No. 699,332. Patented May 6, 1902.

# D. N. LONG.

## ACETYLENE GAS GENERATOR.

(Application filed Oct. 9, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

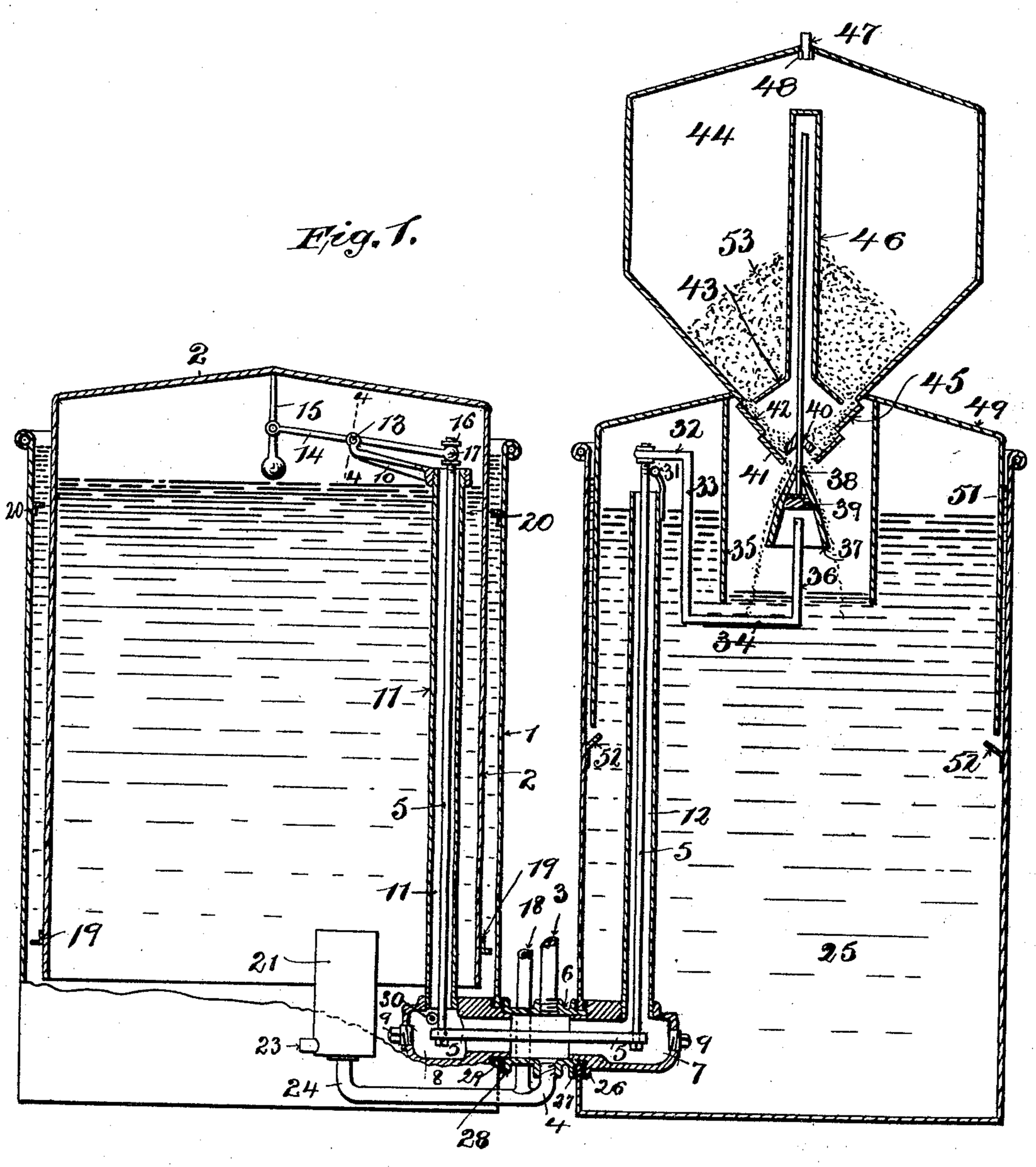


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Fig. 2.

