No. 692,614. Patented Feb. 4, 1902.

C. W. CALDWELL.

ACETYLENE GAS GENERATOR.

(Application filed Sept. 27, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

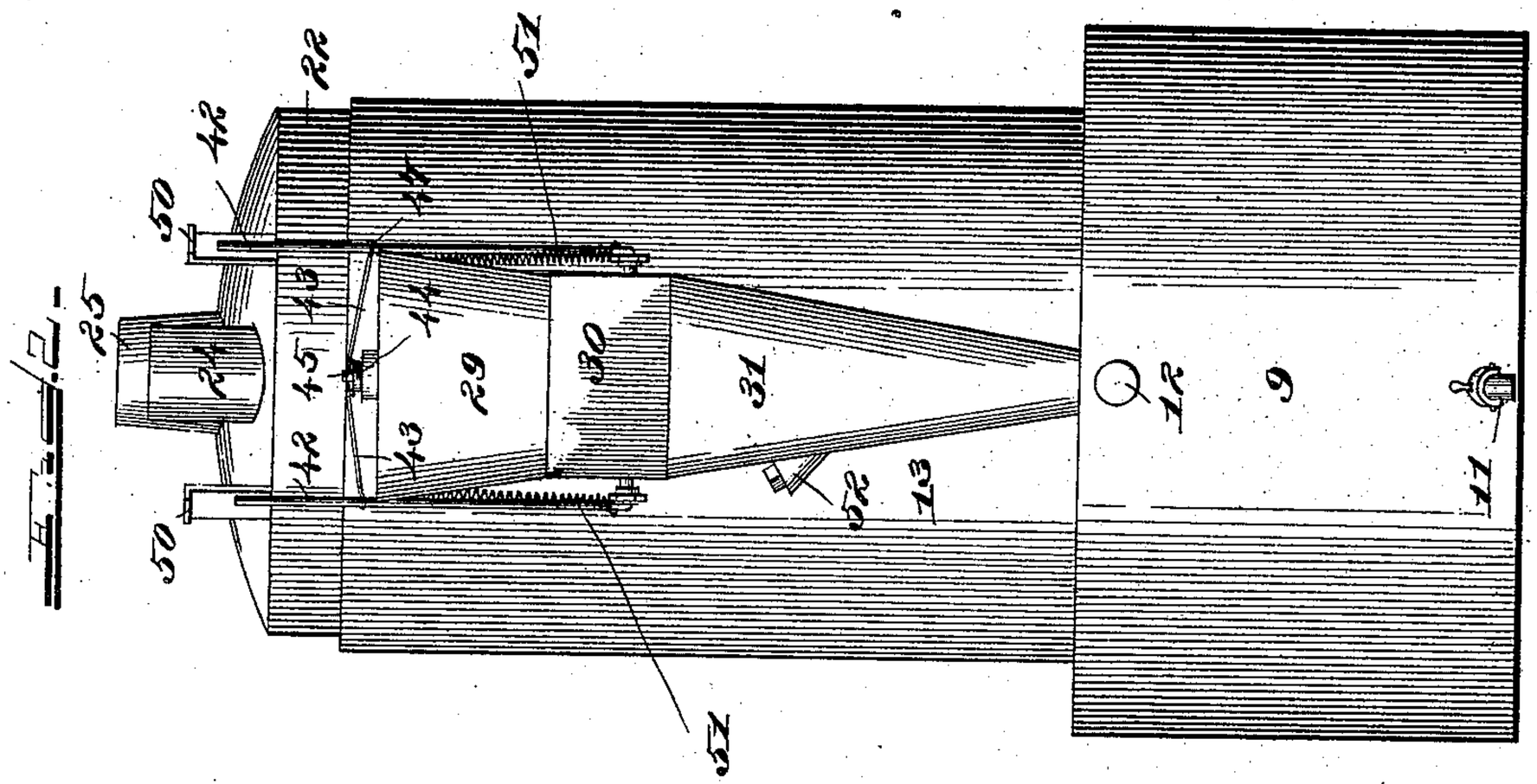
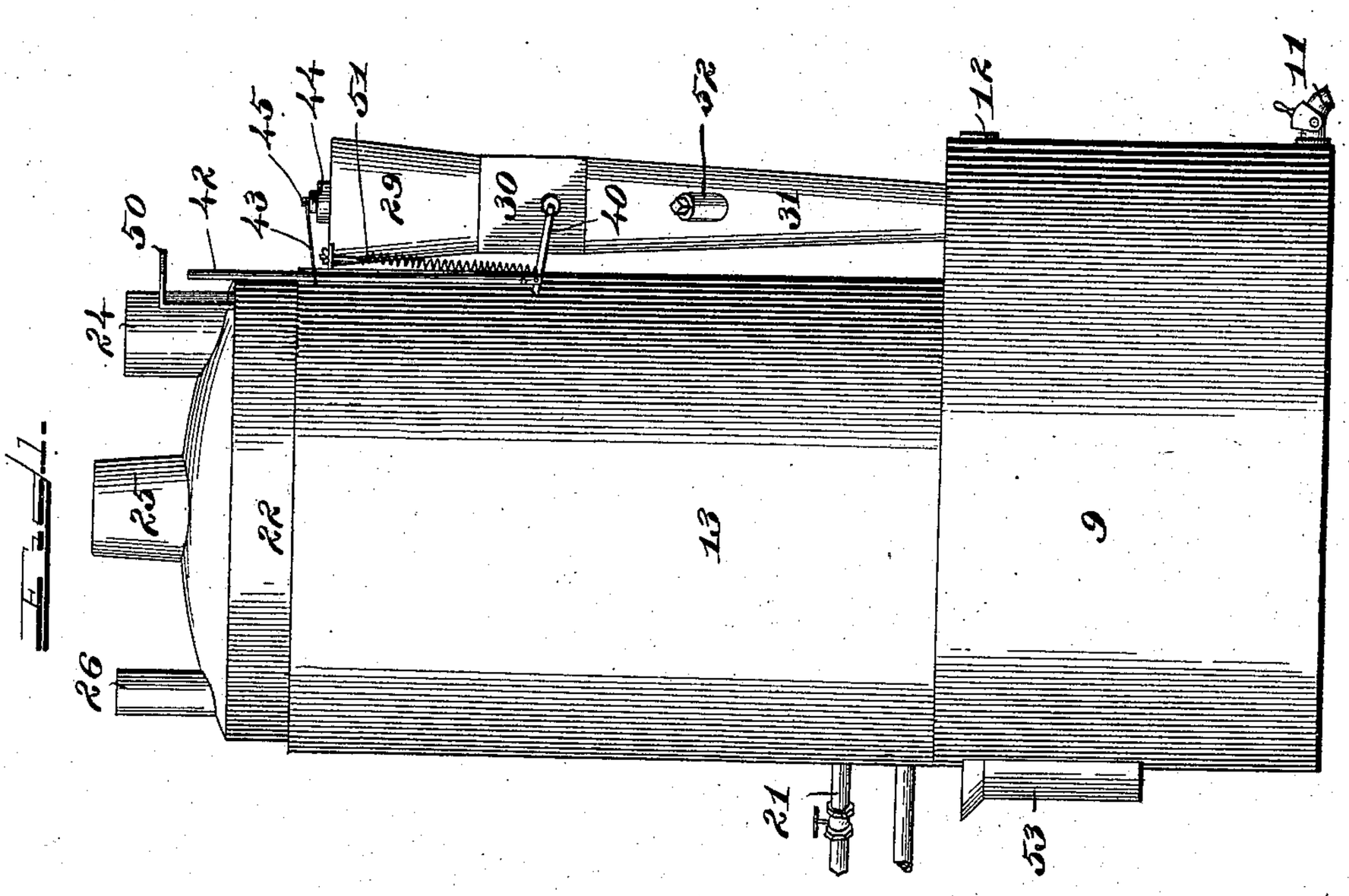


