No. 666,147. Patented Jan. 15, 1901.

F. E. LAYTON.

ACETYLENE GAS GENERATOR.

(Application filed July 10, 1899.)

(No Model.) 2 Sheets—Sheet 1.

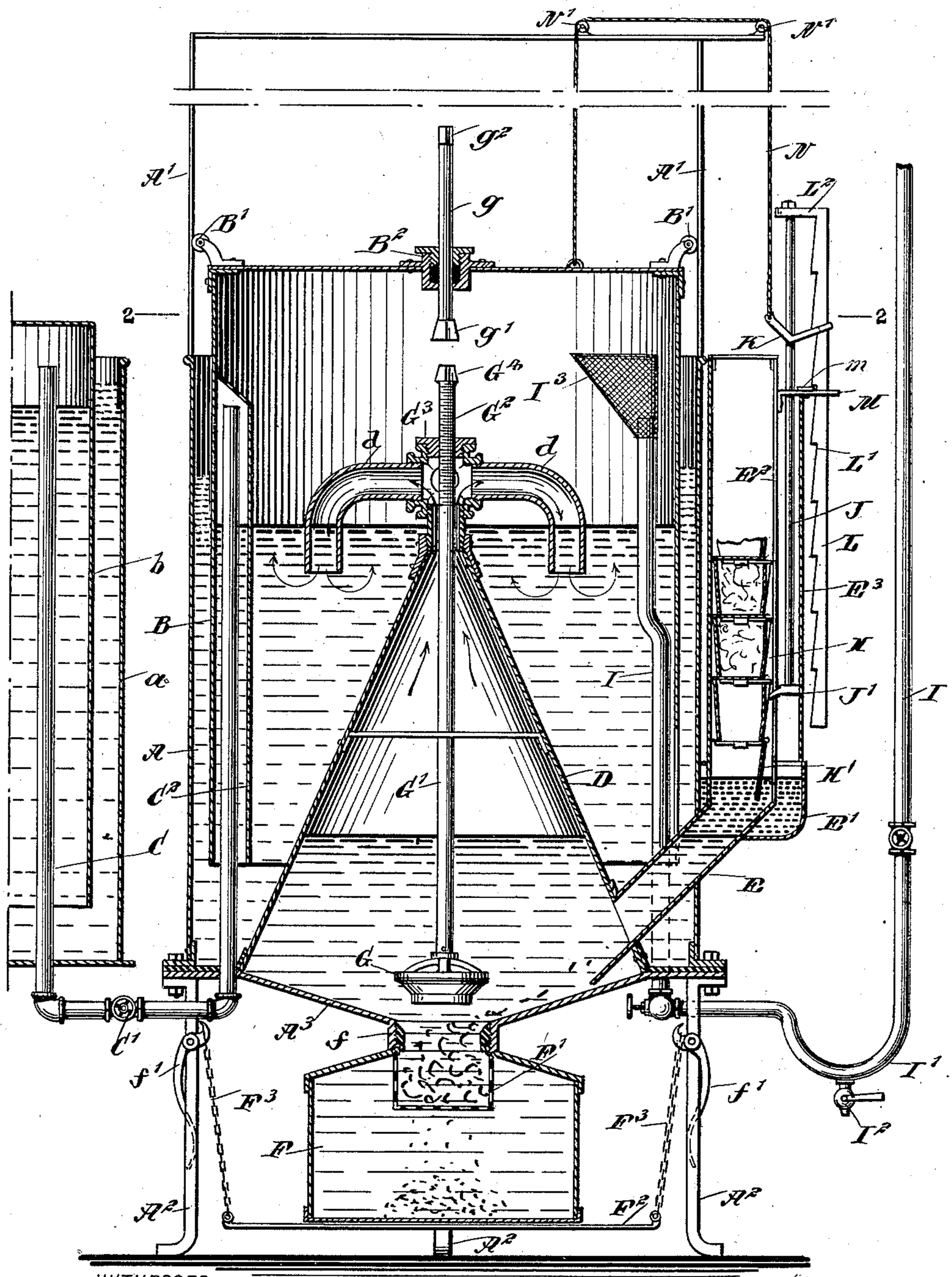

Fig. 1

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Fig. 2

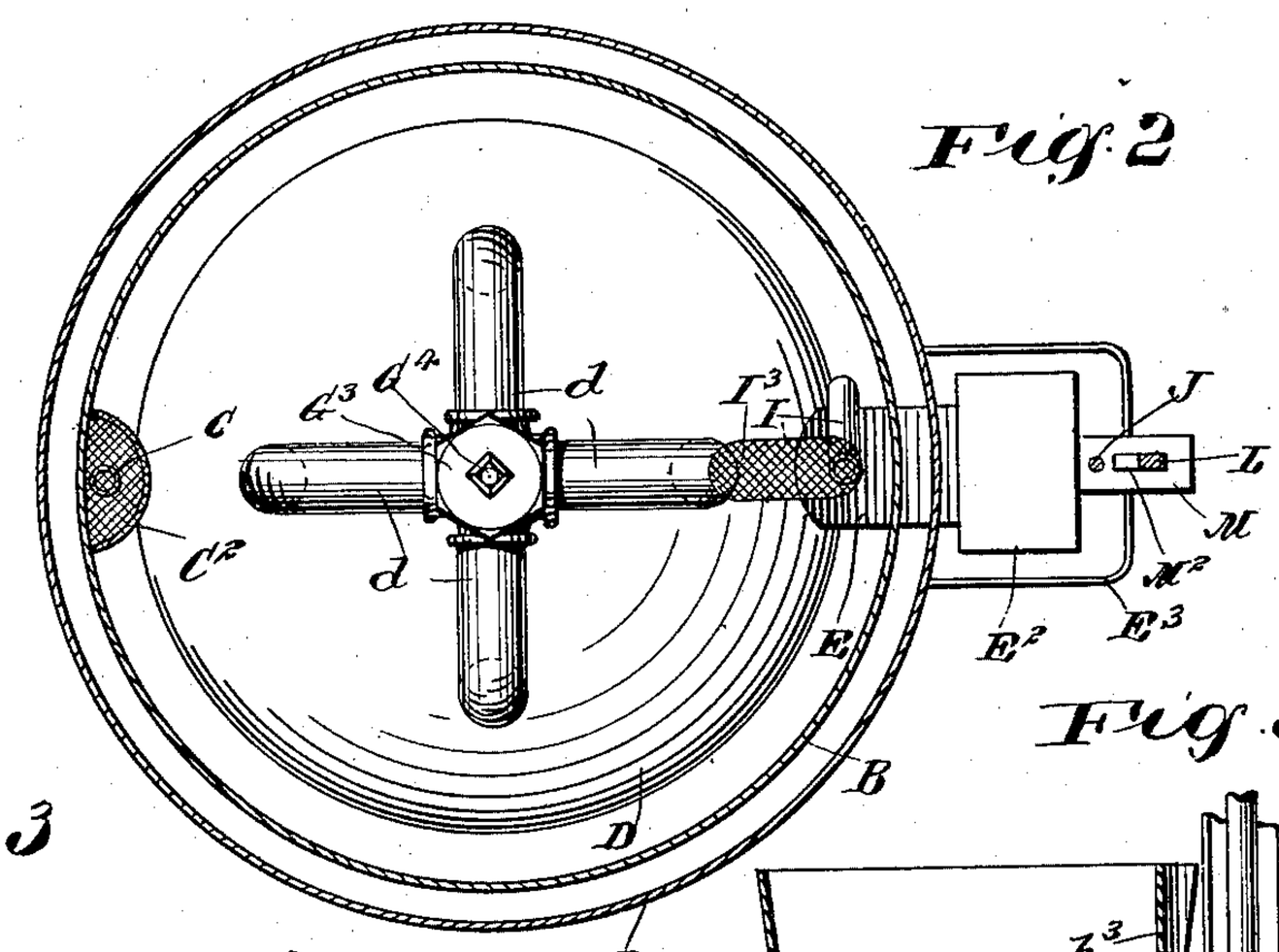

Fig. 5

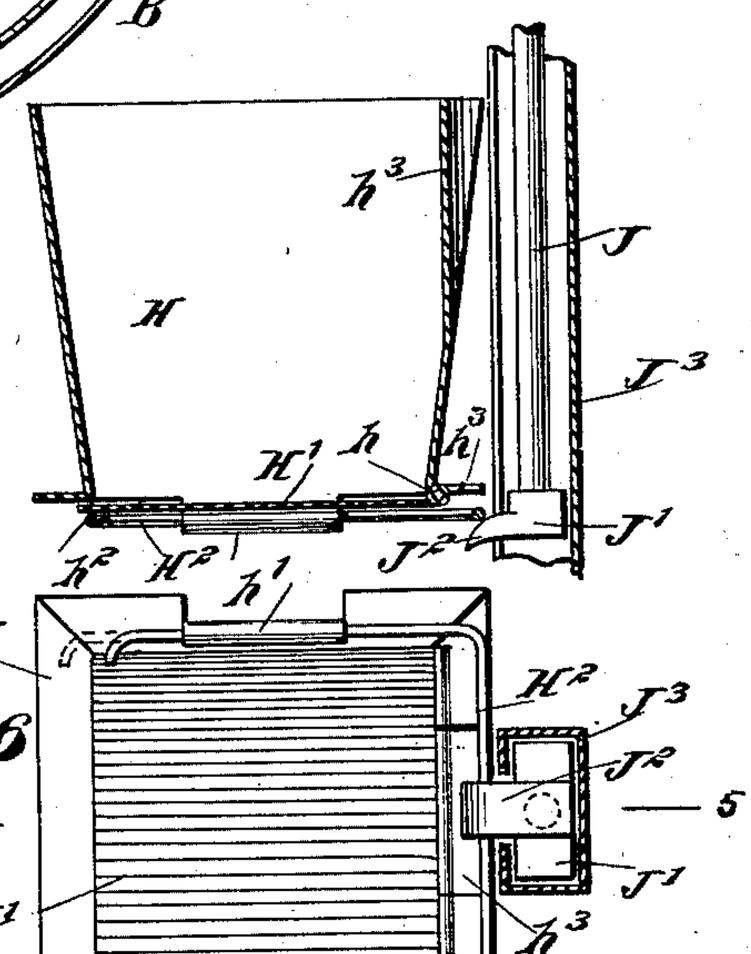

Fig. 3

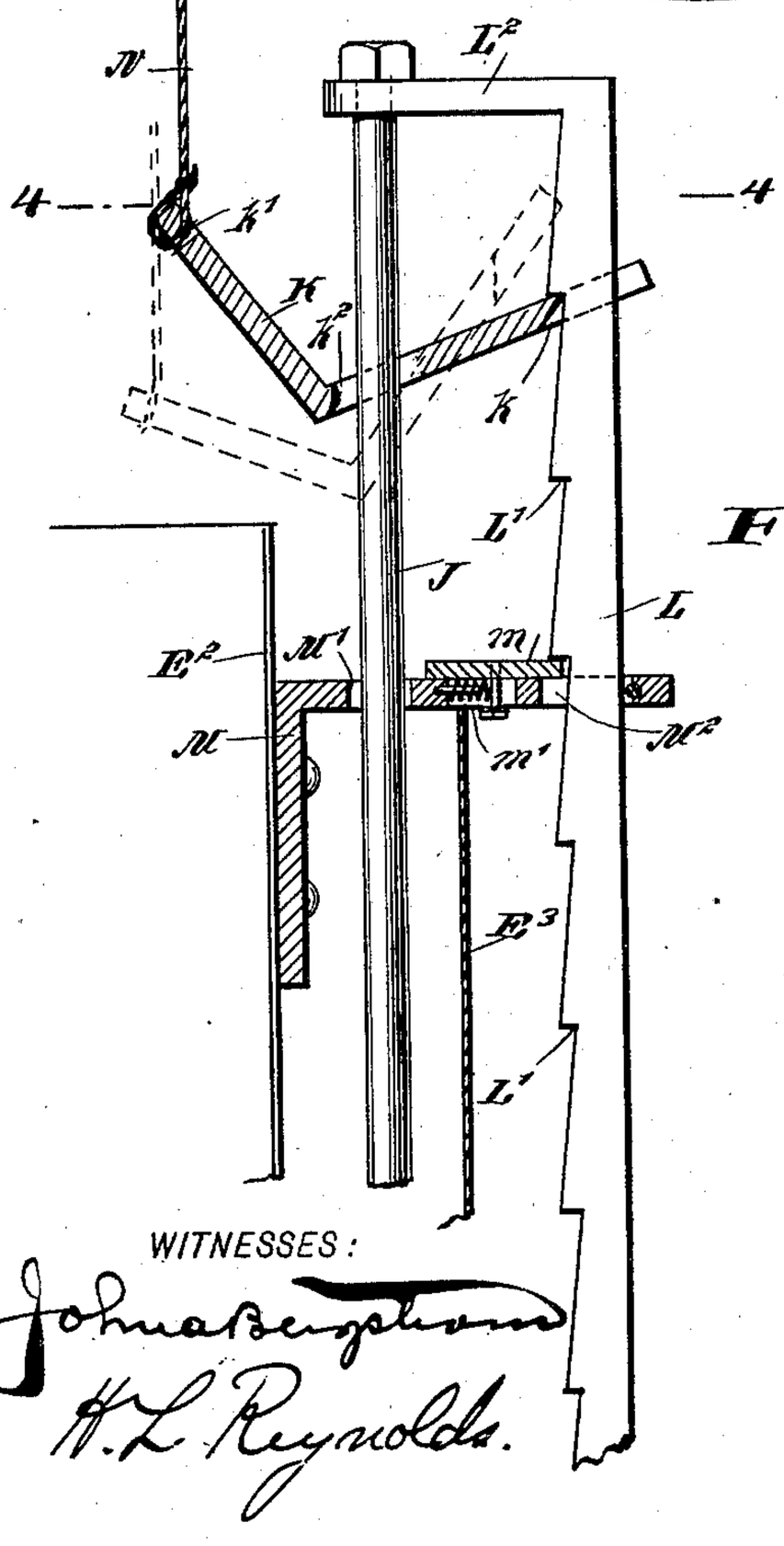

Fig. 6

Fig. 4

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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 666,147, dated January 15, 1901.

Application filed July 10, 1899. Serial No. 723,322. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN EUGENE LAYTON, of Corning, in the county of Steuben and State of New York, have invented a new and Improved Acetylene-Generating Apparatus, of which the following is a full, clear, and exact description.

