No. 637,513. Patented Nov. 21, 1899.

G. L. LAVERY.

ACETYLENE GAS GENERATOR.

(Application filed May 8, 1899.)

(No Model.)

FIG. 2.

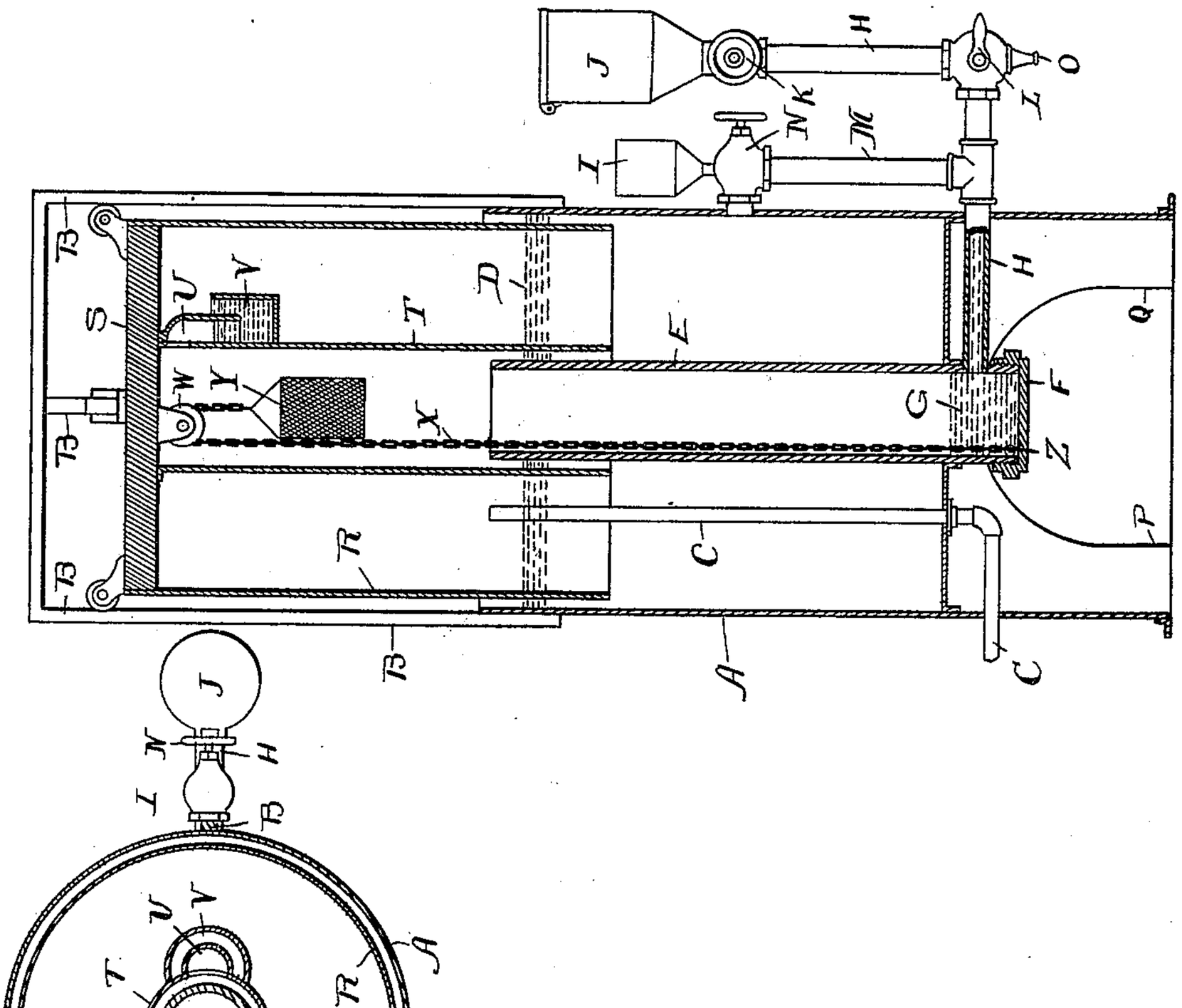
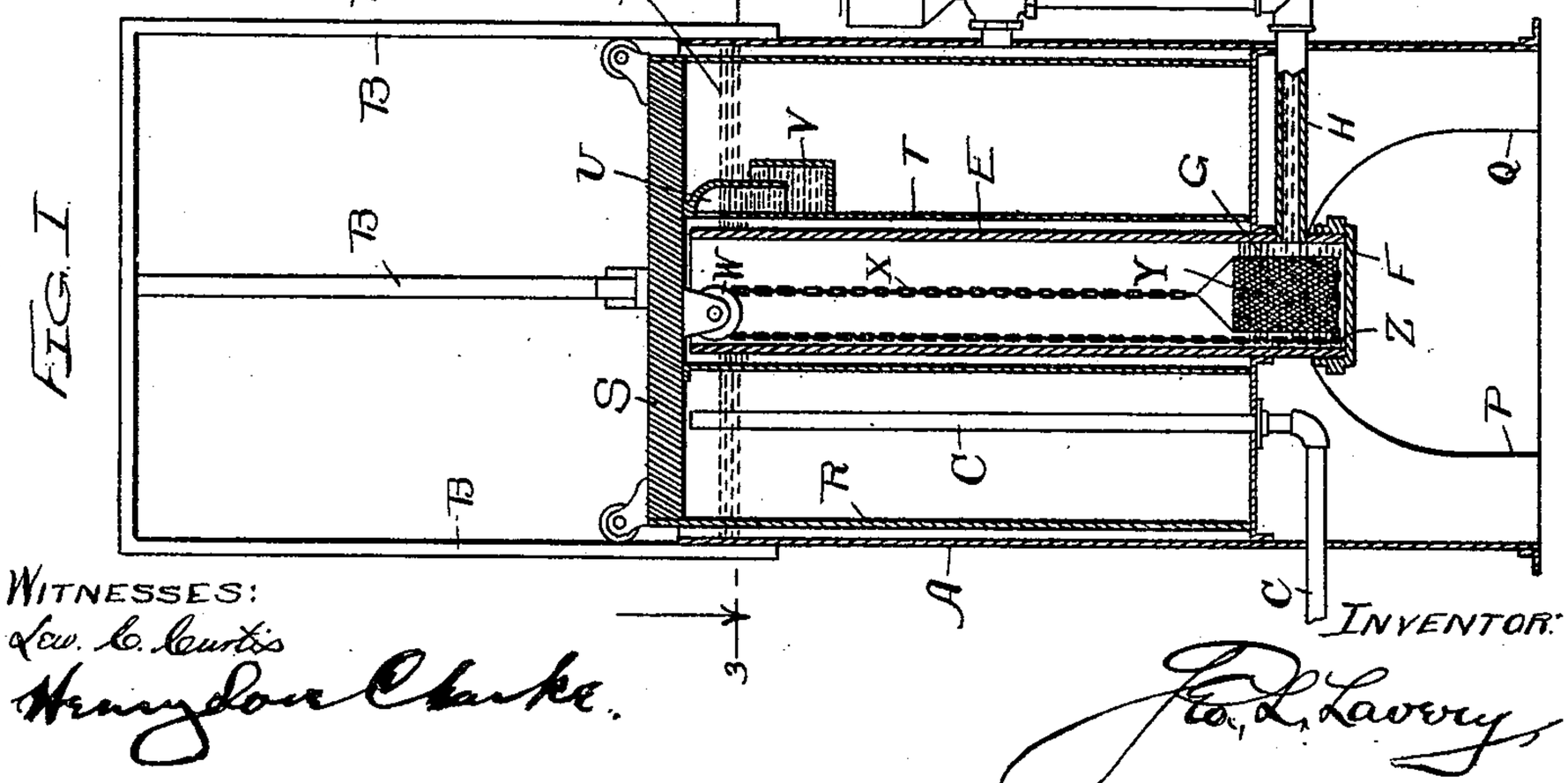


FIG. 3.

