom 8 is a plunger 14, having its lower end pointed and adapted to close the said aperture when in the normal position. Attached to the upper end of the plunger is a rod 15, extending upwardly through a gland or stuffing-box 16 in the top 9 of the receptacle, and secured to the extremity of said rod is a flexible connection, such as a chain 17, passing over pulleys 18 and connected to the movable gasometer-bell 20 and adapted as the gas is consumed and the bell falls below a certain point to raise the plunger and allow a quantity of the carbide to descend through the pipe 6 into the liquid in the generator. The gas formed by the action of the liquid on the carbide is allowed to pass out of the generator by a pipe 22.

In constructing the gasometer I employ a casing 25, in which operates the bell 20, and in the lower end of the shell is a false bottom or partition 26, forming a chamber 27, through which the gas is passed before entering the gasometer. At one side of the chamber is provided a lip or funnel 28, leading to the interior through an aperture 29, through which water or other liquid may be introduced. The discharge end of the pipe 22 is extended downwardly, as shown at 30, and opens below the surface of the liquid in the chamber, so that the gas emitted therefrom will pass through the said liquid and be cooled and washed before entering the bell 20 through the pipe 31 or passing outward into the gas-main or service-pipe 32. The outlet or exhaust pipe 33 extends through the false bottom or partition 26, having its lower end opening into the liquid below the discharge end 30 of the pipe 22, permitting any condensation therein to drain into the chamber 27, and a branch pipe 35, leading to the exterior of the gasometer, serves to permit the gas, in case of an over production, to be conducted to the exterior of the building. The upper end of the exhaust pipe or passage 33 is normally closed by a tube 36, surrounding said pipe and adapted to be raised above the surface of the liquid in the gasometer only when the latter has been filled to its fullest capacity by the gas.

From the above it will be seen that as the bell 20 lowers, as the gas is consumed, the plunger 14 will be raised to open the aperture in the bottom 8 and allow the carbid to fall into the generator, when the gas immediately produced will again raise the bell, permitting the plunger to descend and arrest the inflow of the carbid. The latter is previously crushed into small lumps or into a granular form, the particles of which are readily acted upon by the liquid as they drop into the generator. In order to prevent the carbid from becoming packed in the receptacle and to disturb the mass thereof, I provide an agitator embodying the wings 40, resting upon the bottom 8 and secured to a cylindrical case 21, surrounding the plunger 14, the former being a trifle longer than the plunger, forming a guide therefor, having a top portion 42, provided with an aperture through which the rod 15 freely moves. This arrangement, it will be understood, allows the plunger to be elevated slightly to normally allow the carbid to pass into the generator; but, however, if the carbid should become packed from any cause the continued upward movement of the plunger will raise the case 21 and wings 40, thereby loosening the mass, so that a portion thereof will pass through the aperture, the gas subsequently produced raising the bell 20, allowing the plunger to descend and the wings to be returned to their normal position. The lumps of carbid falling into the liquid will pass to the bottom of the generator, when they will be decomposed. The temperature thus raised in the liquid will cause it to circulate upward, and in order to allow the warmer portion at the top to fall I provide at the side of the generator a passage 43, arranged upon the exterior and opening into the generator at its upper and lower ends, thereby permitting the portions of the water which may be at different temperatures to circulate freely. The feature of causing a circulation of the water is exceedingly desirable, if not practically essential to the proper operation of an acetylene-generator of this type, as without it an amount of heat is oftentimes generated sufficient to render the device unsafe, and many serious accidents have resulted from this overheating, and while I prefer to employ the circulating-pipe shown I do not desire to be confined to this arrangement, as other forms could be devised. It is found in practice that in a generator of this type without means for causing a circulation the water at the top of the tank will be exceedingly hot and that at the bottom quite cool; but nevertheless the top of the generator will be frequently so hot as to melt solder and cause leakage. It is impossible to give the exact relative sizes of the generator and circulating-pipe; but the latter should be sufficiently large to cause a free circulation by the heat generated, and I have found that in a machine adapted for twenty-five lights and employing a generating-tank about

twenty - seven inches high and seventeen inches in diameter a circulating-pipe two inches in diameter connected as described will operate practically when the machine is generating at full capacity without undue heating. Another result flowing from the use of a generator of the wet type and in which the water is circulated and kept cool, as described, is that the gas produced is cooler and drier, and no steam being generated there is no undue consumption of water by evaporation. At the upper end of the passage is provided a cap 44, which may be removed when it becomes necessary to apply additional liquid, and the upper end of said passage is arranged at such a height that the liquid can only be supplied to the required point, thereby preventing the danger of sealing the gas-outlet 22.