Fig. 1.



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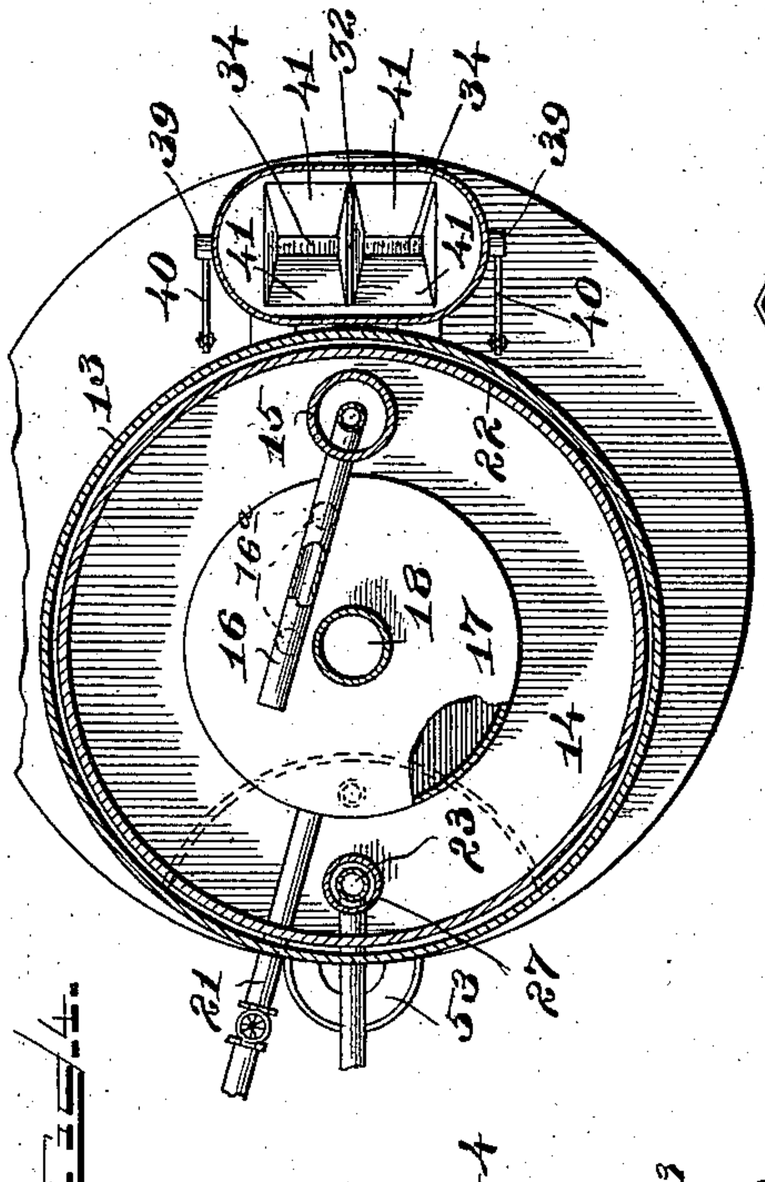