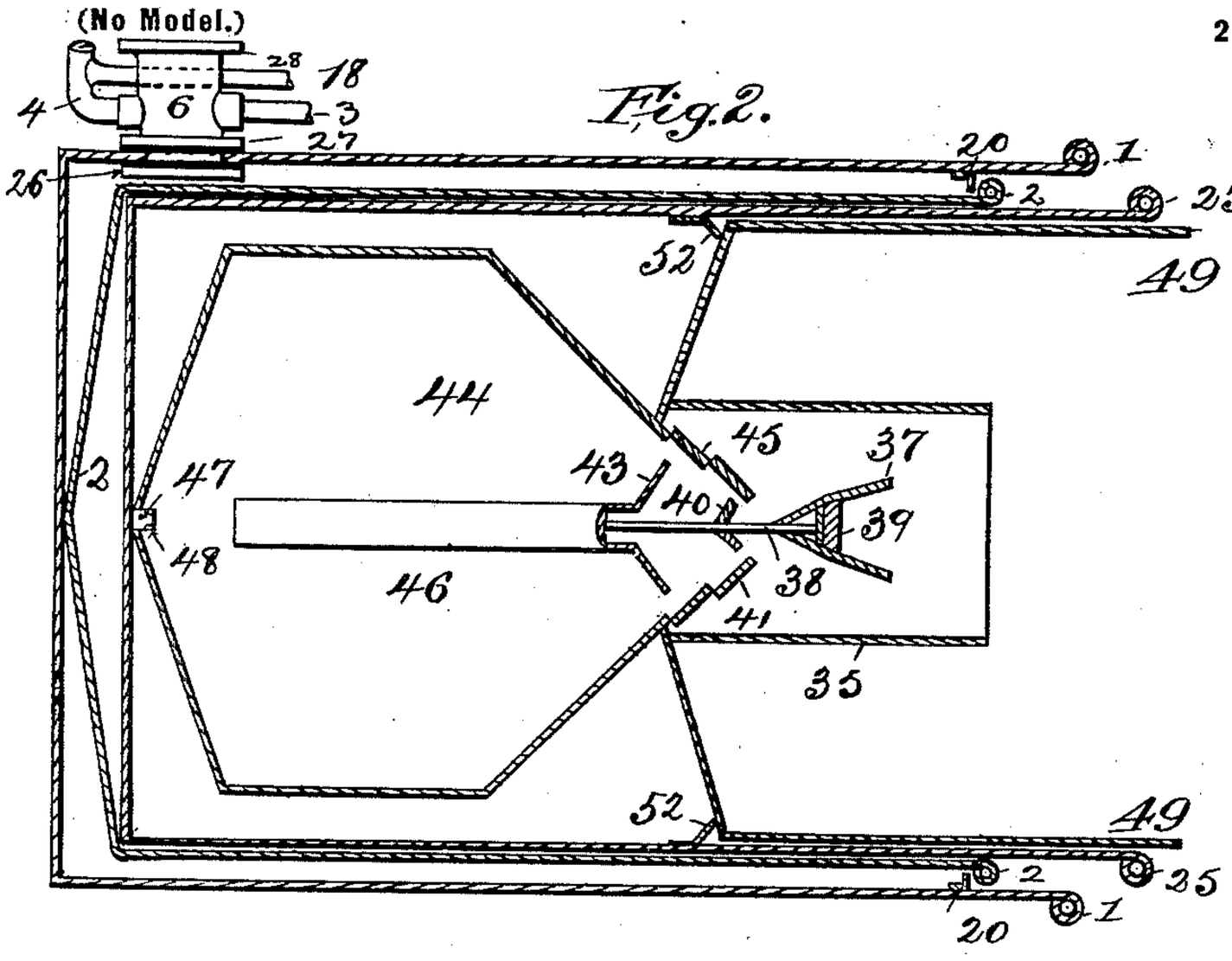



Fig. 4.

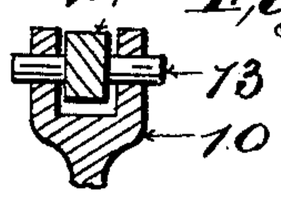



Fig. 5.

