No. 640,175. Patented Jan. 2, 1900.

E. BOURNONVILLE.

ACETYLENE GAS GENERATOR.

(Application filed Apr. 17, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1.

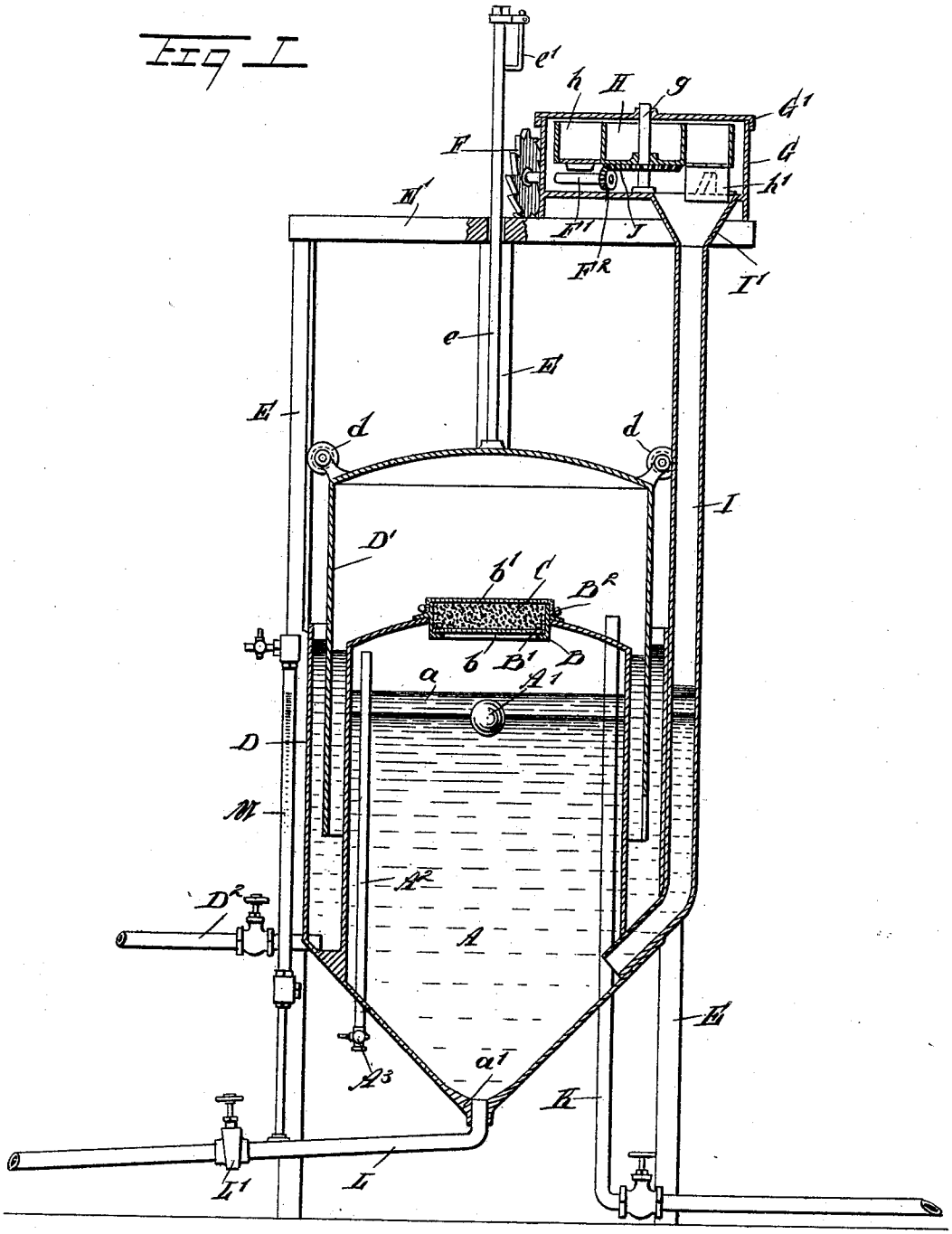

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Fig 2

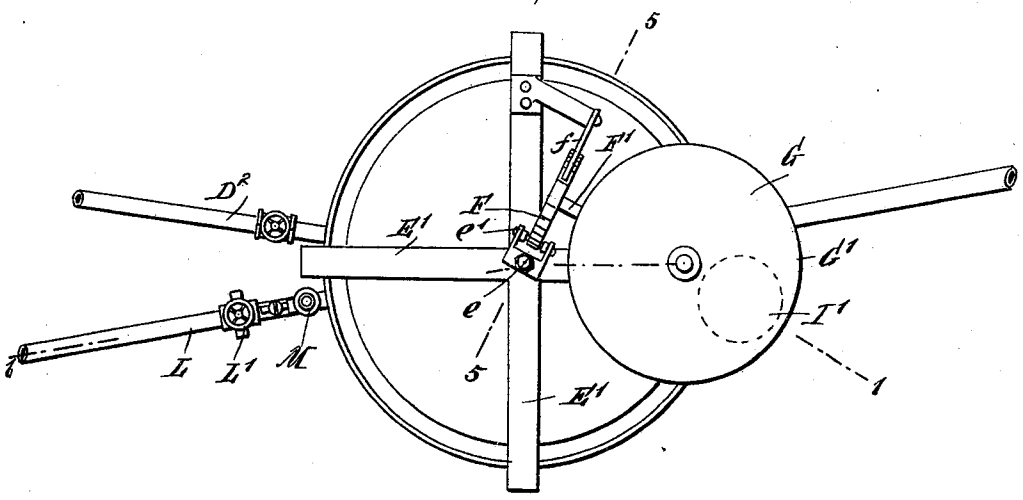


Fig 3

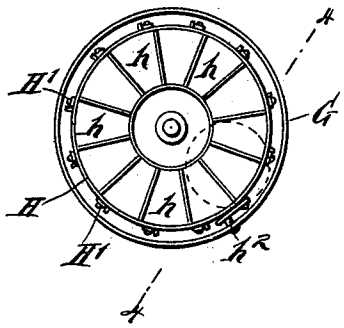


Fig 4

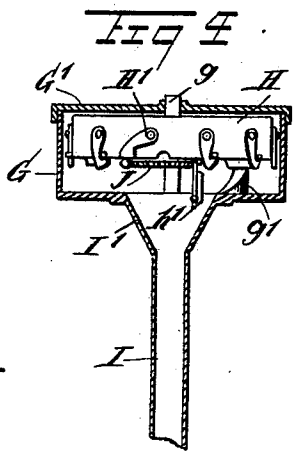
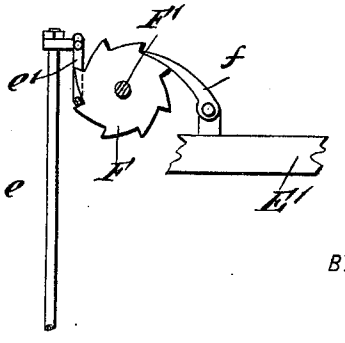


Fig 5



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EUGENE BOURNONVILLE, OF JERSEY CITY, NEW JERSEY.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 640,175, dated January 2, 1900.

Application filed April 17, 1897. Serial No. 632,572. (No model.)

To all whom it may concern:

Be it known that I, EUGENE BOURNONVILLE, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Acetylene-Gas Apparatus, of which the following is a full, clear, and exact description.

My invention relates to an improved form of acetylene-gas generator which is designed to be automatic and absolutely safe in its operation and to be of such simple construction as to render its first cost small and its management easy. It is also provided with purifiers which remove foreign substances from the gas and deliver a pure gas which will not smoke or flicker when burned.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of my device. Fig. 2 is a top plan view. Fig. 3 is a top plan view of the wheel having segmental pockets which are filled with the carbid. Fig. 4 is a section through the casing of this wheel, the wheel itself being shown in elevation. Fig. 5 is a detail showing the operation of the pawls controlling the feed-wheel.