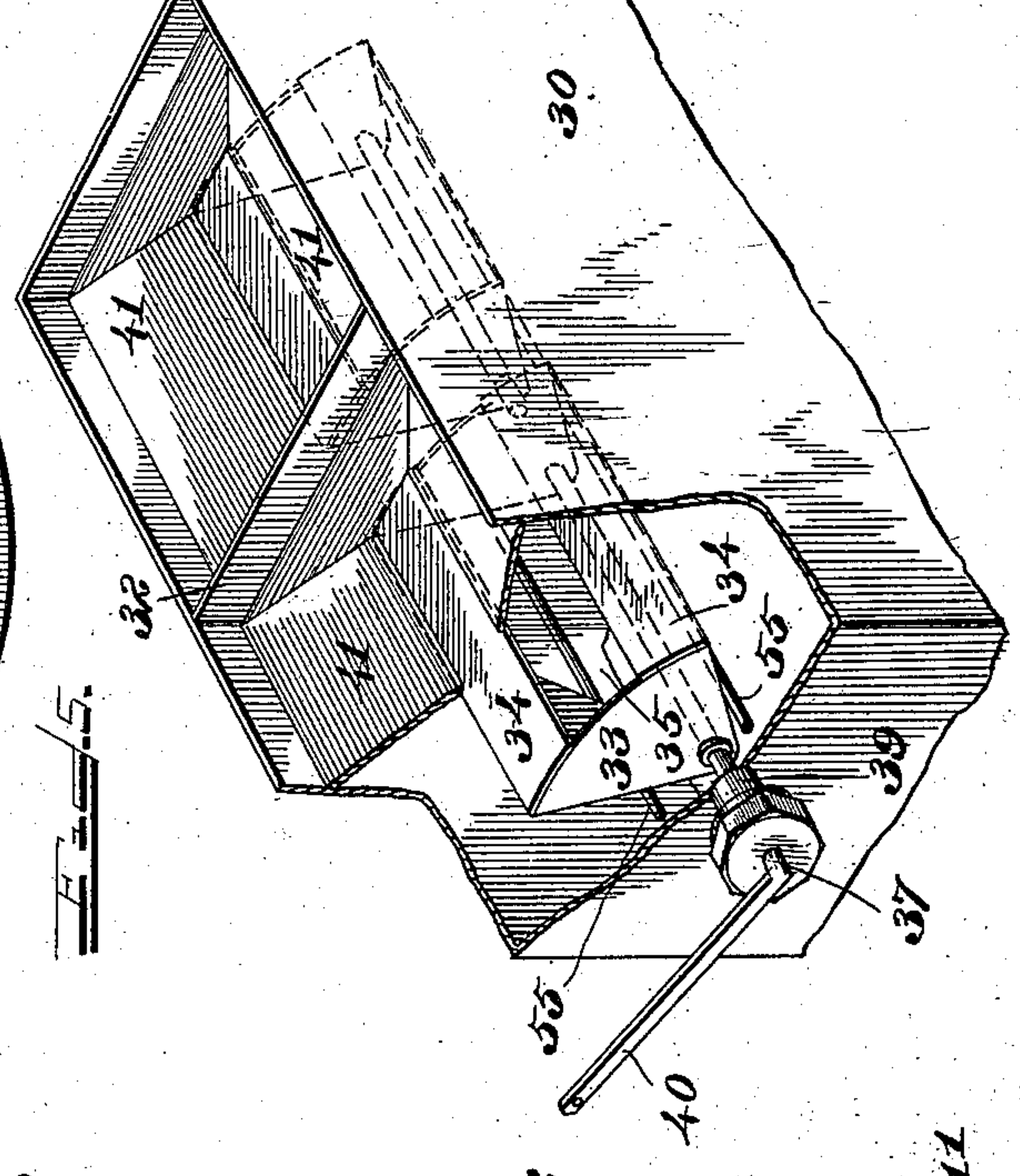

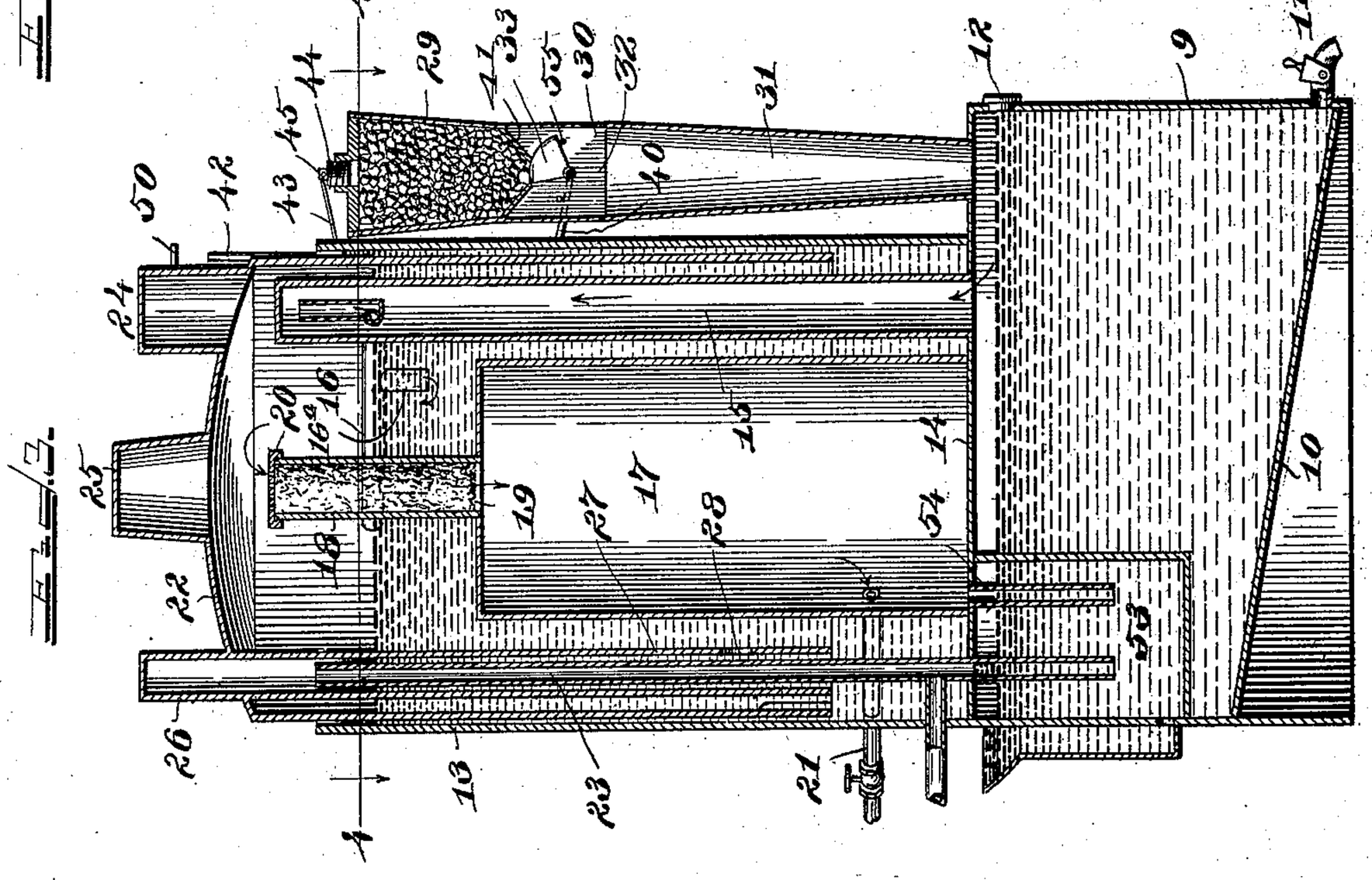

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(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