My invention relates to certain improvements in the apparatus used for automatic generation of acetylene, and comprises certain novel features which will be hereinafter described and claimed.

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 sectional plan taken upon the line 2 2 in Fig. 1. Fig. 3 is a detail sectional elevation of the mechanism by which the trip-rod is raised. Fig. 4 is a plan view of the clutch-bar which engages the trip-rod to raise it; and Figs. 5 and 6 are respectively a sectional elevation and a bottom plan view of one of the carbid-holders.

My device belongs to that class of acetylene apparatus which uses the ordinary gasometer consisting of a water-tank and an inverted bell and a generator in connection therewith which employs a feeding apparatus by which the carbid is discharged into a surplus of water in the generator in small quantities, as desired. The gasometer consists of the water-tank A and the inverted bell B fitting within the same and rising and falling in correspondence with the amount of gas which is at the time stored. The tank A is provided with guide-bars A′ of the usual kind, extending upwardly therefrom and engaged by guide rollers or pulleys B′, mounted upon the gasometer-bell B. The bottom A^3 of the tank A has the central portion thereof sloping downwardly toward the center, forming a section of a cone, the object being that carbid discharged thereon shall slide by gravity to the apex of the cone, which is downwardly. This conical portion of the bottom, as herein shown, does not extend entirely to the outside edge of the tank, but this is immaterial, as said portion might as well extend entirely to the outside of the tank. At the apex of the cone a discharge-opening is provided, through which the carbid will fall. Another cone D is secured to the bottom of the tank and extends upwardly into the water contained in the tank. The water-level of the tank is so located with reference to the cone D that the cone will be submerged at all times. Said cone forms the generating-chamber within which the gas is formed.

To the bottom of the generating-chamber is detachably secured a refuse-receiving chamber F, which receives the lime formed by the decomposition of the carbid. The gas as generated in the chamber or cone D first comes in contact with the upper portion of the wall thereof, and any moisture which may be contained therein is condensed on the side walls and then passes upwardly through a pipe which terminates in one or more goose-necks or depending sections *d*, the open ends of which extend beneath the surface of water in the tank. The gas passing from the generator to the gasometer is thus passed through water and is further cooled, besides having all particles of dust and foreign matter removed therefrom.