My device is provided with a generator consisting of a tank A, formed with a conical bottom, the lowest part being in the center. This tank is closed at the top by a cover which is provided with an opening of considerable area, within which is placed a box B, forming a chamber which is filled with purifying substances through which the gas must pass, said substances acting as a filter to remove impurities. This tank is filled nearly full of water. A body of kerosene-oil is also placed within the tank and floats upon the surface of the water. The body of said oil is represented by *a* in Fig. 1. A sufficient amount of this kerosene-oil is used to make an appreciable layer of the oil. The carbid is delivered to the tank through the pipe I, provided at its upper end with the funnel I′ and connected to the generator-tank A at the upper part of the conical bottom thereof. The carbid is introduced through this pipe in small quantities at certain intervals of time. This is done automatically by an apparatus which will be hereinafter described. The amount of carbid introduced at one time will be such as will generate sufficient gas to nearly fill the gasometer, which is attached to and made a part of the apparatus. The water and oil for filling the tank are also introduced through the filling-tube I or in any other convenient manner. The opening *a′* at the bottom of the generator-tank is adapted to form a valve-seat, and to this opening is connected a discharge-pipe L, provided with a valve L′, through which the water in the tank may be withdrawn whenever it is desired to change it.

The ball A′, which is made of a specific gravity less than that of the water, but greater than that of the oil, will float between the two liquids. This ball is so shaped as to form a valve to close the outlet-opening *a′* when it comes in contact therewith. When the water is drawn off by opening the valve L′, the ball A′ will sink as the water-level lowers until finally it comes in contact with the edges of the opening *a′*, when the water will cease flowing or flow very slowly. When this result is obtained, the valve L′ is closed. This permits practically all of the water to be drawn out without drawing out any of the oil. The tank may then be refilled through the pipe I.

A gage-glass or level-indicator M is attached to the pipe L between the valve L′ and the opening *a′* of the tank A, closed by the ball A′. Attaching the gage-glass at this point prevents the oil from obtaining access to the interior of the glass, and thus fouling it, so that the level of the water is not as readily visible.

The generator-tank A is surrounded by a tank D, which forms a part of the gasometer. The annular space between the tank D and the generator-tank A is filled with water and forms a seal for the upper part D′ of the gasometer. This gasometer is of the usual form and is provided with rollers *d*, bearing upon vertical guides E, which guide the gasometer in its rise and fall. A rod *e* is attached to the gasometer and rises and falls with it. This rod passes through guides in the horizontal bar E′ of the frame and is provided at its upper end with the pawl *e′*, so placed as to engage the teeth upon a ratchet-wheel F when the gasometer falls to near its bottom point.

The ratchet-wheel F is mounted upon a horizontal shaft F′, which passes through one side of a casing G, having a cover G′, and at its inner end has a beveled pinion F^2, engaging with a bevel-gear J, fixed to the bottom of a wheel H, mounted on a shaft *g*, journaled in the casing G. The wheel H consists of a rim having a series of radial partitions which form segmental pockets *h*. These pockets are all of the same size and adapted to contain carbid to generate sufficient gas to nearly fill the gasometer. As a precaution, for safety's sake, the capacity of the gasometer should be somewhat in excess of the gas generated by one of these charges of carbid.

The bottoms *h′* of the cells *h* are hinged at one edge and when released will drop down, one of them being shown in this position in Figs. 1 and 4. Normally the bottoms are held up so as to close the cells by means of the pivoted hooks or latches H′, which engage a pin upon the outer end of the swinging bottoms. A pin h^2, fixed to the inclosing case G, projects inwardly so as to engage the lower ends of the catches H′ and release them when each cell is over the funnel I′ of the feeding-pipe I. These cells *h* are therefore discharged in succession. As the wheel H revolves the hinged bottoms *h′* of the cells will engage the cam *g′* on the base of the casing G and be raised thereby into position to be caught by the catch H′. The cells are thus closed immediately after being emptied. As the wheel H is revolved the contents of the cells are discharged into the pipe I. The carbid being much heavier than water will pass down the pipe and onto the bottom of the generator-tank A. The pipe I being at one side of the final location of the carbid, the gas generated therefrom will not pass up through the pipe I, but will rise in a vertical line into the upper end of the generator-tank. As the gasometer falls so as to engage the pawl *e′* with the wheel F, the latter will rotate the shaft F′ and through the bevel-gear connections turn the wheel H, so as to release the bottom of one of the cells. The wheel F is prevented from retrograding by a pawl *f*, pivoted on a suitable support on the frame E′. (See Figs. 2 and 5.) As soon as the carbid of a cell passes into the water the generation of gas commences. This will prevent any further drop of the gasometer and, in fact, will soon cause it to rise. The wheel F will therefore be rotated only one tooth at a time, and then rotation will occur only when the gas in the gasometer has been nearly consumed. The generation of gas from the carbid will be somewhat rapid and will cease in a comparatively short time. The gasometer, however, is of sufficient storage capacity so that when it rises it will furnish storage-room for the gases. The pressure of the gas is therefore maintained constant, and the consumption may be rapid or very slow. A new charge of carbid will not be added until the gasometer has fallen to near its bottom.

