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L. S. BUFFINGTON.

ACETYLENE GAS GENERATOR.

(Application filed June 24, 1897.)

(No Model.)

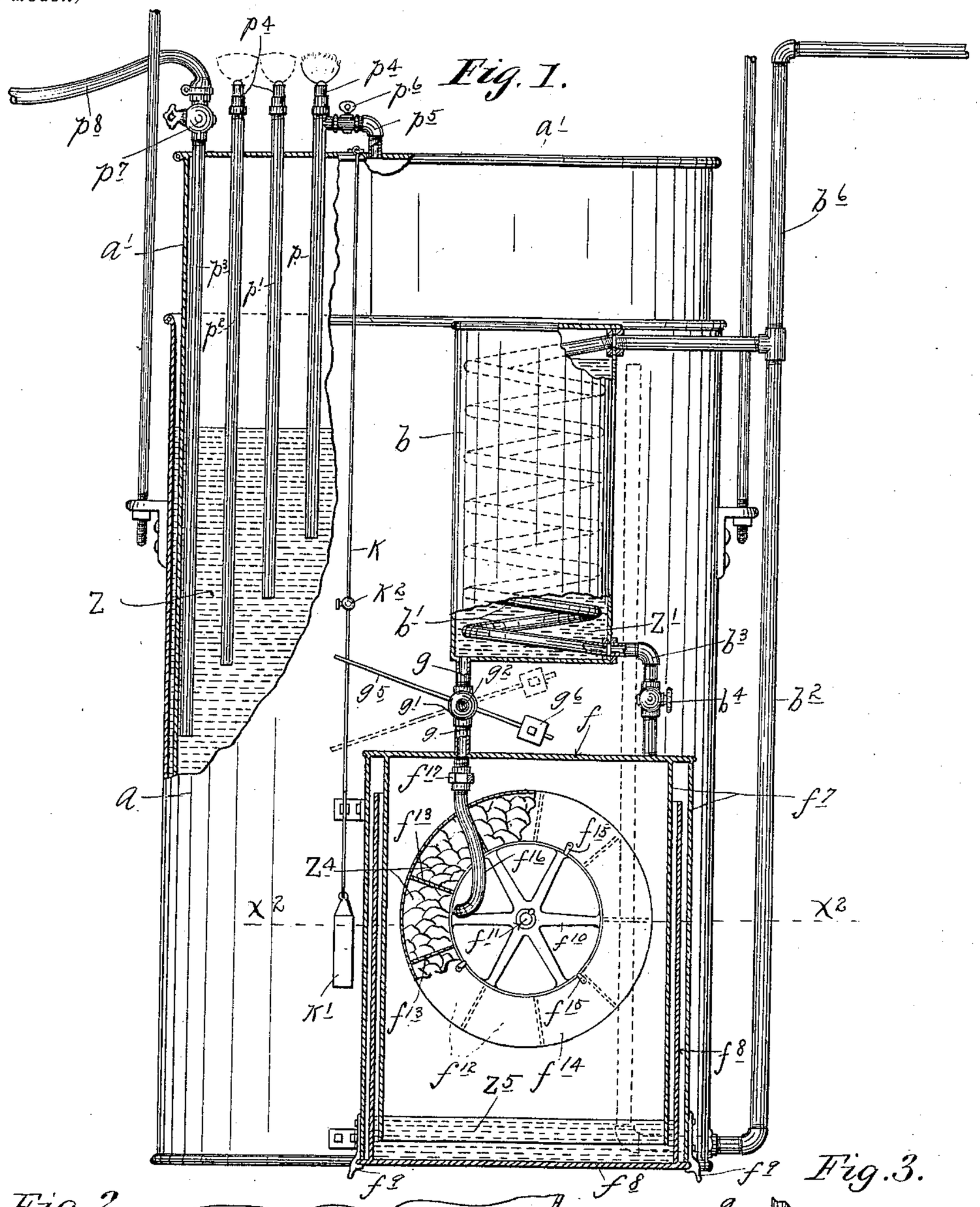

Fig. 1.