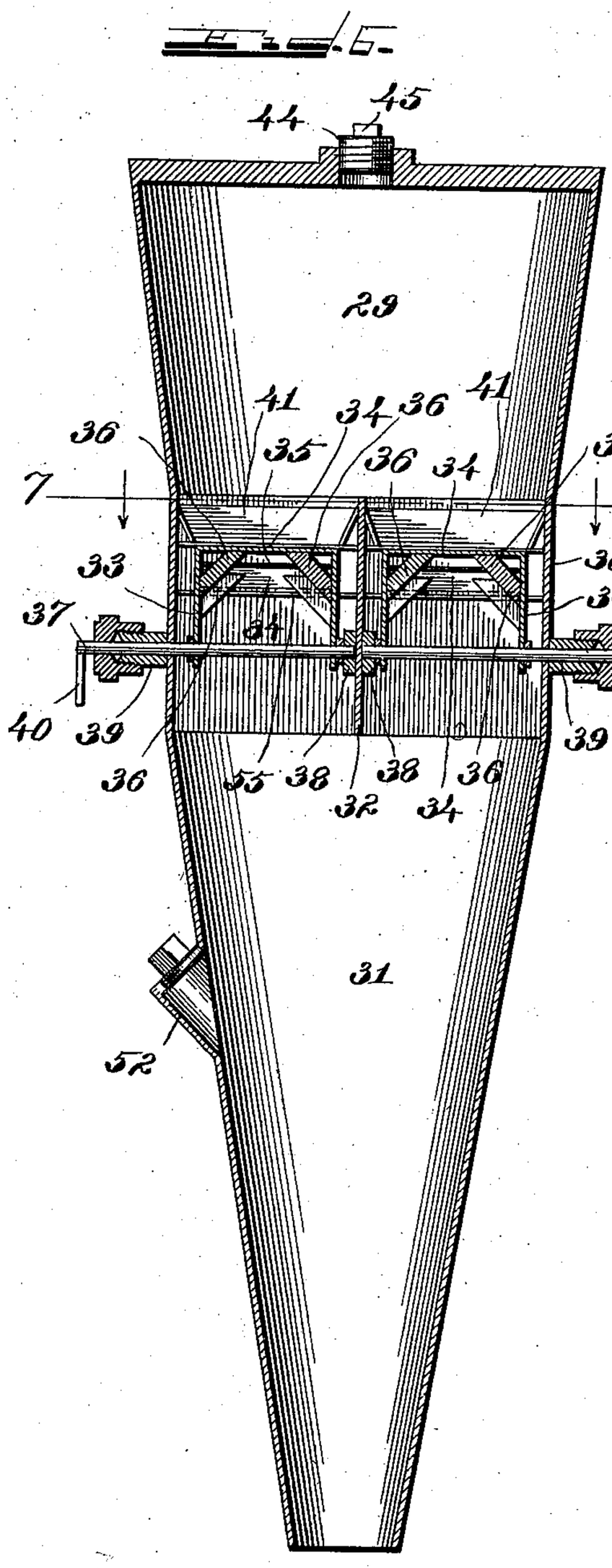


Fig. 7.

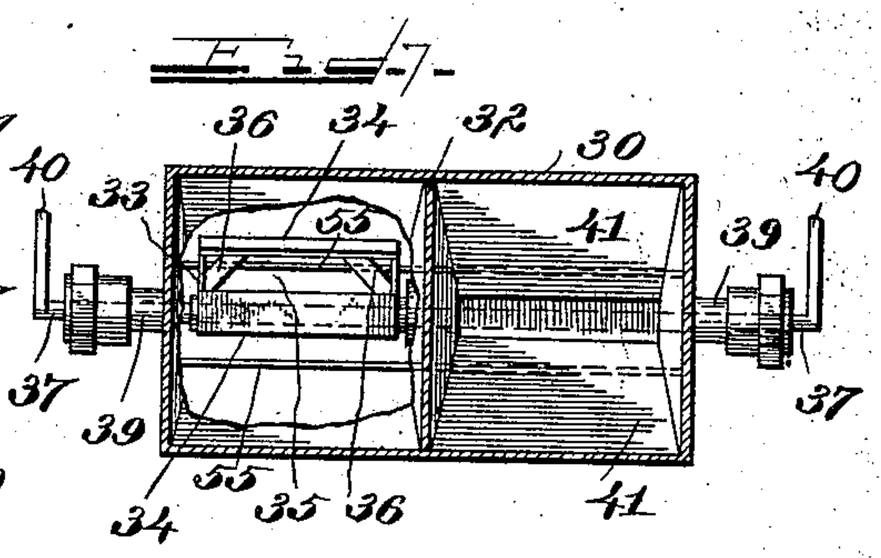
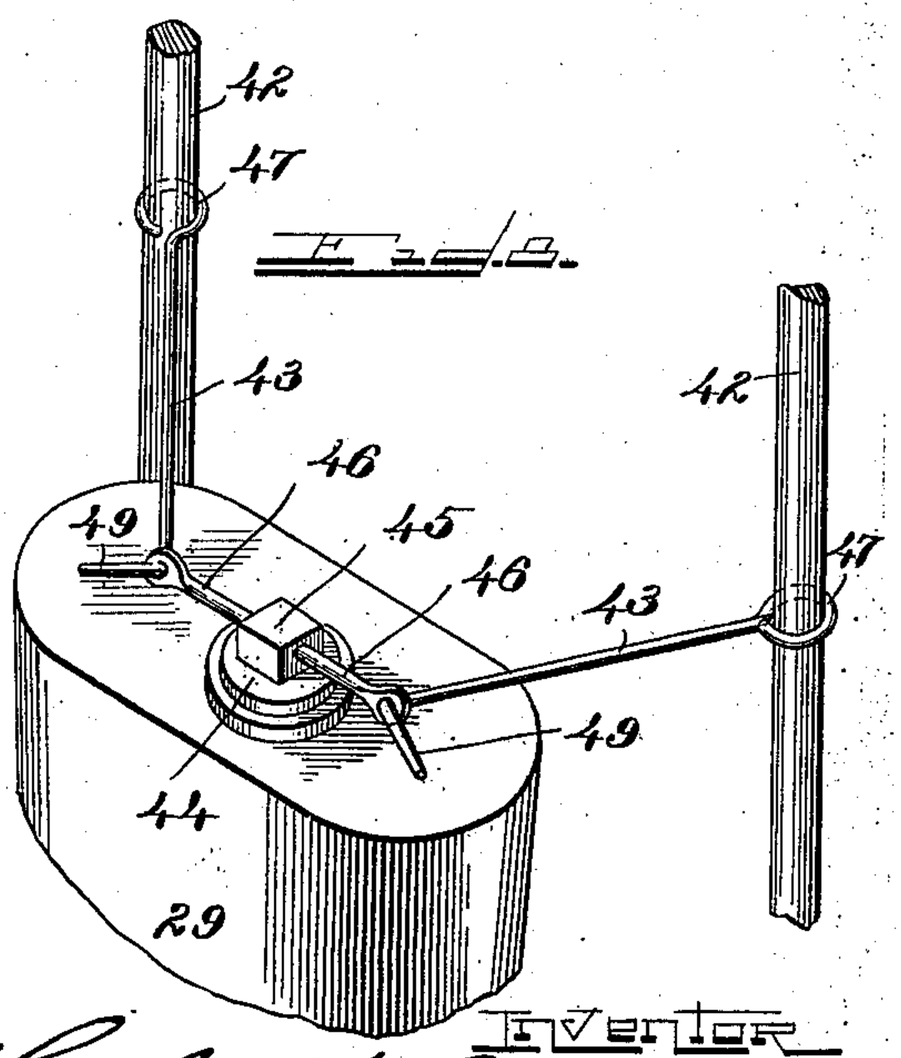