A gas-supply pipe K passes up through the generator-tank and opens into the gasometer. Through this pipe the gas is withdrawn for consumption. A pipe D^3 is connected to the bottom of the annular space between the generator A and the tank D, so that the water forming the seal for the gasometer may be drawn off when desired. A pipe A^2 enters the bottom of the generator and has its open end close to the upper end of the tank, said pipe being provided with a valve A^3 outside the tank. The purpose of this pipe is to admit and discharge air from the generator-tank when the water is being drawn off and replaced. This will prevent any gas from being drawn back from the gasometer when the water is being drawn off and air from being forced into the gasometer when the tank is being refilled with water. It is to be understood that this pipe will not be needed or used only when the gasometer is empty. At other times the gas is allowed to flow back into the generator.

The gas generated from carbid of calcium ordinarily contains some impurities, among which is sulfur. These impurities will in a certain measure pass off with the gas. As a result the light produced from the combustion of the gas is not as perfect as it would otherwise be. These impurities cause an occasional yellow cast to the flame, as well as causing it to flicker and be unsteady. Small particles which float in the gas will also at times clog the burner-opening and prevent the proper exit of gas. At times also the impurities will create a deposit of solid matter, which floats in the air until it has time to settle. To prevent these difficulties and to purify the gas, I have provided the layer of kereosene upon the surface of the water in the generator-tank. This layer is of some little thickness and results in stopping a great many of these impurities. It prevents most of the water-vapor which is caused by the heat of the chemical reaction from escaping into the gas. Many of these impurities are of such a nature that they will float in the water, but are heavier than the oil. In consequence they are caught by the oil and form a layer between the oil and water. The chamber B is also provided for further purifying the gas. This chamber consists of a ring or box which is open at top and bottom. These openings are closed by layers of cloth *b* and *b′*. This cloth is held in place by rings B′ and B^2, placed within and without the ring and clamping the edges of the cloth between the same and the sides of the box B. Within the box thus formed is placed first a layer of powdered charcoal and upon this a layer of tannin, which preferably has been saturated with a solution of potash. This acts as a filter to stop any impurities which may have passed the oil and also to thoroughly dry the gas, removing therefrom all traces of moisture. As a consequence of these provisions gas delivered from my device is free from impurities

and burns with a steady and constant flame. The deposit of sooty material which sometimes follows combustion of these gases is also obviated.

It will be noticed that the gas-generator contains a relatively large quantity of water. This prevents the water from becoming appreciably heated by the process and delivers the gas in a cool condition. It also prevents rapid evaporation of the water.

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

1. An acetylene-gas generator, comprising a tank having a sloping bottom, a carbid-feeding pipe entering the tank above and at one side of the bottom of the slope, whereby the gas-generating material after its introduction is moved laterally from beneath the open end of said pipe, a gasometer receiving its gas from the said tank, a charging-wheel having a series of segmental pockets, and means operated by the fall of the gasometer to successively discharge the contents of the pockets into the carbid-feeding pipe, substantially as described.

2. An acetylene-gas generator, comprising a tank having a sloping bottom, a carbid-feeding pipe entering the tank above and to one side of the bottom of this slope, a gasometer receiving its gas from this tank, a charging-wheel having segmental pockets with swinging bottoms, catches for holding the bottoms closed, a trip for releasing the bottoms as they pass over the carbid-feeding pipe, and means for rotating the wheel by the fall of the gasometer, substantially as described.

3. An acetylene-gas generator, comprising a tank having a sloping bottom, a carbid-feeding pipe entering the tank above and at one side of the bottom of this slope, a gasometer receiving its gas from this tank, a charging-wheel having segmental pockets with swinging bottoms, catches for holding the bottoms closed, a trip for releasing the bottoms as they pass over the carbid-feeding pipe, a ratchet-wheel connected to the charging-wheel to rotate it, and a pawl connected to the gasometer and engaging the ratchet-wheel to turn it by the fall of the gasometer, substantially as described.

