

No. 665,745.

Patented Jan. 8, 1901.

P. L. LINEHAN.  
ACETYLENE GAS GENERATOR.

(Application filed Apr. 17, 1899.)

(No Model.)

2 Sheets—Sheet 1.

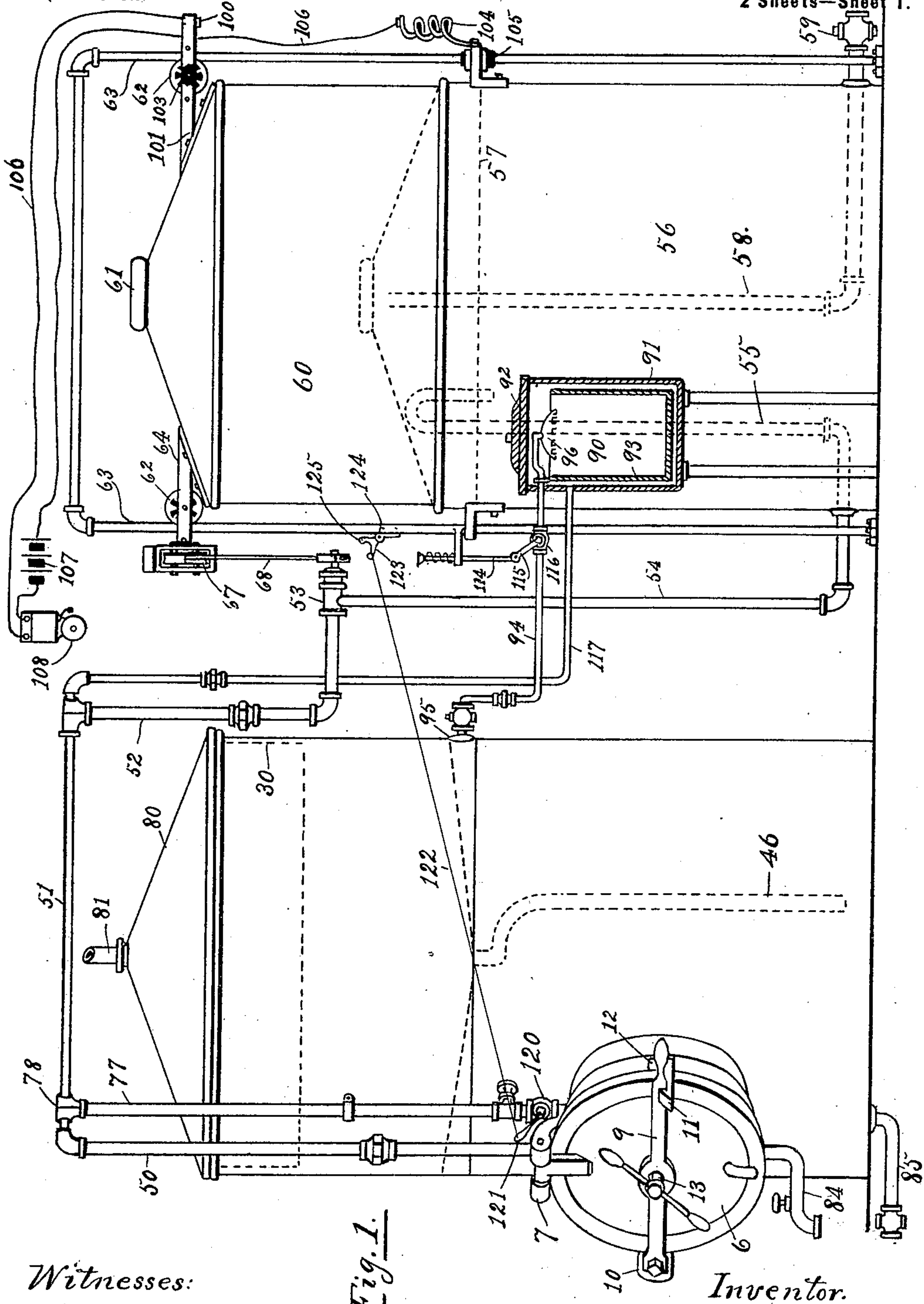


Fig. 1.