FIG. 1.



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GEORGE L. LAVERY, OF CHICAGO, ILLINOIS.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 637,513, dated November 21, 1899.

Application filed May 8, 1899. Serial No. 716,065. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. LAVERY, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Acetylene-Generators, of which the following is a specification.

The object of my invention is the production of a large capacity acetylene generator and tank that shall be of extremely simple and inexpensive form of construction and at the same time have a maximum degree of safety with reference to any dangers of explosion, such as may arise in an acetylene generator and tank from the too rapid generation of the gas.

My invention consists, primarily, in a water-bath for the immersion of the calcium carbid and a porous carbid receptacle or basket, the one being movable in respect to the other, and a simple form of expansible acetylene-gas tank consisting, preferably, in a water-sealed gasometer, all in combination with simple automatic means consisting, preferably, in a positive mechanical movement, such as a chain-and-pulley system, for so varying the amount of the immersion of the carbid-receptacle, and consequent saturation of the carbid, that the said carbid-receptacle shall be withdrawn from immersion in the said water-bath as the gasometer fills with the generated gas at a rate that is in multiple proportion to the rate at which the said gasometer fills with the said gas, thus making a definite and high maximum of safeguard against the too rapid filling of the said gasometer with gas, but at the same time insuring the continuous presence of a considerable volume of gas within the gasometer until the given supply of calcium carbid is almost entirely consumed. Preferably the water-bath aforesaid is stationary and the carbid-receptacle aforesaid is movable.

It also consists in the combination, with the foregoing, of means, such as the weighting of the top of the gasometer, for so compressing the said gasometer or expansible tank that the gas shall be forced out through the gas-discharge pipes at a generally uniform pressure, and of means, preferably of substantially the form hereinafter described, for filling the aforesaid water-bath without allowing the escape of gas to any appreciable extent from the tank, and of means, preferably of substantially the form hereinafter described, for replenishing the supply of carbid in the aforesaid carbid-receptacle without allowing an appreciable escape of gas from the aforesaid gas-tank, and of means, preferably of substantially the form hereinafter described, for flushing out the aforesaid water-bath and the water-supply pipes leading into the said bath.

The accompanying drawings, forming a part of this specification, show the general plan and nature of my invention.

Figure 1 is a vertical section of the device along a diameter of the gasometer and shows the gasometer at its lowest level, empty or nearly empty, and the suspended carbid-receptacle immersed in the stationary water-bath of the generator. Fig. 2 is a like section of the device, but shows the gasometer raised as when filled with gas and the movable suspended carbid-receptacle completely removed from its immersion in the water-bath. Fig. 3 is a horizontal cross-sectional view of the device along the line 3 3 of Fig. 1.

A is the large water-tank, constituting the water-seal of the gasometer. B B B are the guides, fixed to the top of the said tank and adapted to retain the rising and falling gasometer. C is the gas-discharge pipe, rising through the water-tank from its base to a point just above the high-water level D in the said tank. E is a stationary tube rising vertically through the said water-tank from a point below the bottom of the water-containing part of the said tank and through the center of the said tank to a point somewhat above the high-water level D in the said tank. The bottom of this tube is closed by a removable cap F, fitting water-tight over the base of the tube. The lower portion of this tube, shown filled with water G, constitutes the stationary water-bath for the immersion and saturation of the carbid, and this water-bath is supplied with water through the pipes H H, leading from the water-receiving funnel J, the said funnel being of such capacity as to fill the water-bath tube E to just the necessary level when the valves K and L are properly opened. The pipe M, controlled by the valve N, is adapted to allow a current of wa-

ter from the water-tank A to flow through the lower part of the pipe H and the water-bath for the purpose of flushing out any refuse sediment that may be deposited therein.