4. An acetylene-gas generator, comprising a tank, a carbid-feeding pipe entering the tank at one side thereof, a gasometer receiving its gas from the tank, a charging-wheel having pockets with swinging bottoms, catches for holding the bottoms closed, a trip for releasing the bottoms as they pass over the top of the carbid-feeding pipe, means for raising the bottoms into position to be caught by the catches, and means for rotating the wheel by the fall of the gasometer, substantially as described.

5. An acetylene-gas generator, comprising a tank, a carbid-feeding pipe for said tank, a gasometer receiving its gas from the tank, a charging-wheel having segmental pockets with swinging bottoms, catches for holding the bottoms closed, a trip for releasing the bottoms as they pass over the top of the carbid-feeding pipe, a cam for closing the said bottoms, and means for rotating said wheel, substantially as described.

6. An acetylene-gas apparatus, comprising a generator provided with an opening in its top for the passage of the generated gas, means for feeding carbid to said generator, a gasometer, and a chamber located in the discharge-opening at the top of the generator and having its upper and lower sides composed of cloth and filled with powdered drying material, substantially as described.

7. An acetylene-gas apparatus, comprising a generator, a valve for drawing the water from the same, a gasometer, a gas-filtering device located in the top of the generator and through which the gas passes to the gasometer, and a valved vent-pipe connecting the upper part of the generator with the outside air, substantially as described.

8. An acetylene-gas generator having a drainage-outlet adapted to act as a valve-seat, a ball-valve shaped to close the outlet-opening when it comes in contact therewith, the said valve being adapted to float on the surface of the water and to close said outlet by the fall of the water, a discharge-pipe leading from the drainage-outlet and having a valve therein, and a gage-glass connected to said discharge-pipe between the said valve and the drainage-outlet, substantially as described.

9. An acetylene-gas apparatus, comprising a generator having a conical bottom, a drainage-outlet in the center of the bottom, and a carbid-feeding tube opening freely into one side of the generator at the top of the conical bottom, whereby the material introduced is conducted laterally to the center of the bottom, as and for the purpose set forth.

10. An acetylene-gas apparatus, comprising a gasometer, a generator connected therewith, and a purifying-chamber located in an opening in the top of the generator and through which the gas passes to the gasometer, the said purifying-chamber comprising a removable receptacle open at the top and bottom, cloth covers for said opening, and clamping-rings for securing said covers in place, the space between said covers being filled with purifying and drying substances in a crushed state, substantially as described.

11. In acetylene-gas apparatus, a vessel adapted to contain water, a gasometer which receives the gas, a feed device consisting of a series of independent carbid-charge carriers connected together and controlled by the movement of the gasometer to discharge their contents into the generator intermittingly, substantially as and for the purposes set forth.

12. In acetylene-gas apparatus, the tank, the carbid-feeding pipe exterior to the gasometer but opening into said tank below the

water-level in the latter, and an incline to deflect the carbid laterally from beneath the lower end of the feeding-pipe, combined with a feed device consisting of a series of independent carbid-charge carriers connected together and controlled by the movement of the gasometer to discharge their contents into the generator intermittingly; substantially as set forth.

13. In acetylene-gas apparatus, the tank having a sloping bottom, and the carbid-feeding pipe exterior to the gasometer but opening into said tank below the water-level therein in a position to discharge the carbid upon said sloping bottom, combined with a feed device consisting of a series of independent carbid-charge carriers connected together and controlled by the movement of the gasometer to discharge their contents into the generator intermittingly; substantially as set forth.

14. In acetylene-gas apparatus, the tank, the exterior carbid-feeding pipe extending downward from above the water-level in the tank and opening into said tank below the water-level therein, and the gasometer, combined with a carbid-feed device leading to the upper end of said pipe and consisting of a series of independent carbid-charge carriers connected together and controlled by the movement of the gasometer to discharge their contents into the said pipe intermittingly; substantially as set forth.

15. In acetylene-gas apparatus, the gasometer and generator, combined with the carbid-feeding pipe leading into the generator below the water-level therein, and an incline receiving the carbid upon its leaving said pipe and directing it laterally from beneath the lower end of said pipe; substantially as set forth.

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Witnesses:
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