Through the center of the discharge-opening connecting the generating chamber or cone D with the discharge-pipes *d* extends a rod or shaft G′, which has a threaded section G^2 at its upper end and screws into a block G^3, which closes the upper end of the discharge-pipe. On the lower end of this shaft, which extends close to the bottom of the cone, is placed a valve G, which when forced downward is adapted to contact with a valve-seat *f*, formed about the upper edge of the discharge-opening in the bottom of the generating-chamber. By this means the generating-chamber may be cut off from the refuse-receiving chamber F, so that the latter may be detached and cleaned and another or the same one replaced without permitting air to enter the generator or gasometer or interfering with the operation thereof.

The upper end G^4 of the rod G′ is of some non-circular section which is adapted to be engaged by a socket-piece *g′* upon the lower end of a rod *g*, which passes through a stuffing-box B^2, located in the upper end of the gasometer-bell and in line with the shaft G′, so that when the gasometer-bell has fallen to the proper distance the shaft *g* may be forced

inward and into engagement with the upper end of the shaft G′, so that the latter may be turned to force the valve G downward upon its seat. For convenience in turning the shaft g its upper end is made square or of some other non-circular section, as shown at g^2.

Placed within the refuse-receiving chamber F and surrounding the opening in the upper end thereof is a basket or box F′, which is formed of perforated metal, wire screen, or any other suitable similar material which will catch and retain the carbid, but will permit the lime resulting from the decomposition thereof to pass through the openings and downward to the bottom of the chamber F. This keeps the carbid separate from the lime, so that its decomposition proceeds rapidly until it is entirely consumed. The carbid is introduced to the cone D or generating-chamber by means of an inclined spout E, which passes through the side wall of the tank A and enters the cone D near its bottom. The upper end of this chute enters a cup or small tank E′, which is placed outside of the gasometer-tank and which is filled with oil, said oil floating upon the water contained in the generator and forming a layer of neutral liquid covering said water and acting upon the carbid to protect it until it has passed entirely within the generator, so that there is no generation of gas until the carbid has reached a point where the gas in rising will not pass outward through the feeding-chute. This device prevents premature generation of gas and the offensive odor which arises from its escape into the atmosphere.

The carbid is stored in separate charges in a number of holders H, which are contained within the chamber E^2, placed upon one side of the tank A. One of these carbid-holders is shown in detail in Figs. 5 and 6, and consists of a small receptacle H of such a size as to hold an amount of carbid which will generate sufficient gas to substantially fill the gasometer. The bottom H′ consists of a plate which is hinged at h to one side of the receptacle, so that when it is dropped the charge of carbid contained therein will be dropped into the generator. That part of the hinge carried by the bottom plate H′ is formed by cutting two slits inward from the edge of the plate at each side of its center and curving the portion contained between said slits about the pivot-wire, as is clearly shown at h', Figs. 5 and 6, where the same device is used to form a support for the catch-wire H^2, which is thereby mounted to slide upon the body of the receptacle H in the bearings h'. The ends of the wire forming the hinge-pivot are similarly supported from the bottom of one side of the holder. The catch-wire H^2 is capable of being moved in its guiding-supports h', and has its ends h^2 curved inwardly, so as to engage the outer corners of the bottom H′, and thereby support the same. The central portion of this wire or that which lies alongside of the hinge is normally placed at a short distance outside of the hinge, where it may be engaged by a trip-block, hereinafter described, and forced laterally until the hooks h^2 are freed from the bottom H′ and the latter is permitted to drop, and thus to discharge the carbid. This catch device is operated by means of a trip-block J′, supported upon the lower end of a vertical rod J, which extends alongside of the series of carbid-holders. This rod is mounted to slide in suitable guides and is given a step-by-step upward movement by successive falls of the gasometer-bell. The block J′ is preferably mounted to slide within a guide J^3 and the end or finger J^2, which projects from the block and which directly engages the catch-wire H^2, has its upper outer surface sloping, as clearly shown in Fig. 5, so as to act as a cam to force the catch-wire H^2 laterally. A bar L, which is provided with teeth L′ upon one edge, is connected at its upper end by means of a horizontal section L^2 with the upper end of the rod J. The bar L passes through a guide-bracket M, fixedly supported upon a casing E^2, which surrounds the carbid-holders, and the bar is maintained in its elevated position by means of a slide or catch m, mounted upon the bracket M, said slide being normally held projected by means of a spring m', which holds the outer end of the slide against the bar L. As the bar L is moved upward through the opening M^2 in the bracket or arm M the catch m is forced backward until one of the teeth L′ passes above the same, when the catch is forced outwardly and will prevent the bar L from descending, if released. The bar L is elevated by means of a clutch device, (shown in detail in Figs. 3 and 4,) consisting of a bar or bolt K, provided with a central aperture k^2, adapted to receive the rod J, and with a notch k in one end adapted to embrace the bar L. This plate is herein shown as bent nearly in the form of a right angle, and the end opposite the notch k is provided with an aperture k', adapted to receive a cord N, which passes upwardly and about guide-pulleys N′, supported on the framework of the gasometer, and thence downwardly, where it is attached to the gasometer-bell. As the gasometer-bell falls the bar K is raised.