Fig. 8.



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UNITED STATES PATENT OFFICE.

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ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 692,614, dated February 4, 1902.

Application filed September 27, 1900. Serial No. 31,309. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. CALDWELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in acetylene-gas generators of the type wherein calcium carbid is deposited in small quantities from time to time in a water-reservoir.

It has for its objects to provide an improved valve for controlling the discharge of carbid from its holder to the water-reservoir, to provide means for rendering the machine inoperative until the cap or cover of the carbid-holder is secured in position, and to improve generally the construction and operation of the machine as a whole. I accomplish these objects by the devices and combinations of devices shown in the drawings and hereinafter specifically described.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a rear elevation. Fig. 3 is a central vertical section. Fig. 4 is a cross-section at line 4 4 of Fig. 3. Fig. 5 is a perspective view of the pair of valves in the carbid-holder. Fig. 6 is a detail, being an enlarged vertical section through the carbid-holder and its valves. Fig. 7 is a horizontal section at line 7 7 of Fig. 6, a portion of the wall of the carbid-holder being broken away to better illustrate one of the valves; and Fig. 8 is a detail, being a perspective view of the top of the carbid-holder and its cap or cover and the supporting devices attached to said cap or cover by which the vertical operating-rods are maintained in position to be operated upon by the bell or movable portion of the gas-holder.

Referring to such drawings, 9 indicates a water-reservoir, preferably cylindrical in shape and provided with an inclined bottom 10 in order that the refuse from the used carbid may be directed thereby to one side of the reservoir and be the more readily drawn off or taken out through an opening in the side. As shown, an ordinary cock 11 is inserted through the wall of such reservoir opposite the lower end of such inclined bottom, through which cock the water and refuse matter may be drawn off. An opening is provided near the upper end of the reservoir, through which the height of the water in the reservoir can be at any time ascertained. This sight-opening is to be closed by a cap 12.

13 indicates a shell or casing, preferably of cylindrical shape, open at its top, and its bottom formed of a plate 14, that also forms the top of the water-reservoir 9. This shell or casing is adapted and intended to be filled with water to a short distance from its top, as indicated in Fig. 3.

15 indicates a tube secured to the division-plate 14 around an opening in such plate and closed at its upper end.

16 indicates a short section of pipe communicating with and entering the tube 15 at a point about opposite the normal water-level in the shell or casing 13. As shown, the end of the pipe 16 that enters the tube 15 is open and is upturned to bring it near the top of such tube. The other end of the pipe 16 is closed. Such pipe is provided with one or more short open nipples 16^a, projecting into the body of water in the shell or casing 13.

17 indicates a gas holding and cooling chamber secured to the division-plate in such position that it will be located approximately in the center of the said shell or casing. At the upper end of said chamber 17 is secured a filtering-tube 18, adapted to be filled with any suitable gas-filtering material, which is held in such tube upon a grate or netting 19, the tube being closed at its upper end by a suitable perforated cover 20.

21 indicates a service-pipe communicating at any suitable point with the chamber 17 and through which gas in such chamber may be drawn for consumption.

