No. 627,498. Patented June 27, 1899.

J. N. GOLDBACHER & E. BOURNONVILLE.

ACETYLENE GAS GENERATOR.

(Application filed Feb. 18, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

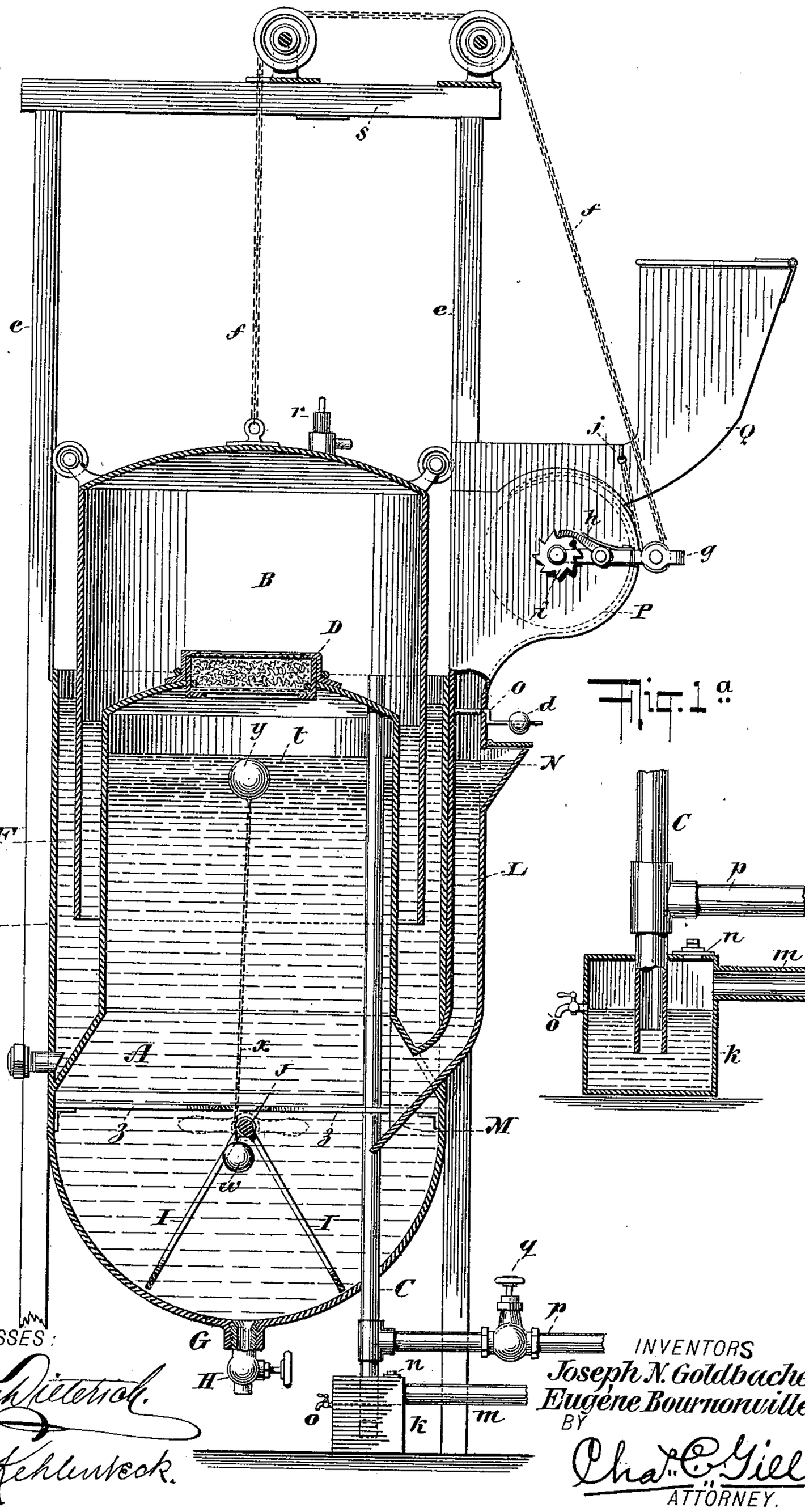

Fig. 1a.

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Fig. 2.