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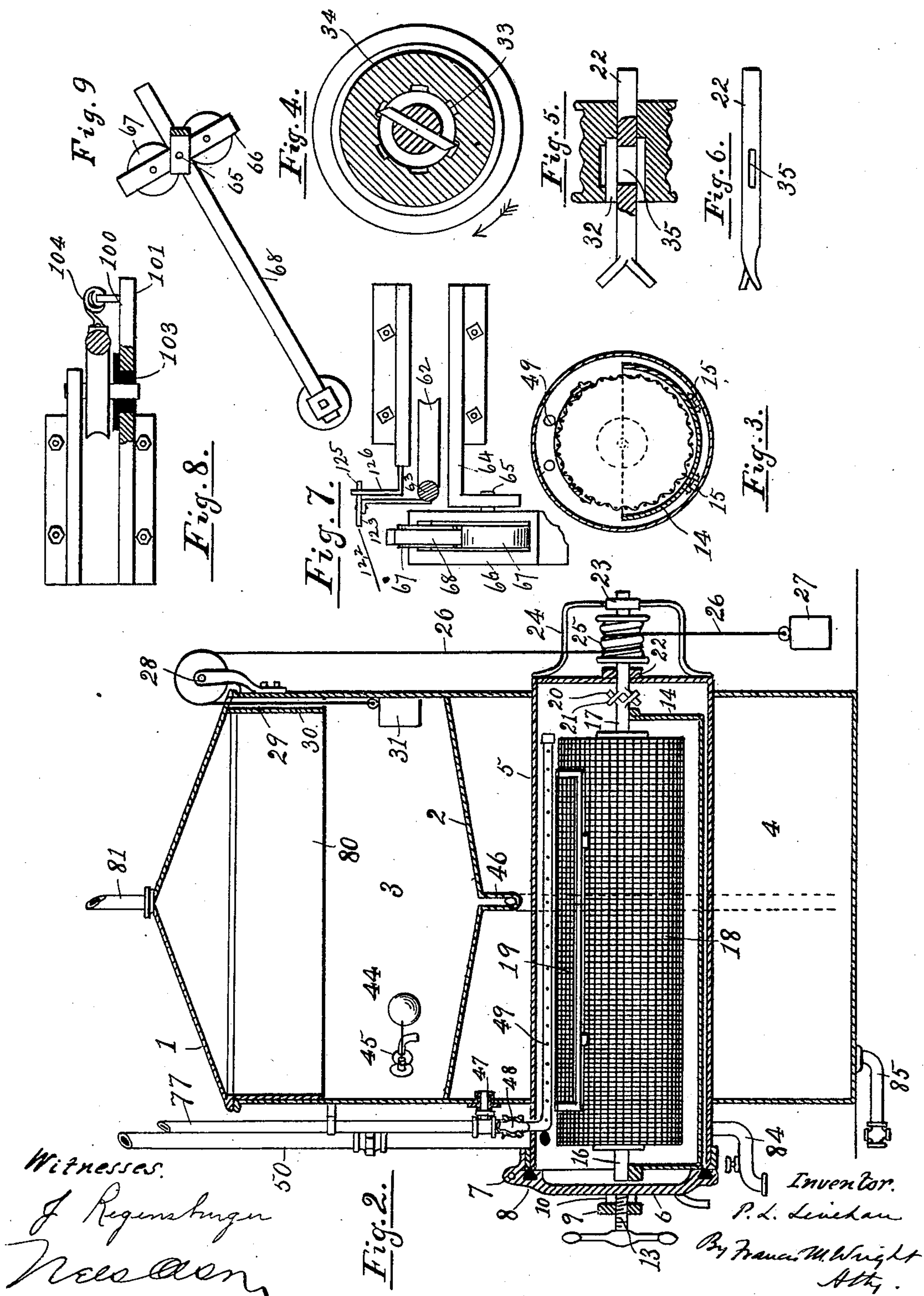
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**2 Sheets—Sheet 2.**



*Inventor.*

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# UNITED STATES PATENT OFFICE.

PETER L. LINEHAN, OF SAN JOSÉ, CALIFORNIA, ASSIGNOR OF ONE-HALF  
TO JOSEPH W. DELANEY, OF SAME PLACE.

## ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 665,745, dated January 8, 1901.

Application filed April 17, 1899. Serial No. 713,406. (No model.)

*To all whom it may concern:*

Be it known that I, PETER L. LINEHAN, a citizen of the United States, residing at San José, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Acetylene-Gas-Generating Apparatus, of which the following is a specification.