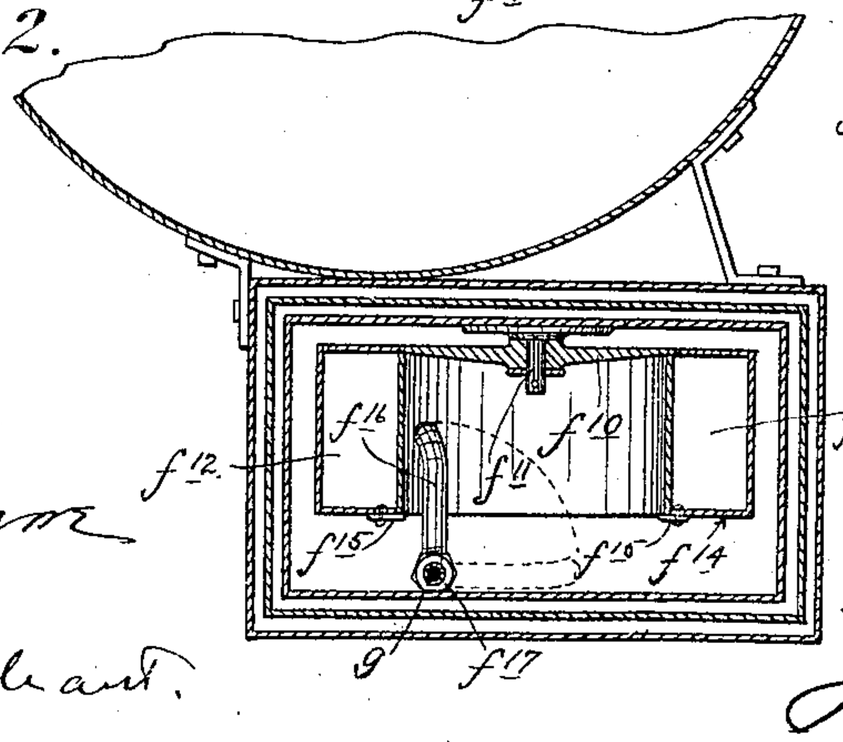

Fig. 2.

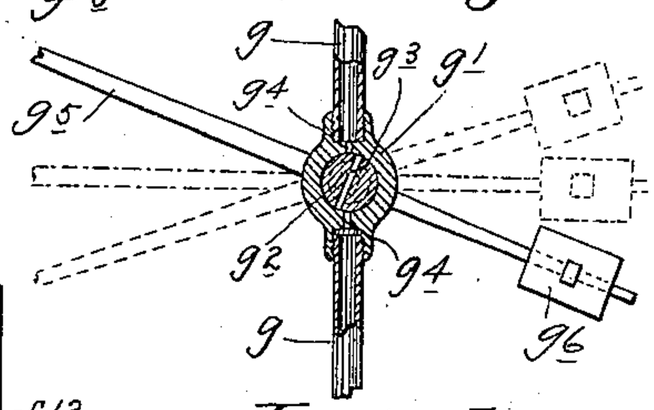

Fig. 3.

Witnesses.

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LEROY S. BUFFINGTON, OF MINNEAPOLIS, MINNESOTA.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 614,439, dated November 22, 1898.

Application filed June 24, 1897. Serial No. 642,053. (No model.)

To all whom it may concern:

Be it known that I, LEROY S. BUFFINGTON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Acetylene-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has for its object to provide an improved apparatus especially adapted to control the generation of acetylene gas from calcium carbid and water.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

Figure 1 is a view principally in side elevation, but with some parts shown in vertical section and others broken away for better illustrating the construction. Fig. 2 is a horizontal section through the apparatus shown in Fig. 1 on the line $x^2\,x^2$; and Fig. 3 is a detail principally in vertical section, but with some parts shown in full, illustrating the valve device which is employed to control the supply of water to the carbid.

In the construction shown I employ an expansible storage-gasometer involving, preferably, a fixed section a, containing a column of water z, and a vertically-movable section a', the lower open end of which is submerged in and sealed by said column of water z. Cooling vessels b are secured to the exteriors of the tank-sections a, near the tops thereof. These cooling vessels b are adapted to contain a column of cooling-water z', and each is provided with a condensing-coil b', which is submerged in said cooling-water z'. The upper ends of the coils b' are in communication with the interiors of the storage-gasometers of the particular apparatus through gas-conveying pipes b^2, the delivery ends of which terminate within said storage-gasometers above the level of the column of water therein contained. The lower and receiving ends of the coils b' are in communication with the interiors of the respective generating chambers or vessels, to be presently described, through pipe-sections b^3, provided with valves b^4, and opening at their lower ends through the top plates f of said generating-chambers.