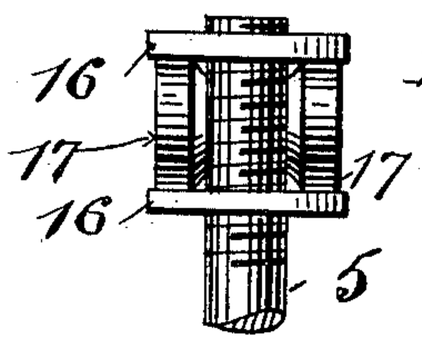
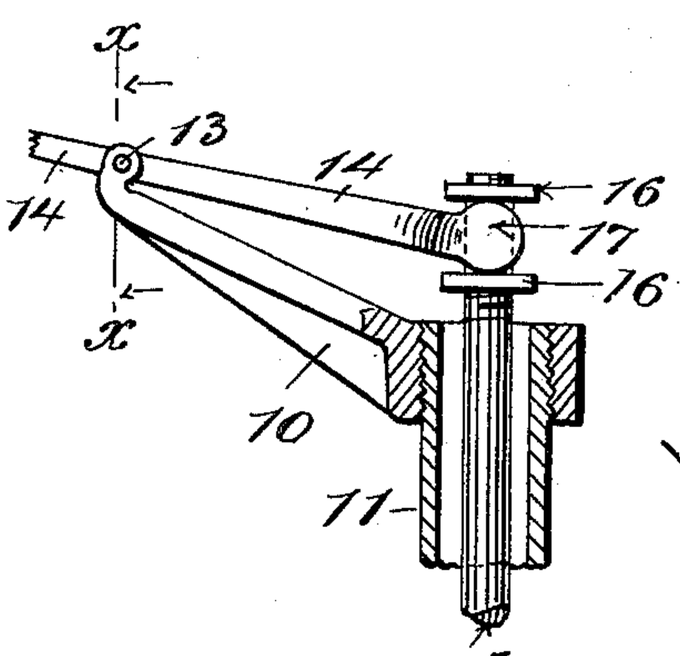
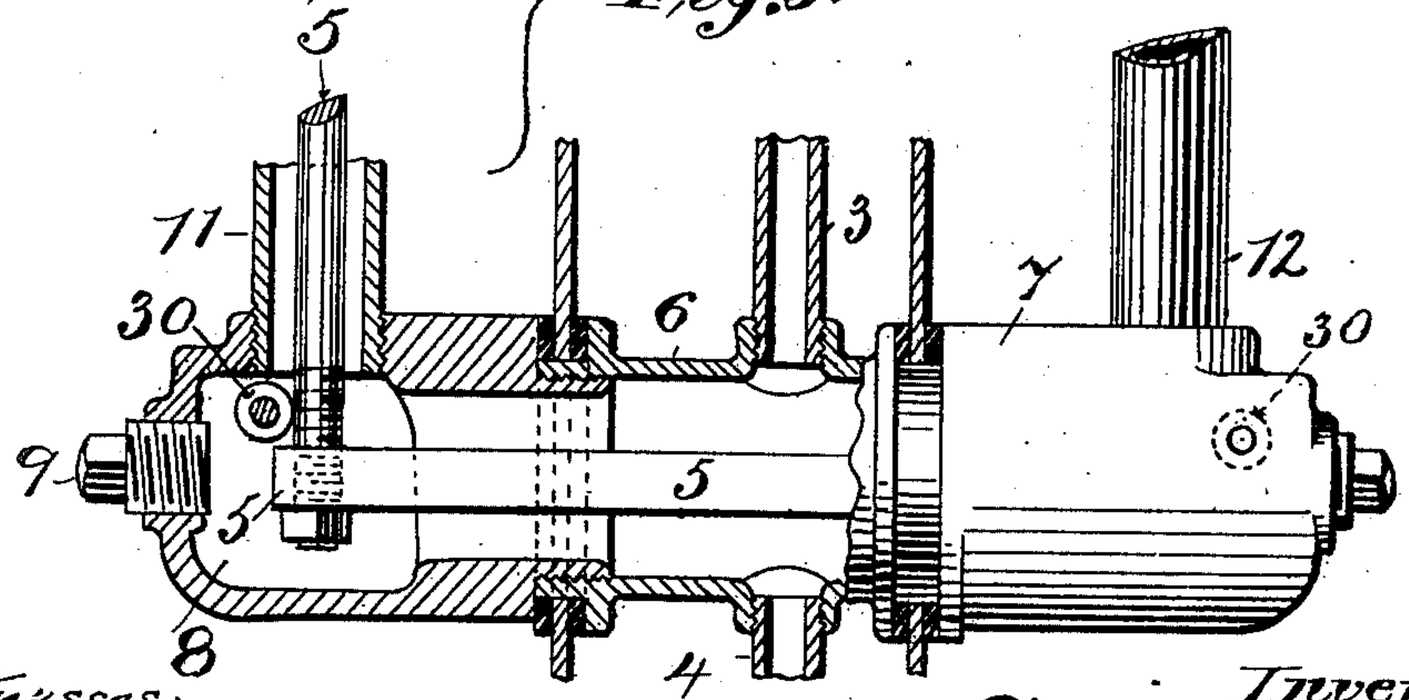