My invention relates to improvements in acetylene-gas-generating apparatus, the object of my invention being to provide an apparatus of this character which shall be safe and convenient to operate and avoid waste of gas; and in particular the objects of my invention have been to provide means, first, for advantageously disposing of the gas which continues to be generated after admission to the gasometer has been cut off; secondly, for maintaining the generating-chamber at a comparatively low temperature, thereby avoiding injury to the packing and other parts; thirdly, for agitating the carbid so as to expose fresh parts to the action of the water; fourthly, for preventing escape of the gas at a place liable to injure the health of the occupants of the building, and, fifthly, for avoiding the necessity of charging the apparatus at night-time.

My invention further resides in the novel construction, combination, and arrangement of the parts hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the apparatus, certain parts being shown in vertical section. Fig. 2 is a vertical section of the water-tank, taken longitudinally through the generating-chamber. Fig. 3 is a transverse section of the generating-chamber. Fig. 4 is a transverse section of the drum 25 to show the clutch contained therein. Fig. 5 is a longitudinal section of the same. Fig. 6 is a plan view of the shaft of said drum detached. Fig. 7 is a top plan view of certain valve-operating mechanism. Fig. 8 is a top view of an electrical connection, and Fig. 9 is a side elevation of a valve-operating lever.

Referring to the drawings, 1 represents the water-tank of the apparatus, divided by a partition 2 into upper and lower compartments 3 4, and through said lower compartment 4,

from one side to the other, extends the cylindrical generator-casing 5. Said casing is closed at one end permanently and at the other end by the lid or cover 6, hinged thereto at 7. A packing 8 in an undercut annular recess in said lid rests against the lip or edge of the casing 5 and renders the same air-tight, said packing being preferably composed of asbestos rope dipped in graphite grease, and in order to press said packing firmly against said lid there is provided a bar 9, hinged at one end to a lug 10 on the casing and at the other end passed over a hook 11 on a diametrically opposite lug 12. Said bar 9 is enlarged in the center and internally screw-threaded in said enlargement, and through said threaded portion passes the screw 13, which abuts against the lid 6, thus rendering the generator gas-tight. Within said generator is contained the semicylindrical trough 14, said trough being mounted on rollers 15, by which means it is readily withdrawn from and inserted into the generating-chamber, and in the ends of said trough is revolvably mounted on pivots or trunnions 16 17 the carbid-holder 18, made of wire-netting, with a suitable opening or door 19, through which to insert the carbid.

The trunnion 17 at the end of the holder, which is first inserted in the generator-casing, is formed with diverging fingers 20, which when the holder is inserted engage similar fingers 21 on a shaft 22, passed through an aperture suitably packed in the closed end of the casing, said shaft having an outer bearing 23 in a bracket 24, secured on the end of the casing 5. Upon said shaft 23 is loosely mounted a grooved pulley 25, and around said pulley is carried a cord 26, its lower end supporting a weight 27 and its upper end being carried over a pulley 28, mounted at the top of the tank and then passed downward in a recess 29 in the rim 30 of the tank-cover and attached to a float 31, having a vertical reciprocation, as hereinafter explained. Said pulley 25 has an undercut cylindrical recess 32, having formed therein shallow grooves 33, into which grooves is adapted to drop a clutch 34, sliding through a slot 35 in the shaft 22. When the pulley 25 is rotating in the direction of the arrow in Fig. 4, the lower edge of



the clutch 34, having fallen into one of the grooves 33, is held therein, and the shaft 22 is thereby caused to rotate with the pulley 25; but when the pulley 25 rotates in the opposite direction to that indicated by the arrow then a beveled surface 35 at the lower end of said clutch, pressed by the edge of the groove 33, causes said clutch to rise out of engagement therewith and the shaft 22 is no longer revolved by the pulley 25. Thus a reciprocating movement of the float 31 imparts a rotary movement in a uniform direction to the carbide-holder. This construction effectually exposes different portions of the carbide in the holder to the action of the water free from a covering of lime.

The water in the tank 1 normally fills the lower compartment 4 and is maintained at a constant height in the upper compartment 3 by a float 44 and valve 45, such as are common to control the admission of water. The partition 2 slopes slightly downward from the circumference to the center and from an aperture in the center a pipe 46 leads downward to a short distance from the bottom of the lower compartment. The water is supplied from the water-tank to the generator-casing through an aperture 47 and pipe 48, said pipe within said casing leading into two or more distributing perforated pipes 49, by means of which the water is sprinkled upon the carbide. The gas generated by the combination of the water and carbide passes upward through the pipes 50 51 52, valve 53, pipes 54 and 55, the latter of siphon form, and discharges downward into the gasometer 56 below the water-line 57 therein, whence it may be drawn and distributed by the pipe 58, which may be connected to the gas-pipes in the house by the joint 59.