The bottom or lower ends of the cooling vessels b are in communication with the interiors of the respective generating-chambers through pipe-sections g, which are connected by valve-seat castings g'. These valve-seat castings g' are provided with suitable valve-seats, in which rotary valves or stop-cocks g^2 work with freedom for pivotal movement. The valves g^2 are provided with transverse slits or perforations g^3, the extremities of which are adapted to be brought into registration with narrow ports g^4, which lead from the valve-seat, one to each of the pipe-sections g, as shown in Fig. 3. The valve or stop-cock g^2 is in the said construction provided with a lever or arm g^5, one end of which is in turn provided with a weight g^6 and the other end of which is perforated so as to pass a cord or light connection k, the upper end of which is secured to the movable gasometer-section a'. At its lower end the cord or connection k is provided with a weight k' and above the lever or valve arm g^5 with an adjustable stop k^2. The operation of this valve device will be given later on.

In the construction illustrated in Figs. 1 and 2 the fixed head-section f is shown as provided with a pair of depending flanges f^7, which in cross-section form a rectangle. The removable section of the generating receptacle or vessel is in the form of a rectangular box f^8, which is adapted to telescope between the flanges f^7. Said removable section f^8 is shown as detachably secured to the outer flange f^7 by means of spring-latches f^9, secured on said flange and engageable with the projecting bottom of said removable section f^8. The carbid-holder shown in this construction is in the form of a wheel f^{10}, loosely mounted on a stud f^{11}, which projects from the inner wall of the inner member of the flanges f^7. The periphery of this wheel f^{10} is formed with an annular series of carbid boxes or cells f^{12}, which, taken together, make up an annular receptacle. The partitions f^{13}, which separate the cells f^{12}, are of imperforate material, while both the inner and outer

cylindrical surfaces of said cells are formed of perforated material. An annular side piece f^{14}, which is removably secured in place by suitable catches f^{15}, when removed gives ready access to the said cells. z^4 indicates carbid contained in the cells f^{12}. In connection with this construction the inner or lower end of the pipe-section g is provided with a nozzle-section f^{16}, which is swiveled thereto at f^{17} and is adapted to be turned with its free end in position to discharge into the interior of the annular vessel formed by the series of carbid-cells f^{12}, as illustrated by full lines in Figs. 1 and 2. The said nozzle-section f^{16} is adapted to be turned into the position indicated by dotted lines in Fig. 2, so as to permit the carbid-wheel to be removed and the cells to be recharged with carbid.

z^5 indicates water or other liquid contained in the bottom of the generator-section f^8 and serving as a seal between the sides thereof and the depending flanges f^7.

In the construction shown in Figs. 1 and 2, p, p', p^2, and p^3 indicate safety or gas-escape pipes, which are carried by the movable gasometer-section a' and are, under the normal action of the apparatus, submerged at their lower ends in the water z. Of the said pipes $p\ p'\ p^2\ p^3$ the member p is the shortest, and the members $p\ p'\ p^2\ p^3$ are successively longer and are submerged at their lower ends successively to greater depths in the said liquid z. The pipe-sections p, p', and p^2 are provided with burners p^4 at their upper or outer ends, which burners are located in such close proximity to each other that the flame from one of the jets will ignite the gas escaping from the adjacent burner. The pipe p is in communication with the upper end or extremity of the movable gasometer-section through an elbow-pipe p^5, provided with a valve p^6. The upper end of the pipe p^3 is shown as provided with a valve p^7 and with a flexible extension p^8, which leads to some suitable point of exhaust.