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 699,332, dated May 6, 1902.

Application filed October 9, 1900. Serial No. 32,483. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID N. LONG, a citizen of the United States of America, residing in the city of Buffalo and State of New York, have invented a new and useful Improvement in Apparatus for Generating Acetylene and other Gases, of which the following is a specification illustrated by drawings.

My invention relates to improvements in apparatus in which calcium carbid or similar gas-generating solid, preferably in a powdered form, is automatically dropped into water or other liquid reagent in quantities proportional to the rate at which the gas is consumed, the dropping being regulated automatically by the volume of gas generated.

The object of the invention is to perfect or improve such apparatus with particular regard to capacity, to reliability in operation, and to accessibility for charging, cleaning, and repairs.

Figure 1 is a side view, partly in section, of the entire apparatus. Fig. 2 represents in section the principal parts of the apparatus nested together in a manner designed to occupy the minimum space for transportation. Fig. 3 is a detailed view, partly in section, of a portion of the gas-passages and mechanical connections between the gasometer and the generating mechanism. Figs. 4 and 5 are details thereof.

These drawings and the following description set forth the preferred form of my invention.

The gasometer-chamber or gas-holder consists, primarily, of a lower portion or tank 1, which contains water, and a gas-holding bell 2, which rises and falls in the water as gas is led into it or withdrawn from it. The gas is generated in a separate chamber. Preferably the carbid-chamber 44, provided with gas-bell 49, is mounted on supports 52 within a water-holding tank 25. A valve 40 forms the feeding device, which controls the flow of powdered carbid into the water beneath it. The invention concerns principally the mounting and operation of this valve, its mechanical connection with the expansible gas-holder, and the gas connections between the tank 25 and the gas-holding bell 2 and tank 1.

Within the carbid-chamber 44 is affixed in any suitable manner a tubular guide 46, provided with a protecting-flange 43, the object of which flange is to keep the load of carbid away from the valve, so as to allow only a small layer or stream of the powdered carbid to reach the valve at any one time. Within the tubular guide 46 plays a vertical valve-rod 38, which carries the valve 40, located above the conical valve-seat 41, as shown. Beneath the valve and its seat is the flaring or conical deflector 37, the object of which is to deflect the falling carbid from the upright 36 of the valve-actuating mechanism. In order to wash the gas as it leaves the vicinity of the valve, I prefer to provide a cylindrical sleeve 35, which extends down into the water around the deflector 37, so as to protect the parts 31 32, which will be presently described, from being spattered and also to cause the gas to be washed in rising from the bottom of the sleeve. Some instrumentality may be provided for pressing the valve 40 downward—for example, a lead weight 39 may be placed within the deflector 37. When the valve is raised from its seat, the carbid falls into the water beneath and generates gas. When the valve rests upon its seat, the generation of gas stops. This movement of the valve is caused and controlled by the movement of the gas-holding bell 2, through the instrumentality of a lever 14 and a peculiarly-shaped mechanical connector, comprising the U-shaped part 5 and the extensions 32, 33, 34, and 36, upon the last of which the valve rests when raised from its seat; but the invention contemplates any suitable system of mechanical connection for the same purpose. The lever 14 has a fixed fulcrum or pivot 13 upon an arm 10, secured to the stationary vertical pipe 11, which will be presently described. Instead of allowing the bell 2 to act directly upon the end of the lever 14 I provide a vertical connecting link or pin 15, pivoted to the end of the lever and counterweighted, so as to extend up toward the bell. This pivotal connection eliminates the friction that would arise by the direct rubbing of the end of the lever 14 against the vertically rising and falling gas-