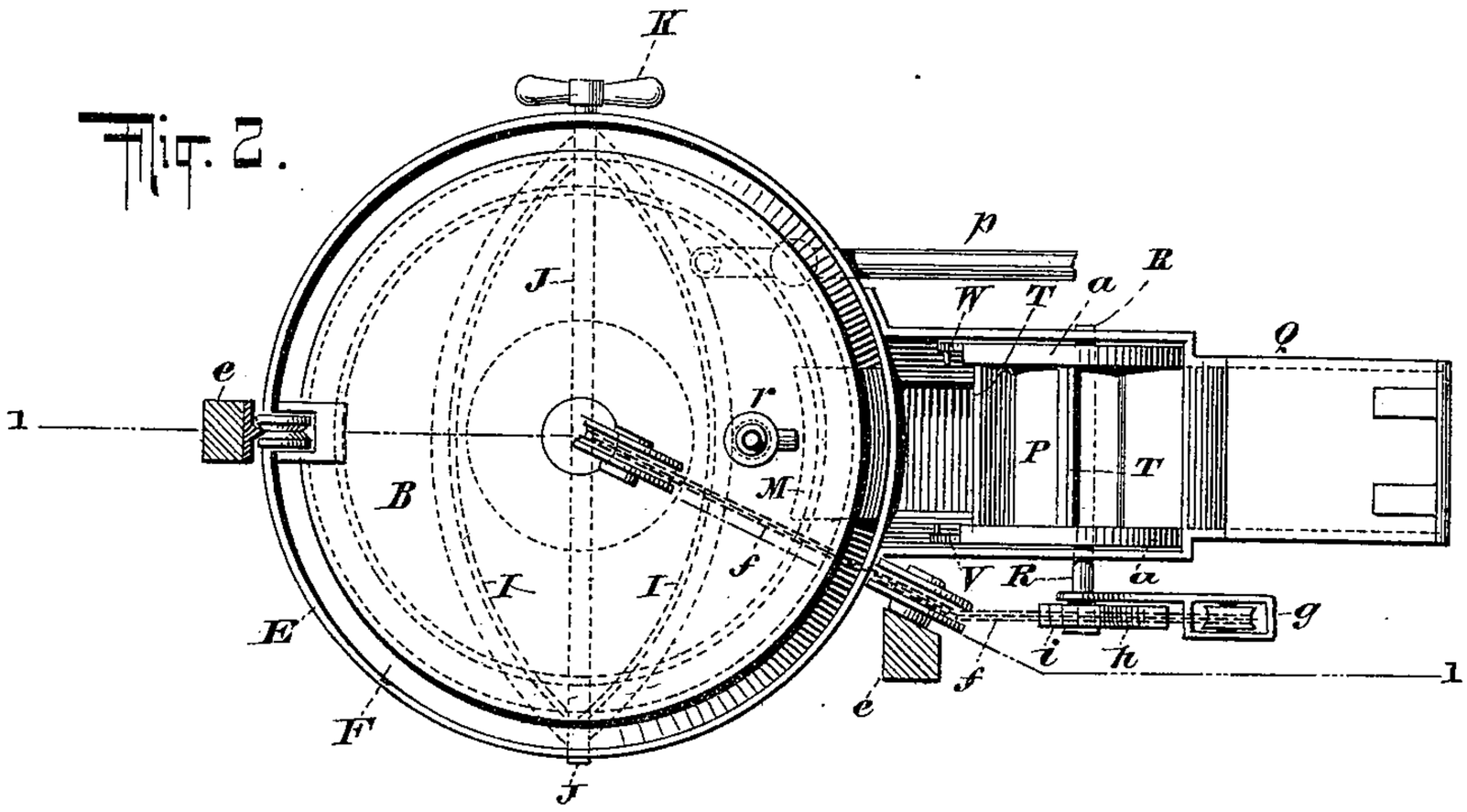


Fig. 3.