The continued evolution of the gas and its entrance into the gasometer will cause the upper cylinder 60 of the gasometer, suitably weighted, as shown at 61, to rise, being guided in its ascent by the rollers 62 rolling on the standards 63, and during said ascent an arm 64 will ascend. Said arm 64 is pivotally secured, as shown at 65, to a block 66, carrying antifriction-rollers 67, between which is a lever 68, attached to the valve 53. Thus the rise of said arm 64 will rock a lever 68 and so close the valve 53, so that at a predetermined height of said upper cylinder the gas will be entirely cut off therefrom.

An important feature of my invention is the provision which I have made for the disposal of the gas, which will now continue for some time to be generated in the casing. For this purpose I carry a pipe 77 from a joint 78 in the pipe 51 to the pipe 48, and so through the aperture 47 a return connection is made with the lower compartment of the water-tank. The gas thus introduced into the compartment 4 will displace the water from the upper portion of said compartment, forcing water up through the pipe 46 into the upper compartment until the level of the water in

the lower compartment falls below the aperture 47. Then, although the water no longer enters the generator through said aperture, gas will continue for some time to be evolved from the moisture left in the generator. This gas will pass out from the generator both through the pipes 50 and 77 and through the perforated pipes 49 and the pipe 48, and this gas will enter the lower compartment of the tank and displace the water therefrom into the upper compartment. Thus said lower compartment serves as an auxiliary or reserve storage-tank for the gas brought into play only when the gasometer is filled to its utmost desired capacity. The rise of the water in the upper compartment, owing to its displacement from the lower compartment by the gas entering said lower compartment, will raise the floats 44 and 31 above the level at which they normally rest when the gas is being evolved. This rise in said float will depend upon the amount of gas evolved from the moisture left in the generator. The float 31 will be raised to a height of about twelve inches in a machine of ordinary size. This will turn the carbide-holder through about one-half of a revolution, thus shaking all the ashes out of it into the pan below.

The capacity of the water-tank is such as ordinarily to hold all the gas that is generated after shutting off from the gasometer; but I obtain absolute safety from an excessive generation of gas by the following construction: The upper compartment of the water-tank is closed by the top 80 of a flattened conical form, having a central aperture, from which a pipe 81 leads sufficiently long to conduct the escaping gas to a height free from danger when the apparatus is set up in place; but to insure that the escaping gas passes through the pipe 81 and not up around the top 80 I provide said lid with a depending rim or flange 30, extending down within the upper edge of the compartment 3, and the two compartments are so proportioned as to capacity that before the water in the lower compartment has descended to the bottom of the pipe 46 the water will have risen in the upper compartment above the lower edge of the rim 30 and will then make a water seal, so that the escaping gas will be compelled to pass through the pipe 81.

Pipes 84 and 85 are used for drawing off water from the generator and water-tank, respectively, when necessary.

A further important feature of my invention is the provision made for avoiding the necessity of charging the apparatus at night. For this purpose there is provided an auxiliary generator 90, comprising an outer cylinder 91, having a lid 92, and an inner cylinder or holder 93, in which the carbide is placed. A pipe 94, connected at 95 to the lower compartment of the water-tank, leads inside the cylinder 91 and terminates in a sprinkler 96, by means of which the water is sprinkled upon the carbide in the holder 93.