bell. The U-shaped connector 5 extends through the gas-passages 11, 8, 6, 7, and 12 and is rigidly secured to its extensions 32 33 34 36 in order that the rise of the U-shaped connector 5 shall cause an equal rise of the upright 36, and thereby raise the valve 40 from its seat. In order to insure the proper vertical movement and to eliminate friction, I provide two guide-rollers 30 and 31, against which the U-shaped connector 5 is pressed by the combined upward pull of the longer end of the lever 14 and the downward thrust or resistance of the valve 40. The pipes 11 and 12 serve to prevent the connector 5 from getting out of place; but if the friction-rollers 30 31 are properly placed there will be little, if any, frictional contact between the connector 5 and the walls of the pipes. The movement of the lever 14 is transmitted to the connector 5 preferably in the manner shown in Figs. 3 and 5, the longer end of the lever 14 being forked and terminating in two disks 17, which lie on edge between the two horizontal disks 16, screwed upon the upper end of the connector 5. It will now be understood that when the bell 2 falls by the drawing off of the gas it acts on lever 14 to raise the connector 5, and thereby raise the valve 40, allowing a small stream of carbid to fall into the water in chamber 25 until the gas so generated again raises the bell 2.

I will now explain the preferable construction of the gas-passages between the generating and the gas-holding chambers. In the two tanks 1 and 25, respectively, peculiarly-shaped hollow castings or elbows 7 and 8 are provided, extending through the walls of the tank and connected by the short hollow casting or pipe 6, suitable packing being, of course, employed between the connections, so as to exclude leakage. Screw-plugs 9 are provided to afford access to the interior of these parts. The gas-pipe 11 is screw-threaded vertically into the casting 8, so as to rigidly support the arm 10 and lever 14. This pipe 11 extends above the water-level within the bell 2. A corresponding pipe 12 in the tank 25 screws into the casting 7 and extends up above the water-level. The friction-roller 31, already mentioned, is carried by the pipe 12. The friction-roller 30 is mounted within the casting 8, as shown. These pipes and connections 12, 7, 6, 8, and 11 allow the gas to flow freely from the generating-chamber into the gas-holder. The gas-outlet pipe—*i. e.*, the service-pipe of the apparatus—is preferably connected at 3 to the upper side of the pipe 6, so that no water will get into it. All these gas connections should of course be tight; but in order to carry off any water of condensation that may form and collect within the pipe 6 I provide a drainage-pipe 4, which extends down from the pipe 6 (six or eight inches, for example) and then up sufficiently to insure proper sealing of the gas in the pipe 6. An overflow-faucet 23 may be provided at the proper height to allow the water of condensation to pass off as it forms in the pipes 6 7 8 11 12, &c. I extend the chamber 21 considerably above the level of the pipe 6, and therefore by closing the plug or faucet 23 and pouring water into the vessel 21 I am able to entirely fill the passage within the pipe 6, and thereby cut off communication between the generator, the service-pipe, and the gas-holder. This enables me to clean out or recharge the generator without allowing any escape of the gas from the gasometer.