22 indicates the bell or movable part of the gas-holder. It is open at its lower end, as usual, and of a size and shape to adapt it to fit within the shell or casing 13 and be freely movable up and down therein. It is provided on its upper end with hollow projections adapted to fit, respectively, over the tubes 15 and 18 and over the projecting upper end

of the pipe 23, through which gas is discharged to the atmosphere when more is generated than the machine can hold. These projections are respectively indicated by the reference-numerals 24, 25, and 26. Immediately below the projection 26 and formed with it, if desired, extends a tube 27, that surrounds the safety blow-off pipe 23, as shown. In it near its lower end is a hole 28, which allows of the escape of gas through said pipe 23 when said tube 27 is raised sufficiently to bring the hole above the surface of the water in the shell or casing 13.

29 indicates the carbid-holder. 30 indicates the valve-case, and 31 the discharge-tube. These parts are located at the side of the shell or casing 13 and are supported upon a projecting portion of the water-reservoir 9, with which reservoir the discharge-tube communicates through an opening in the division-plate 14. The valve-case 30 is divided into two compartments by a central wall 32, and in each compartment is located a rocking valve consisting of two end pieces 33, the upper edges of which are curved, and two cross-pieces 34, extending from end piece to end piece and curved in the direction of its width, so as to conform to the curvature of the edges of said end pieces. The cross-pieces 34 of each valve are so secured to the end pieces 33 as to leave an opening 35 between them for the passage of carbid from the holder 29 to the discharge-tube 31.

36 indicates braces for the cross-pieces 34, such braces being secured to the inner faces of the end pieces and the under faces of the cross-pieces.

37 indicates shafts, each journaled at its inner end in a suitable bearing 38, secured to the wall 32, and having its other end projected through the side of the valve-case 30 and through a suitable bearing-block 39, secured to such valve-case.

40 indicates cranks formed with or secured to the projecting ends of the shafts 37. To each shaft is rigidly secured in any appropriate manner one of the valves 33 34, so that upon the shafts being turned the valves will turn also. As shown, just above each valve and at each side of the valve-case are located two inclined pieces 41, with a space between them, which space is adapted to be bridged by one of the cross-pieces 34 of the valve, and when so bridged the carbid in the holder 29 is prevented from passing to the discharge-tube 31.

55 indicates limit-stops for the valves, which in the construction shown are wires extending from side to side of the two compartments of the valve-case.

42 indicates rods, each pivoted at its lower end to one of the cranks 40 and held in a vertical position by a link 43, that is detachably secured to the cap or cover 44, that closes the filling-opening in the top of the carbid-holder 29. In the form of construction shown this cap or cover has thereon a head 45, from opposite sides of which project two arms 46, in the end of each of which is an eye adapted to receive the hook end 49 of one of the links 43, the opposite end of such link being formed with a loop 47, that embraces one of the rods 42. Before unscrewing the cap or cover 44 the links 43 must be disengaged therefrom, which is accomplished by disengaging the hooked ends 49 from the eyes in the arms 46. The rods 42, having no other support than their respective pivots at their lower ends, will of course fall over, and as the machine cannot operate unless such rods are properly secured in their upright position it follows that no harm can be done if after filling the carbid-holder 29 the user omits to so secure them or to place the cap or cover 44 in place. Much damage might be done by escaping gas if the machine were organized so as to operate when the said cap or cover was not screwed down in place; but all danger of this is obviated by my construction, which compels the user to fasten the rods 42 in place to be operated by the descending bell 22, and this fastening can only be done when the cap or cover of the carbid-holder is first secured in place. The rods 42 require but slight resistance to prevent them from falling from the vertical position, so that while they are free to fall over when unsupported by the links 43, as described, the frictional resistance afforded at their points of pivotal connection with the cranks 40 and by the engagement of the links 43 in the eyes of the arms 46 is sufficient to securely maintain them in the upright position. These rods 42 are of slightly-different lengths. (See Fig. 2.)

50 indicates contact-pieces secured to the bell 22 in position to strike the upper ends of the rods 42.

51 indicates coiled springs, each attached at one end to one of the cranks 40 and at the other end to an ear on the carbid-holder 29.

52 indicates a spout in the side of the discharge-tube 31, through which water is to be poured for the purpose of filling the reservoir 9, such spout being suitably closed when not in use. By locating the filling-opening in the discharge-tube such tube is of course washed out at each filling operation.

53 indicates a condensation-chamber located at one side of the water-reservoir 9 and having a portion projecting outside of such reservoir to adapt it to be filled with water from the outside. Into it projects a short section of pipe 54 from the gas holding and cooling chamber 17, and all condensation accumulating in such chamber 17 and such as drips back from the service-pipe is conducted away by said section of pipe 54.