When the carbid in the main generator is exhausted and the gas in the gasometer is being consumed, the upper cylinder 60 falls until a finger 100, carried on the arm 101, which supports the upper roller 62, but electrically separated therefrom by the insulation 103, comes into contact with the upper end of a light spring 104, supported on the standard 63 and electrically separated therefrom by the insulation 105, said finger 100 and spring 104 being connected by wires 106 to a battery 107 and an annunciator 108 in any convenient place. Thus the descent of the cylinder 60 automatically announces that the carbid in the main generator has been exhausted. The purpose of the light spring 104 is to permit the upper cylinder to descend and exert its full weight upon the contained gas after electric contact has been made. Otherwise were the lower contact rigidly supported the pressure in the gasometer would be removed, and the lights would go out. Immediate replacement of said carbid is not necessary, as the descent of the upper cylinder 60 causes the lever 68 to bear upon a spring-resisted rod 114, actuating a lever 115, which opens a valve 116 in the pipe 94 to admit water from the tank to the auxiliary generator. The gas evolved from said generator passes by the pipe 117 to the pipe 52 and thence through the valve 53 and pipes 54 55 to the gasometer. The upper cylinder of the gasometer will then after a time rise slightly until the lever 68 just rests on the rod 114 and maintains open the valve 116 just sufficient to admit the necessary amount of water to the generator 90 to provide the gas as fast as it is being consumed. The supply of carbid in said auxiliary generator will be sufficient to last one night, so that fresh charging of the main generator is not required until the next day. After the gas has been exhausted from the lower compartment 4 the water will rise therein and will, unless prevented, enter the main generating-chamber 5. This is to be avoided, as the admission of water to the residuum of the carbid will produce a slimy mixture, which is difficult to remove without injury to the clothing, whereas the residuum of lime in its dry state can readily be shaken out. For the purpose of preventing entrance of the water into said casing 5 after the carbid has been exhausted I attach to a valve 120 in the pipe 48 a lever 121, a cord or wire 122 connecting the end of said lever 121 with the arm 123 of a bell-crank lever mounted at 124 upon one of the standards 63, the other arm, 125, of said lever being adapted to be depressed by a finger 126, carried by the arm 64. Thus the descent of the gasometer by the exhaustion of the gas will automatically operate the valve 120 and cut off the entrance of water from the compartment 4 into the gas-generating chamber.

The position of the generating-chamber diametrically through the water-tank is an important feature of my invention. Great heat

is produced in the generating-chamber by the chemical changes there undergone, and this heat would have a tendency to impair the efficiency of the packing and other parts connected with said chamber. By the immersion of the generating-casing in the water of the tank 1 this heat is rapidly abstracted and the temperature of the casing is maintained comparatively low.

I claim—

1. In an acetylene-gas generator, the combination of upper and lower water-chambers, a pipe leading from a point near the bottom of the lower chamber to the upper chamber, a gas-generating chamber connected with the lower chamber, and a gasometer connected with said generating-chamber and automatically controlling its connection therewith, substantially as described.

2. In an acetylene-gas generator, the combination of two water-chambers, a gas-generating chamber connected with one of said water-chambers, said latter chamber having a connection leading from a point near its bottom to the other water-chamber, and a gasometer connected with said gas-generating chamber and automatically controlling its connection therewith, substantially as described.

3. In an acetylene-gas generator, the combination of a water-tank, a cylindrical generator and chamber extending horizontally entirely through said tank, the ends of said chamber extending beyond the sides of the tank, a carbid-holder in said chamber removable therefrom, a pipe leading from said tank and discharging in the upper portion of said chamber, and a gasometer connected with said chamber, substantially as described.

4. In an acetylene-gas generator, the combination of a water-tank partitioned into upper and lower compartments, a pipe leading from a point near the bottom of the lower compartment into the upper compartment, a conical cover for the upper compartment, having a rim extending down within the top of said compartment, a pipe leading from the center of said top to a distant point, and a generator supplied with water from the lower compartment, substantially described.

5. In an acetylene-gas generator, the combination of a water-tank, partitioned into upper and lower compartments, a pipe leading from a point near the bottom of the lower compartment into the upper compartment, a gas-generator, a gasometer, a pipe leading from the lower compartment into the gas-generator and having a sprinkler therein, and a pipe leading from the generator to the gasometer, said generator being connected with the lower compartment independently of the pipe for sprinkling, substantially as described.

6. In an acetylene-gas generator, the combination of a water-tank, partitioned into upper and lower compartments, a pipe leading



from a point near the bottom of the lower compartment into the upper compartment, a gas-generator, a gasometer, a pipe leading from the lower compartment into the gas-generator and having a sprinkler therein, a pipe leading from the generator to the gasometer, and a pipe from the latter pipe to the lower compartment independently of the pipe for sprinkling, substantially as described.

7. In an acetylene-gas generator, the combination of a water-tank, a cylindrical generating-chamber extending horizontally through said tank, a carbid-holder revolvably mounted in said chamber, a float in said tank, an operative connection between said float and holder whereby the rise and fall of the float rotates the holder, a gasometer, a

conduit from the generating-chamber to the gasometer, a valve controlling said conduit, and automatically closing when the gasometer rises to a predetermined point, means for conducting the surplus gas then generated into the tank, and means whereby the gas thus conducted displaces the water in the tank upwardly, thereby raising the float and shifting the carbid-holder, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER L. LINEHAN.

Witnesses:

CHAS. W. SMYTH,  
FRANCIS M. WRIGHT.