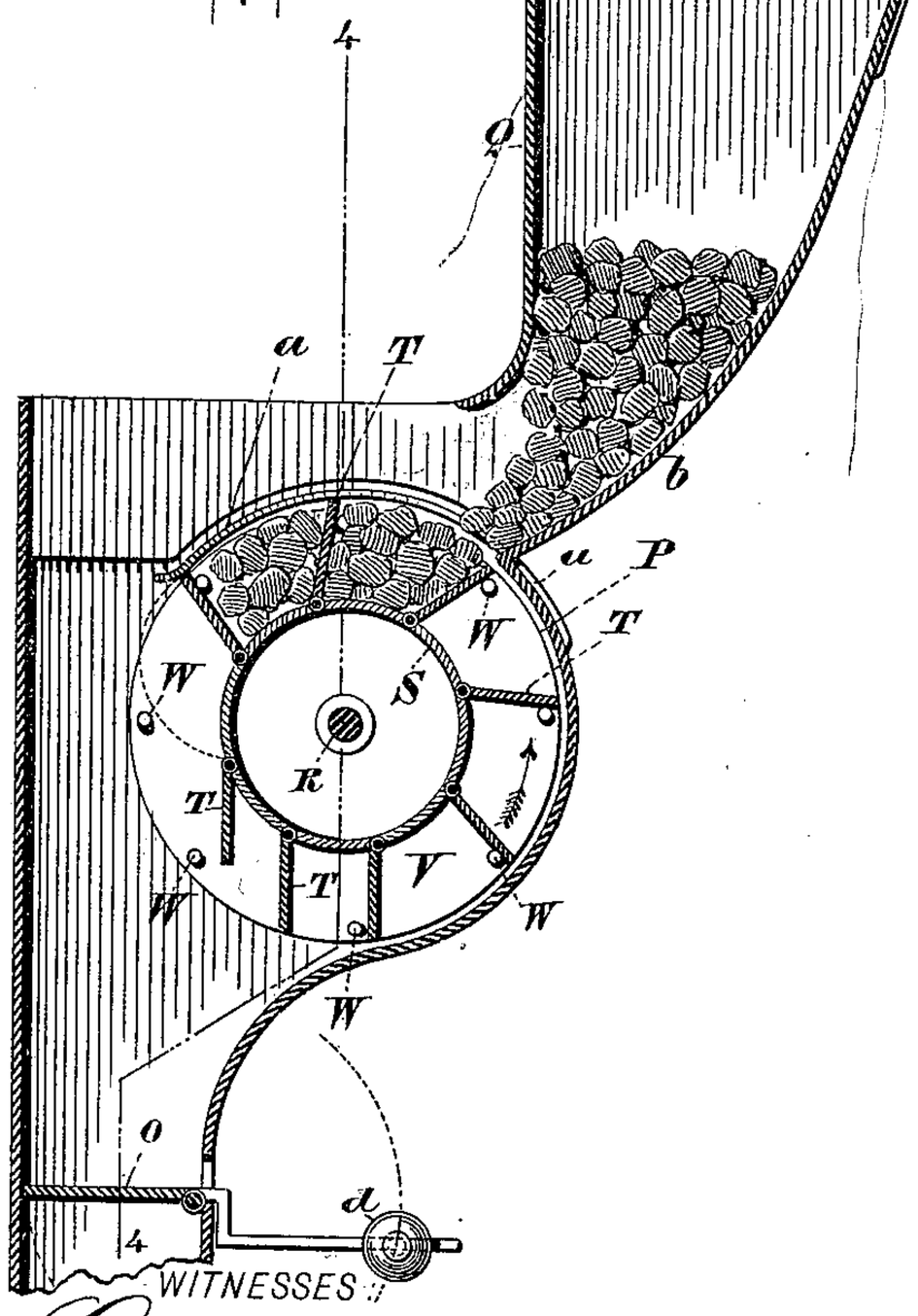
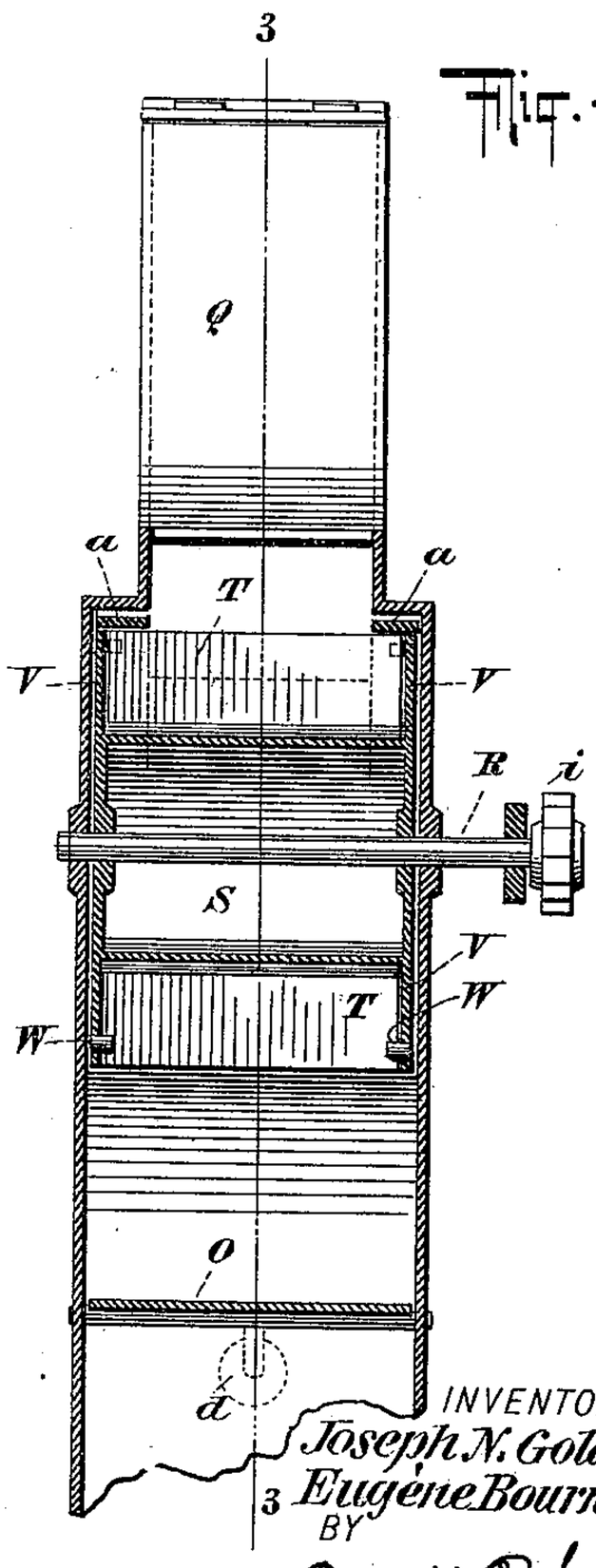