In the position in which the device is shown in Fig. 3 if the bar K is allowed to drop it will descend until finally the notched end thereof falls below the tooth L′ located next beneath the one with which it is shown as engaged. Then if the bar K is raised by the descent of the gasometer-bell said bar will engage the tooth L′ next beneath the one with which it is shown in engagement, and its rise will thus raise the bar L until the catch m may engage another one of the teeth L′. The raising of the rod J and bar L is thus cumulative, they being raised a single step at a time, said step being the distance between two adjacent teeth L′ and being also the distance between two adjacent carbid-

holders H. It will be noticed that the charges of carbid in the holders H, except for the bottom one, will be discharged through the holders beneath them. Thus the number of charges which may be used depends upon the height of the casing E^2 and of the individual holders H.

Should the gasometer become overcharged, the gas is drawn off from the gasometer either through an automatic relief service-pipe I of the usual character or through the overflow or relief pipe C. One end of the relief-pipe C extends upwardly within the gasometer-bell and preferably within a small chamber formed by a plate C^2, which is secured to one side of the gasometer-bell and curves inwardly. The upper end of this chamber is preferably provided with a screen of any convenient form, as shown in Fig. 2. The other end of this pipe enters the surplus or relief gasometer. This surplus or relief gasometer, located alongside the regular gasometer, is of the usual form, consisting of a tank *a* and an inverted bell *b*, weighted so as to rise at a slightly-greater pressure than that of the bell B, so that the relief-gasometer will not be brought into use except after the bell B is filled. The guiding-framework surrounding the bell B is designed to form a stop which limits the rise of the bell, stopping the same at a point where its lower edge is at a sufficiently safe distance beneath the surface of the water in the tank. The gas will therefore not escape from beneath the lower edge of the bell unless the pressure is materially increased. As soon as the pressure rises above the normal the surplus or overflow gasometer bell *b* will be raised. Any excess of gas which may for any reason be generated will therefore instead of being discharged, pass into the overflow-gasometer and be retained there until the pressure in the ordinary gasometer has been reduced to the normal, when the overflow-gasometer bell will fall, thus driving the gas back into the ordinary gasometer, from whence it is drawn and consumed.

A valve C′ is shown as placed in the pipe C, by which communication may be cut off between the two gasometers. It is immaterial whether the service-pipe be conducted into the ordinary gasometer or the overflow-gasometer, as the gas may be drawn from either at will.

The refuse-receiving chamber F may be connected to the bottom of the generator-tank by any suitable means, either by a screw-threaded collar or by being clamped in place by any suitable device. It is herein shown as supported upon a plate or frame F^2, which is in turn supported by means of chains F^3, which at their upper ends are hooked upon the short ends of levers *f*′, which are pivoted upon the posts A^2, which support the gasometer in a raised position.

The service-pipe I, which leads to the burners, enters the gasometer at its bottom and outside of the conical generating-chamber D. Its upper end extends above the water-level in the tank and is provided with a screen-top I^3, which is filled with a drying material—as animal charcoal, pumice-stone, or camphor—through which the gas must pass, thus more perfectly drying the gas and preventing dust from entering the pipe and being thereby conducted to the burners. This pipe has a loop I′, which forms a trap for the collection of water condensation. At the bottom of this loop is placed a drip-cock I^2, which may be opened when desired to relieve the pipe of water.

The generating-cone D, it will be noticed, is only partially filled with water and is entirely submerged in the water in the gasometer-tank A. The upper portion of this cone therefore acts as a condenser to cool the gas and to condense any water-vapor which may be carried thereby. As a result of this, very little water will collect in the service-pipe, and there will be but little necessity for the drip-cock I^2.