I is a funnel adapted to receive water for the same purpose last mentioned and has its orifice controlled by the same valve N. The valve L is also adapted to discharge any refuse water or sediment out of the pipes H H and M through the nozzle O.

The base of the water-tank A is cut away, as shown by the line P Q, so as to allow the opening of the cap F, forming the bottom of the water-bath.

The gasometer R has its top heavily weighted, as shown by the shaded portion S in Figs. 1 and 2. A tube closed at the top and open at the bottom and lettered T is fixed centrally in the gasometer and adapted to rise and sink over and close around the central water-bath tube E of the water-tank. The tube T has an orifice U near its top for the escape into the main portion of the gasometer of the gas generated from the carbid, and the said orifice has its outer aperture closed by a water-seal V, fixed to the outside of the tube T. Within the tube T and fixed to the top of the gasometer is a pulley W, over which passes a chain X, the said chain having suspended on its free end the porous carbid-receptacle Y and having its other end attached to the base of the inner wall of the water-bath tube at the point Z. The point Z may be at a higher level on the inner wall of the said water-bath tube than as shown in the accompanying drawings.

In practical operation the cap F of the water-bath tube is opened and the carbid-receptacle, which hangs near the bottom of the said tube when the gasometer is empty, is filled with the carbid and attached to the fastening devices on the free end of the chain. The said cap is then closed, and the proper amount of water is allowed to flow into the water-bath through the system of pipes and funnel before mentioned, the valves of the said pipes being immediately closed after the funnel J is emptied of water. The generation of the acetylene gas begins rapidly immediately that the water percolates through the wall of the more or less porous carbid-receptacle. The generated gas flows out into the main cavity of the gasometer, bubbling through the water seal that closes the orifice of the central inner tube of the gasometer. As the gasometer fills it rises above the water-level of the water-tank A, and simultaneously, by means of the chain-and-pulley system, the more or less saturated carbid-receptacle is carried out of immersion in the water-bath at a rate twice as rapid as the rate of rise of the gasometer itself, and the too rapid generation of the gas is thus checked. By manifolding the length of the chain and multiplying the number of pulleys, as well as by more or less elongating the carbid-receptacle itself, the rate of change in the generation of the gas may be definitely limited in the construction of the machine. The chain-and-pulley device above shown and specified provides a definite multiple ratio between the rate of gas generation and the amount of gas stored in the gas-tank, and thus by extremely simple and absolutely positive mechanical means gives a maximum degree of safeguard against the generation of the gas with explosive violence. The heavily-weighted top of the gasometer in proportion to the relatively thin cylinders constituting the vertical walls of the said gasometer insures a practically uniform pressure of the gas discharged through the feed-pipe C, because the variation due to the flotation of the sinking gasometer will be very small in proportion to the whole weight of the said gasometer.

The arrangement for flushing out the sediment in the water-bath and in the supply-pipes of the water-bath may be varied by providing a special opening or funnel, as I, for receiving the water to be used in such operation of flushing; but the drawings also show a convenient method of utilizing the water in the main water-tank A, that forms the seal of the gasometer, it being a simple matter to restore the water-level in the said water-tank A by pouring the necessary quantity of water into the open mouth of the said tank. The water seal fixed to the outside of the inner central tube of the gas-tank is adapted to sink a little below the water-level of the large water-tank A each time the gasometer sinks to its lowest point, thus insuring the constant presence of sufficient water in the said water seal V.

Having thus described my invention, I claim—

1. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, substantially as specified.

2. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, and means for so compressing the said expansible tank that the gas shall be forced out through the discharge-pipes at a generally uniform pressure, substantially as specified.

3. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, and means for filling the said wa-

ter-bath without allowing the escape of gas from the said gas-tank, substantially as specified.

4. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, and means for replenishing the carbid in the said carbid-receptacle without allowing an appreciable escape of gas from the said gas-tank, substantially as specified.

5. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, and means for flushing out the said water-bath and the water-supply pipes leading into the said bath, substantially as specified.

6. In an acetylene-generator, in combination, a porous carbid-receptacle and a water-bath, the one movable in respect to the other, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle in the water-bath at a rate that is in multiple proportion to the expansion of the gas-tank, and means for so compressing the said expansible tank that the gas shall be forced out through the discharge-pipes at a generally uniform pressure, and means for replenishing the carbid in the said carbid-receptacle without allowing an appreciable escape of gas from the said gas-tank, and means for filling the said water-bath without allowing the escape of gas from the said gas-tank, and means for flushing out the said water-bath and the water-supply pipes leading into the said bath, substantially as specified.

7. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, substantially as specified.

8. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, and means for so compressing the said expansible tank that the gas shall be forced out through the discharge-pipes at a generally uniform pressure, substantially as specified.

9. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, and means for filling the said water-bath without allowing the escape of gas from the said gas-tank, substantially as specified.

10. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, and means for replenishing the carbid in the said carbid-receptacle without allowing an appreciable escape of gas from the said gas-tank, substantially as specified.

11. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and automatic means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, and means for flushing out the water-bath and the water-supply pipes leading into the said bath, substantially as specified.

12. In an acetylene-generator, in combination, a suspended movable porous carbid-receptacle, a stationary water-bath for the immersion of the said carbid-receptacle, an expansible gas-tank, and means for varying the immersion of the carbid-receptacle at a rate that is in multiple proportion to the expansion of the said gas-tank, and means for so compressing the said expansible tank that the gas shall be forced out through the discharge-pipes at a generally uniform pressure, and means for filling the said water-bath without allowing the escape of gas from the said gas-tank, and means for replenishing the carbid in the said carbid-receptacle without allowing an appreciable escape of gas from the said gas-tank, and means for flushing out the water-bath and the water-supply pipes leading into the said bath, substantially as specified.

13. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley system, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath, and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, substantially as specified.

14. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley system, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath,

and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, and a weighting of the top of the said gasometer for the purpose of securing a generally uniform pressure for the gas forced out through the discharge-pipes, substantially as specified.

15. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley system, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath, and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, and a removable cap closing the bottom of the water-bath and adapted to open and allow the removal of the carbid-receptacle when the gasometer is at the lowest level, substantially as specified.

16. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley system, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath, and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, and a pipe leading from the said water-bath to a funnel external to the water-sealed gasometer and controlled by valves so as to allow the introduction of water into the said water-bath through such pipe, funnel and valves, substantially as specified.

17. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley sytem, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath, and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, and a pipe, funnel and valves adapted to allow the flushing out of the said water-bath and the supply-pipes leading into the said bath, substantially as specified.

18. In an acetylene-generator, in combination, a porous carbid-receptacle suspended to the free end of a chain-and-pulley system, adapted to vary the immersion of the said carbid-receptacle in a stationary water-bath, and a water-sealed gasometer adapted to operate, by the expansion of the said gasometer, the said chain-and-pulley system so that the said immersion is varied in multiple proportion to the said expansion, and a weighting of the top of the said gasometer for the purpose of securing a generally uniform pressure for the gas forced out through the discharge-pipes, and a removable cap closing the bottom of the water-bath and adapted to open and allow the removal of the carbid-receptacle when the gasometer is at the lowest level, and a pipe leading from the said water-bath to a funnel external to the water-sealed gasometer and controlled by valves so as to allow the introduction of water into the said water-bath through such pipe, funnel and valves, and a pipe, funnel and valves adapted to allow the flushing out of the said water-bath and the supply-pipes leading into the said bath, substantially as specified.

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Witnesses:
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