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH N. GOLDBACHER, OF NEW YORK, N. Y., AND EUGÈNE BOURNONVILLE, OF JERSEY CITY, NEW JERSEY.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 627,498, dated June 27, 1899.

Application filed February 18, 1898. Serial No. 670,747. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH N. GOLDBACHER, residing at New York, in the county and State of New York, and EUGÈNE BOURNONVILLE, residing at Jersey City, in the county of Hudson and State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Acetylene-Gas Apparatus, of which the following is a specification.

Our invention is presented in this application in an apparatus comprising a generator-tank containing water, a gasometer receiving the gas from said tank, means operable from the gasometer for feeding definite charges of the carbid to said tank, and an outlet-pipe for gas from the gasometer; and the purpose of our invention is to improve such apparatus as a whole and also in its details.

Our invention pertains more particularly to novel automatic means for feeding and delivering predetermined charges of the carbid directly into the lower portion of the generator-tank, to novel valve mechanism for controlling the outflow from the lower end of said tank, and to certain details; and the invention consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

Referring to the accompanying drawings, forming a part of this application, Figure 1 is a side elevation, partly in section, of an apparatus constructed in accordance with and embodying the invention, the section being on the dotted line 1 1 of Fig. 2. Fig. 1ª is an enlarged detached vertical section of the water seal connected with the lower end of the pipe for gas from the gasometer. Fig. 2 is a top view, partly in section, of the apparatus embodying the invention. Fig. 3 is an enlarged central vertical section through that portion of the apparatus by which the calcium carbid is fed to the tank, this section being on the dotted line 3 3 of Fig. 4; and Fig. 4 is a vertical transverse section of same on the dotted line 4 4 of Fig. 3.

In the drawings, A designates the tank, B the gasometer, and C the outlet-pipe for gas from said gasometer to the burners.