The operation of the device above described is substantially as follows: The valve g^2 is normally held closed by the weight or counterpoise g^6, as indicated by full lines in Figs. 1 and 2. When the gas contained in the storage-gasometer is drawn off and the volume thereof reduced, the movable gasometer-section a' will lower until the stop k^2 on the connection k strikes the free end of the valve-lever g^5 and permits the weight k' to become effective to throw the valve and arm into the position indicated by broken dotted lines in Fig. 3. In this intermediate position of the valve g^2 and its arm the valve slit or passage g^3 is turned into registration with the ports g^4, thus permitting water to flow through the pipe-sections g and nozzle-sections at the delivery end thereof onto the carbid within the carbid-holder. This will of course cause a generation of additional acetylene gas, which will find its way through the connections described into the gasometer and cause the movable gasometer-section a' to again rise and permit the weight g^6 to throw the valve g^2 back into its normal closed position, and thereby stop the further generation of gas for the time being. If, however, the generating action is not quickly started by the introduction of water while the valve g^2 is in its open position, the movable gasometer-section will continue to lower beyond the position in which it causes the opening in said valve, and this excessive downward movement of the movable gasometer-section will permit the weight k' to move the valve g and its arm g^5 into an extreme position. (Indicated by dotted lines in Figs. 1 and 3.) In this position the valve g^2 will, however, be closed. It will thus be seen that with this construction an extremely large amount of water can in no case or at no one time be discharged onto the carbid. If the action just described should take place, it would only be a matter of a short time when the small amount of water introduced onto the carbid would cause the intended generation of gas, which generation would, of course, cause the movable gasometer-section to again move upward.

In the construction illustrated in Figs. 1 and 2 the water will be discharged from the lower end of the nozzle-section f^{16} onto the contents or carbid contained in the cell adjacent thereto. As the contents of the first cell are decomposed the load of the cell becomes heavier by the increasing bulk of the solid products of decomposition. This will cause the loose wheel or carbid-holder to revolve, so that one cell after another will be automatically brought opposite the discharge end of the said nozzle.

The gas which passes from the generating chamber or vessel before reaching the storage-gasometer or the service-pipe passes through the condensing-coil b', under the cooling action of which all of the water or liquid vapors of the gas are condensed and precipitated and will run back into the generating-receptacle.

With the construction illustrated in Figs. 1 and 2 the burner p^4 of the pipe g should be kept lighted and a small amount of gas applied thereto through the valved elbow-pipe p^5. In case of an accidental overgeneration of gas sufficient to raise the lower ends of the pipes p and p' above the level of the water z gas will of course escape through said pipes and through the burner of the pipe p', as well as through the pipe p and its burner. The flame from the first burner will, as has already been indicated, light the second, and in case the lower end of the pipe p^2 is raised above the water the flame from the pipe p' will light the flame from the burner of the pipe p^2. If the movable gasometer was raised still higher, so that the lower end of the pipe p^3 is raised above the water, the gas may then escape through said pipe and its flexible extension p^8. Obviously a greater or less number of these safety escape-pipes may be provided.

The burners, in connection with the pipes, not only serve to burn the escaping gas and prevent offensive odors in the room, but also serve to indicate when an overgeneration has taken place. The ordinary flame from the burner of the pipe *p* may be very small; but this flame will of course be increased whenever the open lower end of the same is raised above the water, by which it is ordinarily sealed.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In an expansible gasometer, the combination with the movable section thereof, of a series of escape-pipes of different lengths opening to the atmosphere and normally submerged and sealed by liquid contained in said gasometer and adapted to be moved into unsealed positions, in succession, by the expanding movement of said movable gasometer-section, substantially as and for the purposes set forth.

2. In an expansible gasometer, the combination with the movable section thereof, of a burner-equipped escape-pipe provided with a capillary by-path opening into the gasometer, and having its lower open end normally sealed by liquid contained in said gasometer, but adapted to be moved into an unsealed position by the expanding movement of said movable gasometer-section, substantially as described.

3. In a water-containing gasometer, the combination with a burner-equipped escape pipe or passage normally sealed by the liquid in said gasometer, of another burner-equipped escape pipe or passage which is normally open and the burner of which is so related to the burner of the aforenoted pipe or passage that it will serve as an igniter for the same, substantially as described.

4. In an expansible gasometer, the combination with the movable section thereof, of a series of escape-pipes provided, at their outer ends, with burners so located that the flame from one burner will light the adjacent burner, and submerged at their inner ends successively to greater depths in the sealing liquid contained in said gasometer, and a branch pipe or passage normally affording communication between the unsealed portion of the shortest member of said escape-pipes and the gas-containing chamber of said gasometer, substantially as described.

5. In a generating apparatus of the character described, the combination with the generating-chamber, of a carbid-holder located therein, consisting of a loose wheel formed with an annularly-arranged series of carbid-cells, the inner and outer cylindrical surfaces of which are formed of perforate material, and a water-supplying device positioned to discharge onto the inner perforate cylindrical surface of said series of cells, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LEROY S. BUFFINGTON.

Witnesses:
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