Generators such as I have shown and described are easily constructed, and the generation of the gas being automatically controlled they may be attended by an unskilled operator without possible danger. The carbid hopper or receptacle being separated from the generator and the aperture leading thereto being normally closed, the carbid is prevented from leaching and is retained in a perfect condition until required for use.

I claim as my invention—

1. In a gas-generator, the combination with a casing adapted to contain a liquid, a carbid-receptacle arranged above the casing having a tapering bottom and provided with an aperture leading into the casing, and a plug or plunger arranged above and normally closing the aperture, of a gas-holder having a movable bell, connections between the bell and the plunger for operating the latter to uncover the aperture, a carbid-agitator arranged in the receptacle and supported independent of the plunger and operated by the movement of the bell when lowered abnormally, and after the plunger is removed from the aperture.

2. In a gas-generator, the combination with a casing adapted to contain a liquid, a carbid-receptacle above the casing having an aperture in its bottom leading to the generator, and a movable plug or plunger arranged above and normally closing the aperture, of a gas-holder having a movable bell connected to the plug or plunger to cause the operation of the latter, a carbid-agitator arranged within the carbid-receptacle and supported independently of the plunger but adapted to be engaged and operated by the latter after it has moved from the aperture.

3. In a gas-generator, the combination with a casing containing a liquid, a carbid-receptacle arranged above the casing and having the bottom provided with an aperture leading into the generator, and a plunger closing said aperture, of a gasometer having the movable bell, connections between the bell and the plunger, an agitator embodying a casing surrounding the plunger having wings normally

resting upon the bottom of the receptacle, and a top portion on the agitator arranged above the top of the plunger whereby as the latter is elevated the agitator will be lifted out of contact with the bottom of the receptacle.

4. In a gas-generator, the combination with a casing containing a liquid, a carbid-receptacle mounted upon the casing having a bottom provided with an aperture leading into the generator, and a plunger normally closing said aperture, of a gasometer having a movable bell, connections between the latter and the plunger, and a casing surrounding the plunger and forming a guide therefor, wings on the casing normally resting upon the bottom of the receptacle and centering the casing therein, and a top portion on the casing extending over the plunger but out of contact therewith whereby the wings will only be elevated by an excessive movement of the plunger.

5. In a gas-generator, the combination with a carbid-feeding device, of a casing adapted to contain a volume of liquid and constituting a gas-generating chamber and a free and unobstructed liquid-circulating passage at one side, out of contact with the liquid in the casing and connecting with the volume of liquid in the gas-chamber near its upper portion at a point removed from the discharge of carbid into the liquid, and also connecting with the lower portion of the chamber.

6. In a generator, the combination with a carbid-feeding device, of a casing adapted to contain a liquid at a determined level and constituting a gas-generating chamber, a circulating-passage leading from the lower end of the casing to the upper end below the level of the liquid in the gas-chamber and having an open end arranged at said level, and a closure for the open end of the passage.

7. In a gas-generator, the combination with a casing containing a liquid at a determined level, having a passage leading from its lower end to its upper end at a point below the level of said liquid, provided with an open end arranged at said level, and a carbid-receptacle located above the casing having a conical bottom provided with a central aperture, a vertically-extending casing surrounding said

aperture having wings normally resting upon the bottom of the receptacle and centering the casing therein and a plunger guided in said casing normally closing the aperture, of a gasometer having the movable bell, connections between the latter and the plunger operating to raise the plunger upon the downward movement of the bell, and connections between the casing and the plunger whereby the wings are raised from the bottom of the receptacle upon the excessive upward movement of the plunger.

8. In an acetylene-generator, the combination with a receptacle adapted to contain a liquid acting on the carbid and constituting a gas-generating chamber, of a free and unobstructed liquid-circulating passage located outside of the receptacle and connecting separated portions of the receptacle in different horizontal planes, the upper connection being within the gas-chamber.

9. In an acetylene-generator, the combination with a tank or receptacle adapted to contain liquid acting on the carbid and constituting a gas-generating chamber, and having a carbid-feeding aperture at its upper portion, of a free and unobstructed liquid-circulating passage located outside of the tank and connecting at one end with the upper portion of the receptacle below the level of the liquid in the gas-chamber and at its other end with the lower portion, above the ash or carbid support and laterally of the carbid-feeding aperture, whereby a free circulation of the liquid may be caused by the heat derived from the generation of the gas.

10. In an acetylene-generator, the combination with a tank or receptacle adapted to contain liquid acting on the carbid and constituting a gas-generating chamber, of a free and unobstructed liquid-circulating tube or passage located outside of the tank and connected at its upper end to the latter and below the level of the liquid in the gas-chamber and connected at its lower end to one side of the tank near the lower portion thereof.

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Witnesses:

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