The tank A is adapted to contain a proper amount of water and is closed at its upper end, except at the box D, which is in the form of a filter, through which the gas arising from the tank A must pass on its way to the gasometer B. The filter-box D is not made the subject of the present application and will be of any suitable form and construction desired. It is preferred that the box D have upper and lower cloth surfaces, between which will be inclosed a layer of powdered charcoal and a layer of tannin, which preferably has been saturated with a solution of potash. The filter-box D is employed to arrest any impurities which may have passed upward with the gas generated in the tank A. The tank A above its lower portion is encompassed by the cylindrical shell E, between which and the vertical walls of the upper portion of the tank proper is formed a space to contain water, as shown, and to receive the lower walls of the gasometer B. The space between the shell E and tank proper constitutes ample provision for the formation of the water seal, which will prevent the gas within the gasometer B from descending below the latter, and in addition said space, which for convenience is lettered F, affords the proper facilities for the vertical movement of the gasometer. The lower end of the tank A is hemispherical or bowl-shaped in outline and at its lower end is provided with the outlet-nozzle G, to which is connected the valve H, the latter affording proper means for permitting the discharge from the tank A of the lime and water. The lower end of the tank A is given the special form illustrated for the purpose of increasing the capacity of the tank, of permitting the proper feeding of the calcium carbid to the tank, and of enabling the tank at its lower end to be readily cleansed by means of the semi-cylindrical scrapers I, which are secured to the rock-shaft J and may be oscillated back and forth over the bottom of the said tank by means of the handle K applied to one end of said rock-shaft.

At one side of the tank A is provided the feed-pipe L, which extends downward and is bell-shaped, as shown in Fig. 1, within the walls of the tank A, the lower portion M of the bell forming a chute which extends inward toward the center of the tank and away from the walls thereof in order that the gas

generated may be prevented from passing upward into the feed-pipe L and be caused to ascend through the water to the upper portion of the tank A and thence into the gasometer B. The lower portion M of the bell-shaped discharge at the lower end of the feed-pipe L constitutes a deflector to prevent the gas from entering the pipe L and also to direct the calcium carbid passing downward through said pipe into the middle portions of the tank A. The upper portion of the pipe L is provided with a filling-spout N, and above this spout N is a weighted valve O, above which are provided the feed-wheel P and hopper Q, the latter being adapted to contain the calcium carbid in bulk and to permit the automatic passage of the same to the wheel P, by which definite charges of the carbid are, as required, delivered to the feed-pipe L, by which they are directed into the tank A.

The feed-wheel P is mounted upon a shaft R and is formed with the central hub S and radial blades T, the latter forming between themselves compartments of predetermined size to receive from the hopper Q and deliver to the pipe L predetermined quantities or charges of the calcium carbid. The wheel P is operated by the gasometer, as will be hereinafter described, and the blades T of said wheel are hinged and located between disks V, carried by said hub T, and closing at their ends the compartments formed between the blades T. The blades T are hinged to the hub S, as indicated in Fig. 3, and said disks V carry the pins, lugs, or studs W, which during the rotation of said wheel P operate during their ascent to maintain the blades T rigid and to properly space said blades. At the descending side of the wheel P the studs W are unable to maintain the blades T, and hence during the rotation of the wheel P the said blades at said side, one after another, fall and permit the discharge of the calcium carbid into the lower end of the casing which incloses said wheel P and which at its lower end constitutes a chute leading directly into the feed-pipe L. Above the upper opposite edges of the feed-wheel are provided the spring-brakes *a*, which exert a spring tension upon the opposite edges of the blades T and prevent a too free rotation of the wheel P. The springs *a a* also serve to prevent the calcium carbid from wedging itself between the sides of the wheel P and the casing inclosing said wheel.

As illustrated in Fig. 4, the width of the hopper Q is slightly less at its base than the width of the casing inclosing the wheel P, and hence the springs *a a* are not in the path of the descending calcium carbid, but are slightly removed therefrom. The hopper Q is provided with a suitable lid or cover and with the curved neck *b*, which turns laterally toward the upper portion of the wheel P and discharges the calcium carbid at one side of the vertical center of said wheel, whereby practically at all times at least two of the compartments between the hinged blades T will be filled with the carbid, the next following compartment being filled from said neck *b* with each discharge of the first compartment at the descending side of the wheel P. The spring-brakes *a a* not only aid in preventing a too free rotation of the wheel P and in preventing the entrance of small particles of carbid between the sides of said wheel and its inclosing casing, but also prevent at the descending side of the wheel P the turning downward of the blades T until the latter have passed beyond the influence of said springs, and said blades will not pass beyond the influence of said springs except by the definite action of the gasometer B.

The valve O is provided below the feed-wheel P to catch any small particles of the carbid which might pass over the wheel P and to retain said particles until by a proper discharge of the said wheel enough of the calcium carbid has passed downward to constitute the proper feed for the tank A. The valve O is provided with a weight *d*, so that said valve will not open until the proper quantity of the carbid has fallen upon it and exerted sufficient force to overcome the weight *d* and turn the valve O into its open position. After the calcium carbid has passed beyond the valve O the weight *d* will automatically close said valve.