It will be seen that the refuse may be readily removed from the generator without cutting off the supply of gas and also that the carbid-holders may be refilled without interfering with the operation of the machine. At the same time the water is not drawn off from the generating-chamber D, and there is no chance of air obtaining access to the gasometer or the generator, and thus forming an explosive mixture. This device is therefore both safe and convenient to operate.

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

1. An acetylene-generator, comprising a gasometer having a water-tank and a movable bell, a generating-chamber, in said tank and having a discharge-opening, a valve adapted to close said opening and provided with a rod extending upward within the gasometer, and means carried by said gasometer-bell for engaging the said valve-rod, whereby the valve may be operated, substantially as described.

2. An acetylene-generator, comprising a water-sealed gasometer, a generating-chamber within the gasometer-tank and having a discharge-opening in its bottom, a valve adapted to close said opening and provided with a rod extending upward above the top of the generating-chamber, and within the gasometer, a shaft carried by the gasometer-bell, and adapted to engage the valve-rod, whereby the valve may be operated, means for feeding carbid to the generating-chamber, and a gas-discharge pipe leading from the generating-chamber to the gasometer, substantially as described.

3. An acetylene-generating apparatus, comprising a gasometer having a water-tank, a generating-chamber extending upward from the bottom of said tank, and surrounded by the water therein, a refuse-receiving chamber, removably attached to the bottom of the generating-chamber, the two having communi-

cating openings, a perforated or screen box within the refuse-chamber and beneath said communicating openings, a valve adapted to close said openings, and having an upwardly-extending valve-rod, means carried by the bell of said gasometer whereby the valve may be operated, and an inclined feed-chute passing through the sides of the gasometer and generator and extending upward at its outer end into an oil-holding chamber to form a liquid seal, substantially as described.

4. An acetylene-generator, comprising a water-sealed gasometer, a generating-chamber immersed in and surrounded by the water in the gasometer, a refuse-receiving chamber removably attached to the bottom of the generating-chamber the two having communicating openings, a gas-delivery pipe extending from the upper part of the generating-chamber into the gasometer, and a valve for closing the communicating openings between the generator and the refuse-receiving chamber, the said valve being provided with a threaded rod extending vertically through the upper part of the generating-chamber, and means carried by the gasometer-bell, whereby said rod may be turned to open and close the valve, substantially as described.

5. In an acetylene-generator, a gasometer provided with a movable bell, a generating-chamber extending upward from the bottom of the gasometer, a refuse-receiving chamber removably attached to the bottom of the generating-chamber, the two having communicating openings, a valve for closing said openings, the said valve having a threaded valve-rod mounted to turn in a threaded support, and extending vertically through the top of the generating-chamber into the gasometer, and a device adapted to engage the upper end of the valve-rod to turn the same, substantially as described.

6. An acetylene-generator, having a sloping bottom terminating in a discharge-opening, a valve for closing said discharge-opening and provided with a threaded valve-rod extending upwardly through the generating-chamber, said rod having a threaded support, means for turning the said valve-rod, a refuse-receiver adapted to be secured beneath and to inclose said discharge-opening, a screen or perforated box within the refuse-chamber and beneath the discharge-opening, and means for feeding carbid to the generator, substantially as described.

7. An acetylene-generating apparatus, comprising a gasometer having a water-tank, a generating-chamber extending upward from the bottom of said tank and surrounded by the water therein, a refuse-receiving chamber removably attachable to the bottom of the generating-chamber, the two having communicating openings, a valve mounted on a vertical shaft in the generator and adapted to close said communicating openings, said shaft having a threaded support and passing through the generator-wall, and a shaft or bar passing through a stuffing-box in the top of the gasometer-bell and adapted to engage the threaded valve-rod to turn it, and means for introducing carbid to the generator, substantially as described.

8. An acetylene-generating apparatus, comprising a gasometer having a water-tank, a generating-chamber extending upward from the bottom of said tank and surrounded by the water therein, gas-discharge pipes extending upward from said generating-chamber and terminating in goosenecks or downward bends opening beneath the water-surface in the gasometer, a refuse-receiving chamber removably attachable to the bottom of the generating-chamber, the two having communicating openings, a valve mounted on a vertical shaft in the generator and adapted to close said communicating openings, said shaft passing through the discharge-pipe and having a threaded support therein, a shaft or bar passing through a stuffing-box in the top of the gasometer-bell and adapted to engage the threaded valve-rod to turn it, and means for introducing carbid to the generator, substantially as described.