In order to allow the horizontal portion of the U-shaped connector 5 to rise and fall about an inch and a half within the gas-passages, the internal diameter of the horizontal passages in the pipe 6 and the elbow-castings 7 and 8 should be about two inches. This is quite sufficient, as the valve 40 need only rise a fraction of an inch from its seat. I prefer to have the gas-pipe 11 somewhat larger than the gas-pipe 12, so that the pressure of gas at the outlet-pipe 3 can never be appreciably greater than it is within the bell 2, and if any considerable quantity of gas is generated suddenly it will be retarded more by friction in the pipe 12 than in the pipe 11.

I also provide a safety escape-pipe or blow-off 18, which may lead from the pipe 4 at a point above the lowest part of the pipe 4 and yet suitably below the normal water-level in the pipe 4. This pipe 18 should lead out of the building in which the apparatus is contained, so that any escaping gas will not cause an offensive odor nor be in danger of igniting. An abnormal pressure of gas will therefore force down the water in the pipe 4 until the gas can escape through the pipe 18. In order to prevent the rise of the bell 2 entirely out of the tank 1, I provide projections 19 on the bell adapted to engage projections 20 on the inner wall of the tank 1. These need not extend all the way around the tank and the bell, but may preferably leave intervals, so that the bell may be manually turned and raised without interference. The gas-passages and the mechanical connections for operating the valve may be readily disconnected from the tanks for packing or shipment. After these are removed the bell 2 may be placed within the tank 1, as shown in Fig. 2. The tank 25 is of slightly less diameter than the bell 2, so that it may be placed within the bell, and then the carbid-chamber 44, with its attached parts 49 50, &c., may be placed within the tank 25, all as shown in Fig. 2.

Having now described my invention and illustrated it with sufficient details to enable any one skilled in the art to make and use the same, I claim as the characteristic features the following:

1. In combination with a carbid-holder and a water-holder of a generator, and a separated and detachable expansible gas-holding chamber provided with connections for controlling the gas generation, a connecting gas-pipe between the generator and the said gas-holding chamber, and a water-sealed drain-pipe lead-

ing from the said connecting gas-pipe and provided with a raised mouth through which water may be poured to close the said connecting gas-pipe and cut off the generator from the gas-holding chamber, substantially as set forth.

2. In combination with a carbid-holder and a water-holder of a generator, and a separated and detachable expansible gas-holding chamber provided with connections for controlling the gas generation, a connecting gas-pipe between the generator and the said gas-holding chamber, a water-sealed safety blow-off pipe and a service-pipe leading from the said connecting gas-pipe, and means for introducing water to cut off the service-pipe, substantially as set forth.

3. In combination with a carbid-holder and a water-holder of a generator, and a separated and detachable expansible gas-holding chamber provided with connections for controlling the gas generation, a connecting gas-pipe between the generator and the said gas-holding chamber, and a service-pipe connection from the said connecting gas-pipe and means for introducing water to cut off the said service-pipe, substantially as set forth.

4. In a gas-generating apparatus, the combination with a gasometer distinct from the gas-generating chamber, of a gas connection leading from one to the other, a service-pipe leading from the said gas connection, a drain-pipe for the service-pipe and gas connection, and means for introducing water to seal the service-pipe and gas connection, substantially as set forth.

5. In a gas-generating apparatus, the combination with a gasometer distinct from the gas-generating chamber, of a gas connection leading from one to the other, a substantially rigid sliding operating connection controlling the generation of gas, actuated by the gasometer, extending through the said gas connection, and guides against which the said operating connection is guided, substantially as set forth.

6. In a gas-generating apparatus, the combination with a gasometer distinct from the gas-generating chamber, of a gas connection leading from one to the other, and combining a section exterior to both the generating-chamber and the gasometer, an elbow within the generating-chamber, a gas-pipe secured to said elbow, an elbow and gas-pipe in the gasometer, all detachably coupled to and communicating through the walls of the gasometer and the gas-generating chamber, and an operating connection for controlling the generation of gas, extending through the said elbows and gas connection, substantially as set forth.

Signed this 18th day of September, 1900, at Buffalo, New York.

DAVID N. LONG.

Witnesses:
E. L. MAGNER,
EDWARD M. SHELDON.