The gasometer B is guided in standards *e* in the usual manner and by means of a chain *f* is connected with the outer end of the weighted lever *g*, which is swiveled upon one end of the shaft R and carries a pawl *h*, which is in engagement with the ratchet-wheel *i*, rigidly secured upon the end of said shaft R. The chain *f* passes around a pulley carried by the lever *g* and thence is carried upward to a hook *j*, to which the end of the chain is secured. During any rising movement of the gasometer B the outer end of the chain *f* and the outer end of the lever *g* will descend of their own weight, preserving the chain taut, and at such time the pawl *h* will slide over the teeth of the ratchet-wheel *i* without in any manner affecting said ratchet-wheel or the parts connected therewith. The gasometer B only ascends when the gas enters the same from the tank A, and hence during the ascent of the gasometer B it is desirable that the feed-wheel P shall remain at rest. During the descent of the gasometer B, due to the consumption of the gas escaping through the outlet-pipe C, the outer portion of the chain *f* will be pulled upward by the weight of the gasometer B, applied at the inner end of the chain *f*, and will exert its force to move the outer end of the lever *g* upward, whereby the pawl *h* is brought into active engagement with the teeth of the ratchet-wheel *i* and will operate through said wheel and the shaft R to rotate the feed-wheel P in the direction of the arrow shown in Fig. 3, whereby one of the compartments between the blades T of

said feed-wheel will be moved to a sufficient extent to insure the discharge of its contents downward into the feed-pipe L and thence into the tank A, and thereupon the gas generated in said tank from said charge of carbid will ascend through the water in the tank and through the filter-box D into the gasometer B, which under the pressure of the gas thus generated will ascend and again lower the outer end of the chain *f* and lever *g*, as above explained. With each descent of the gasometer B one charge of calcium carbid is directed into the tank A, and with each ascent of the gasometer B the lever *g* is placed into a position in which it may, upon the next descent of the gasometer B, effect the discharge of another proportion of the carbid into the tank A.

In order to provide against any accident that might arise by reason of an undue pressure of the gas in the gasometer B, we conduct the lower end of the pipe C into the seal-box *k*, as more clearly illustrated in Fig. 1ª. The box *k* is provided with a gas-outlet pipe *m*, a filling-orifice for water *n*, and a valved overflow pipe or faucet *o*. The lower end of the pipe C is immersed within the water contained in the seal-box *k* and said water will enter and fill the lower end of said pipe. The pressure of the gas within the gasometer B and pipe C will under normal conditions create a higher water-level in the box *k* exterior to the pipe C than within said pipe C, as illustrated, and should any undue quantity of gas accumulate within the gasometer B the force of the same would displace the column of water from the lower end of the pipe C and the surplus of gas would pass downward from the lower end of said pipe C and bubble up through the water in the seal-box *k* and find its outlet through the pipe or discharge *m*. The pipe C above the seal-box *k* is provided with the branch pipe which forms, in effect, a continuation of the supply-pipe C and is provided with a suitable valve *q*. The water-seal box *k* is employed simply as a precautionary measure, since in view of the means we have provided for regulating the feed of the carbid to the tank A it will not be likely that at any time any undue quantity of the gas will pass from the tank A into the gasometer B. In the absence of the seal-box *k* any undue force within the gasometer B would press upon the water between the lower walls of the gasometer and the sides of the tank A and force the water within the space F upward and over the walls of the shell E, and thereby the pressure within the gasometer B would be relieved. It is preferred, however, for some reasons, to make use of the seal-box *k*, since the latter may be directly applied to the pipe C, leading from the gasometer. The seal-box *k* will receive its water through the orifice *n*, which will thereafter be closed by a suitable plug, and the valved pipe or faucet *o* will be located at the level desired for the water within the box *k*. While the water is being poured into the box *k* the faucet *o* will be left open, and when the water commences to flow through said faucet it will be an indication that a sufficient quantity of water has been poured into the box *k*, and thereupon the valve in the faucet or pipe *o* will be closed and the orifice *n* will be closed by its plug.