9. An acetylene-generator, comprising a gasometer having a water-tank and a movable bell, a generating-chamber in said tank and having a discharge-opening in its bottom, a valve adapted to close said opening, the said valve having a threaded rod mounted to turn in a support and extending upward within the gasometer, and means carried by the gasometer-bell for engaging the valve-rod to turn the same, substantially as described.

10. An acetylene-generator, comprising a gasometer having a water-tank and a movable bell, a generating-chamber extending upward in said tank and having a sloping bottom terminating in a discharge-opening, a valve for closing said opening and provided with an upwardly-extending threaded valve-rod mounted to turn in a screw-threaded support, and a shaft mounted to turn in the movable bell of the gasometer and adapted to engage the upper end of said valve-rod to turn the same, substantially as described.

11. An acetylene-generating apparatus, comprising a rising and falling gasometer, the tank of the gasometer having a sloping bottom provided with a discharge-opening, a conical chamber within the tank and immersed in the water therein, said conical chamber forming a combined generating-chamber and condenser, a valve adapted to close the discharge-opening in the bottom of the tank and provided with a valve-rod extending upward through the conical chamber, and means for operating the said valve, substantially as described.

12. An acetylene-generating apparatus, comprising a rising and falling gasometer, the tank of the gasometer having a sloping bottom provided with a discharge-opening, a

conical chamber within the tank and immersed in the water therein, said conical chamber forming a combined generating-chamber and condenser separate from the gasometer, a gooseneck discharge-pipe extending from the generator and discharging beneath the water-level of the tank, a carbid-feed pipe extending from the generator through the wall of the gasometer, the outer end of said feed-pipe being below the top of the generator-cone and having a liquid seal formed therein, a valve adapted to close the discharge-opening in the bottom of the tank, and means carried by the bell of the gasometer whereby the valve may be operated, substantially as described.

13. A carbid-feeding device, comprising a carbid-holder having a pivoted bottom, a laterally-sliding catch for holding the bottom raised, a bar mounted to slide vertically, a trip-block carried by said bar and having a projecting finger adapted to engage said catch and move it laterally to release the bottom, and means for moving the said bar vertically, substantially as described.

14. A carbid-feeding device, comprising a series of superposed carbid-holders, each having a pivoted bottom, a catch for holding the bottom raised, a bar mounted to slide alongside of said holders, a trip-block thereon adapted to engage the catches to release them, and a step-by-step feeding device engaging said bar and actuated by the falling gasometer, substantially as described.

15. A carbid-feeding device, comprising a series of superposed carbid-holders, each having a pivoted bottom and a catch for holding the bottom raised, a toothed bar mounted to slide alongside the said holders, a trip-block carried thereby and adapted to engage the catches to release them, a detent engaging the bar to support it, a pawl or clutch adapted to engage the bar to raise it, and connections from said clutch to the gasometer-bell, substantially as described.

16. A carbid-feeding device, comprising a series of superposed carbid-holders each having a pivoted bottom, and a catch for holding the bottom raised, a smooth and a toothed bar connected together, and mounted to slide alongside the said holders, a trip-block carried by one of the bars and adapted to engage the catches to release them, a detent engaging the toothed bar to support it, a pawl or clutch adapted to embrace the smooth bar and to engage the toothed bar to raise them, and a cord passing over guide-pulleys and connecting said clutch with the gasometer-bell, substantially as described.

17. An acetylene-generating apparatus, comprising a gasometer having a water-tank, a generating-chamber extending upward from the bottom of said tank and surrounded by the water therein, a refuse-receiving chamber arranged to be removably attached to the bottom of the generating-chamber, the two having communicating openings, a support for said refuse-chamber, and chains connected with said support and with levers pivoted upon a fixed part of the apparatus, substantially as described.

18. An acetylene-generator, comprising a gasometer having a water-tank and a movable bell, a generating-chamber in said tank and having a discharge-opening in its bottom, a valve adapted to close said opening and provided with a rod extending upward within the gasometer, and a vertically-movable device carried by the gasometer-bell and adapted to engage the upper end of said valve-rod, whereby the valve may be operated, substantially as described.

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