In operation with the parts adjusted in position one of the shafts 37 is to be slightly rocked by pressing down on its crank 40, which will open the valve connected thereto, allowing carbid to pass to the water in the reservoir 9, whereupon gas will be immediately evolved and rise through the large tube

15, passing therefrom into the pipe 16 and out beneath the surface of the water through the nipples attached to said pipe. From the water the gas rises and presses against the end of the bell 22 and also enters the chamber 17 through the filtering material in the tube 18. The pressure of the gas so generated forces the bell 22 upward, and thereafter the action of the machine in the feeding of carbid to the reservoir 9 is automatic, for, as will be readily understood, as the gas is drawn off for consumption the bell will gradually descend, and in descending one of the contact-pieces 50, carried by the bell, will strike the longer of the rods 42 and force it down, causing the shaft 37, to which it is connected through the crank 40, to turn and turning the valve on such shaft so as to bring the portion of the opening 35 that is between the two cross-pieces 34 below the opening in the bottom of the carbid-holder. This allows carbid to escape to the water in the reservoir 9, and gas will be evolved and rise and immediately cause the bell to rise, whereupon the valve will be instantly closed by its spring 51. Only one of the valves 33 34 will ordinarily be used, as under ordinary circumstances the carbid escaping into the water in the reservoir 9 by the partial opening of one valve—viz., that which the longer rod actuates—will generate sufficient gas to raise the bell before the contact 50 for the shorter rod 42 has reached and forced down such shorter rod; but in cases where the supply of carbid in one compartment is not sufficient the other valve will then be brought into action, or in case of one valve becoming clogged or damaged the other will then operate. Each of said valves is provided with two cross-pieces 34, (which are each of the same size and shape and each equally adapted to prevent the escape of carbid,) so that in case of the breaking or disengagement of the spring 51 the opening between the two inclined pieces 41 will not be left uncovered, so that the carbid in the holder may pass through, for, owing to the weight of the crank and its attached rod 42, the valve in such an event will of course be turned, and by having two of such cross-pieces 34 one of them will be brought into position to prevent the passage of the carbid when the turning of the shaft and its valve is stopped by one of the cross-wires 55, as will be readily understood by reference to the drawings, and particularly to Fig. 5. By the provision of two valves and the providing of two of the described cross-pieces for each valve any danger of the machine becoming inoperative or permitting the carbid to be wastefully fed, with disastrous results from the sudden formation of too much gas, is overcome.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a carbid-holder divided at its lower end into two compartments, of a valve in each compartment, each of said valves comprising two cross-pieces with a space between them, and each of said cross-pieces being adapted to prevent the discharge of carbid from the holder, a separate pivotal support for each valve, means for rocking one only of said valves to permit the discharge of carbid through the space between the two cross-pieces of the valve while the other valve remains stationary, means for normally holding one of said cross-pieces of the said operating-valve in position to prevent the discharge of carbid, means for throwing and holding the other cross-piece of said operating-valve into position to prevent the discharge of carbid in case of accident to the means through which said operating-valve is moved, and means for thereafter operating the other of the two valves only, substantially as specified.

2. In an acetylene-gas generator, the combination with a casing open at its upper end and adapted to contain water, a bell movable therein, a water-reservoir communicating with said casing and adapted to contain water, a carbid-holder communicating with said reservoir, a valve in said holder, an operating-rod pivotally connected with said valve, means for moving said rod through the downward movement of the said bell, a cap or cover for the carbid-holder, and a supporting connection for said rod, extended to said cap or cover and removably secured thereto, whereby upon its disengagement from the cap or cover in order to permit said cap or cover to be removed, the said rod will turn upon its pivotal connection out of position to be operated upon by the bell, substantially as and for the purpose specified.

3. In an acetylene-gas generator, the combination with a casing open at its upper end and adapted to contain water, a bell movable therein, a water-reservoir communicating with said casing and adapted to contain water, a carbid-holder communicating with said reservoir, a valve in said holder, a rock-shaft secured to said valve and suitably journaled in said holder and projecting at one end therethrough, a crank on said projecting end, a rod pivoted to said crank, means for moving said rod through the downward movement of the said bell, a cap or cover for the carbid-holder, and a supporting connection for said rod, extended to said cap or cover and removably secured thereto, whereby upon its disengagement from the cap or cover in order to permit said cap or cover to be removed, the said rod will turn upon its pivotal connection out of position to be operated upon by the bell, substantially as and for the purpose specified.

4. In an acetylene-gas generator, the combination with a casing open at its upper end and adapted to contain water, a bell movable therein, a water-reservoir communicating with said casing and adapted to contain water, a carbid-holder communicating with said reservoir, a valve in said holder, an operating-

rod pivotally connected with said valve, means for moving said rod through the downward movement of the said bell, a cap or cover for the carbid-holder, an engaging device carried by said cap or cover and adapted to receive a hook, and a link attached at one end to said pivoted rod and having a hook at the other end adapted to be connected to said engaging device on the cap or cover, substantially as and for the purpose specified.

5. The combination with a carbid-holder open at its lower end, of a valve comprising two curved concentric cross-pieces with a space between them, each of said curved concentric cross-pieces being arranged in juxtaposition to the open lower end of the carbid-holder and adapted to close such open lower end, a pivotal support for said valve located below the valve, means for rocking said valve on its pivotal support, and a stop on each side of the valve to limit the movement of the valve in either direction so as to insure the said open lower end of the carbid-holder being closed by one or the other of said curved concentric cross-pieces in case of accident and thereby prevent the discharge of any carbid from the holder, substantially as and for the purpose specified.

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