As an additional precaution against any accident which might arise from the accumulation of an undue pressure of gas within the gasometer B, we provide the upper end of the gasometer with a valve *r*, whose stem projects upward in position to pass into contact with the cross-beam *s* should at any time the gasometer, due to the extra pressure of gas therein, ascend above its normal height. Any undue quantity of gas within the gasometer B would cause the latter to ascend to the full limit of its movement, and hence under such conditions the stem of the valve *r* would strike the beam *s*, and thereby the valve *r* would be opened, so as to permit the discharge of the gas from the gasometer until by reason of the lessening of the pressure within the latter the gasometer passes downward a sufficient distance to relieve the stem of the valve *r* from the beam *s*, thereby permitting the valve *r* to automatically close and cut off any further escape of the gas.

The tank A will, as above explained, be suitably filled with water, and the latter will be supplied through the filling-nozzle N or in any other manner preferred. Upon the surface of the water in the tank A will preferably be provided a layer of oil *t*, through which the generated gas will be compelled to pass prior to entering the gasometer.

Within the tank A is suspended the ball-valve *w*, the latter being of greater specific gravity than the water and being connected by a chain *x* with a floating ball *y*, the latter being of greater specific gravity than the oil *t* and of less specific gravity than the water, whereby said ball *y* is caused to float substantially between the water and the oil. The chain *x* passes through an eye at the center of the horizontal bar *z*, and thereby said chain is kept in central position over the outlet-nozzle G, and the ball *w* may be directed to said outlet-nozzle for the purpose of closing the same after a sufficient quantity of water has passed from the tank A. The chain *x*, connecting the ball-valve *w* with the float-ball *y*, is preferably of predetermined length in order that during the outflow of water from the tank A the ball *w* may be caused to close the nozzle G before the water-level within the tank has passed below the bell-shaped discharge at the lower end of the feed-pipe L, so that said discharge may never be unintentionally uncovered and that no gas shall pass upward into said pipe L. It is of advantage to have the float-ball at the upper end of the chain *x*, since thereby said chain is kept substantially taut and is prevented from kinking or otherwise becoming disarranged. If at any

time it should be desired to withdraw all of the water and oil from the tank A, it may be necessary to keep the ball *w* from sealing the outlet orifice or nozzle G, and this may be readily accomplished by inserting a stick or rod upward through the valve H, so as to move the ball *w* laterally from over said nozzle G. It is ordinarily desired, however, not to empty the tank A of all of the water and oil, and hence it will not usually be necessary to adopt any means for moving the ball *w* from over the nozzle G.

The carbid to be supplied to the generator-tank A is, as above explained, placed within the hopper Q, and thereupon during each descending motion of the gasometer B the chain *f* and lever *g* will actuate the feed-wheel P a definite distance sufficient to cause the latter to discharge the contents of one of its compartments into the feed-pipe L, whence it will pass to the generator-tank A. The introduction of the calcium carbid into the water in the tank A will result in the generation of gas in the usual manner, which gas will ascend through the water and the layer of oil thereon and thence pass through the filter-chamber D and enter the gasometer B. As above explained, the weighted valve O will catch any small particles of calcium carbid which may fall from the wheel P at times other than during the discharge from said wheel of the full contents of one of its compartments, and thus there will be no constant fall of calcium carbid, either in the shape of dust or otherwise, downward through the feed-pipe L. Upon the falling of the calcium carbid into the water contained within the tank A the generated gas will be prevented from passing upward into the pipe L by reason of the lower deflecting-blade M extending inward from the lower end of said pipe L and serving to deflect the calcium carbid inward toward the central portion of the tank L and also to prevent the ascending gas from passing into the pipe L. Upon any undue pressure of gas being generated and entering the gasometer B the excess of pressure may find its outlet in the seal-box *k*, as above described, and also when necessary through the valve *r*, applied to the upper end of the gasometer B. The valve *r* will, however, only act upon the full upward ascent of the gasometer B sufficient to cause the stem of said valve to contact with the cross-beam *s*.

The lower end of the generator-tank A is hemispherical or bowl-shaped in outline, and when thus constructed very great advantages are obtained in that the capacity of the tank is increased and the lower end of the tank is specially adapted not only to hold the lime resulting from the calcium carbid, but to so retain the lime that it will not interfere with the proper discharge from the lower end of the pipe L nor accumulate in such manner as to create the liability of the gas ascending through the pipe L. The lower end of the tank A of the form shown is also of great importance in this art in that by reason thereof we are enabled to use the hemispherical scraper-blades I, which may move back and forth over the inner surfaces of the bottom of the tank and dislodge the lime and other products therefrom. In the drawing off of the lime and other impurities from the tank A the valve H will be open and the water will be permitted to flow outward through the nozzle G for the purpose of carrying away the lime and other impurities from the tank; but unless otherwise desired all of the water will not flow from the tank A, since after a certain quantity of the same has escaped the ball *w* will seat itself over the nozzle G, and thus check the further flow of the water. The checking of the flow of the water in this manner serves to prevent the water from uncovering the lower end of the feed-pipe L, and hence the tank A may be cleansed at any time without danger of the generated gas escaping into the pipe L.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, the generator-tank containing the water, and the vertically-movable gasometer to receive the gas from said tank, combined with the feed-wheel mounted upon a horizontal shaft and having hinged blades forming a series of compartments to contain charges of the carbid, means for maintaining said blades in substantially rigid position to form said compartments, automatic means for rotating said wheel, and means for releasing said blades upon their arrival at a certain point in order that the charges of carbid held thereby may be fed to the generator-tank; substantially as set forth.

2. In apparatus of the character described, the generator-tank containing the water, and the vertically-movable gasometer to receive the gas from said tank, combined with the feed-wheel mounted upon a horizontal shaft and having the hinged blades forming compartments between them, means intermediate said wheel and said gasometer for revolving the latter from the former, and means for releasing said blades upon their arrival at a definite point to effect the discharge of the carbid held by them to the generator-tank; substantially as set forth.

3. In apparatus of the character described, the generator-tank containing the water, and the vertically-movable gasometer to receive the gas from said tank, combined with the feed-wheel having the hinged blades forming compartments for the carbid, the hopper supplying said wheel, means for releasing said blades as they arrive at a definite point so as to effect the discharge of the carbid to said tank, means restraining said wheel against undue freedom of rotation, and means intermediate said wheel and said gasometer whereby upon the descent of the latter said wheel

will turn to discharge the contents of one of its compartments to the generator-tank; substantially as set forth.

4. In the apparatus of the character described, the generator-tank containing the water, and the gasometer to receive gas from said tank, combined with the feed-wheel having the series of blades and mounted upon the horizontal shaft, the spring-brakes *a*, *a*, bearing upon the edges of said blades, the hopper for supplying said wheel with the carbid, and means intermediate said wheel and said gasometer for actuating the wheel from the gasometer; substantially as set forth.

5. In apparatus of the character described, the generator-tank containing the water and having the carbid-feed pipe L which enters said tank below the water-level therein, and the gasometer to receive the gas from said tank, combined with the discharge-nozzle from the lower end of said tank, the valve *w* for said discharge-nozzle, and the float connected with said valve but separated a predetermined distance therefrom with relation to the lower end of said feed-pipe L, whereby during the drawing off of the water and deposit from said tank said valve will close said discharge-nozzle before the water is enabled to uncover the lower end of said feed-pipe and thereby prevent the gas from ascending through said feed-pipe; substantially as set forth.

6. In apparatus of the character described, the generator-tank having the outlet-nozzle at its lower end, the feed-pipe L which enters said tank below the water-level therein, and the gasometer to receive the gas from said tank, combined with the valve *w* within said tank for closing said outlet-nozzle, the float within said tank, the chain connecting said float and valve, and means for guiding said chain directly over said outlet, said chain being of such predetermined length with relation to the lower end of said feed-pipe that during the drawing off of the water and deposit from said tank said valve will close said outlet-nozzle before the water is enabled to uncover the lower end of said feed-pipe, whereby the gas is prevented from ascending through said feed-pipe; substantially as set forth.

7. In apparatus of the character described, the generator-tank, and the vertically-movable gasometer to receive the gas from said tank, combined with the revoluble feed-wheel for feeding charges of the carbid to said tank, and means intermediate said wheel and gasometer whereby the latter may operate said wheel, said wheel comprising the sides, hub, hinged blades and fingers for maintaining said blades at the ascending side of said wheel; substantially as set forth.

8. In apparatus of the character described, the generator-tank, the vertically-movable gasometer to receive the gas from said tank, the revoluble feed-wheel for feeding charges of the carbid to said tank, and means intermediate said wheel and gasometer whereby the latter may operate said wheel, said wheel comprising the hinged blades and means for maintaining said blades at the ascending side of the wheel, combined with means for maintaining said blades at the descending side of the wheel until they have arrived at the proper point to discharge the carbid; substantially as set forth.

Signed at New York, in the county and State of New York, this 17th day of February, 1898.

JOSEPH N. GOLDBACHER.
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Witnesses:
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