No. 639,925. Patented Dec. 26, 1899.

P. LACROIX.

ACETYLENE GAS GENERATOR.

(Application filed Aug. 2, 1899.)

(No Model.)

FIG. 1

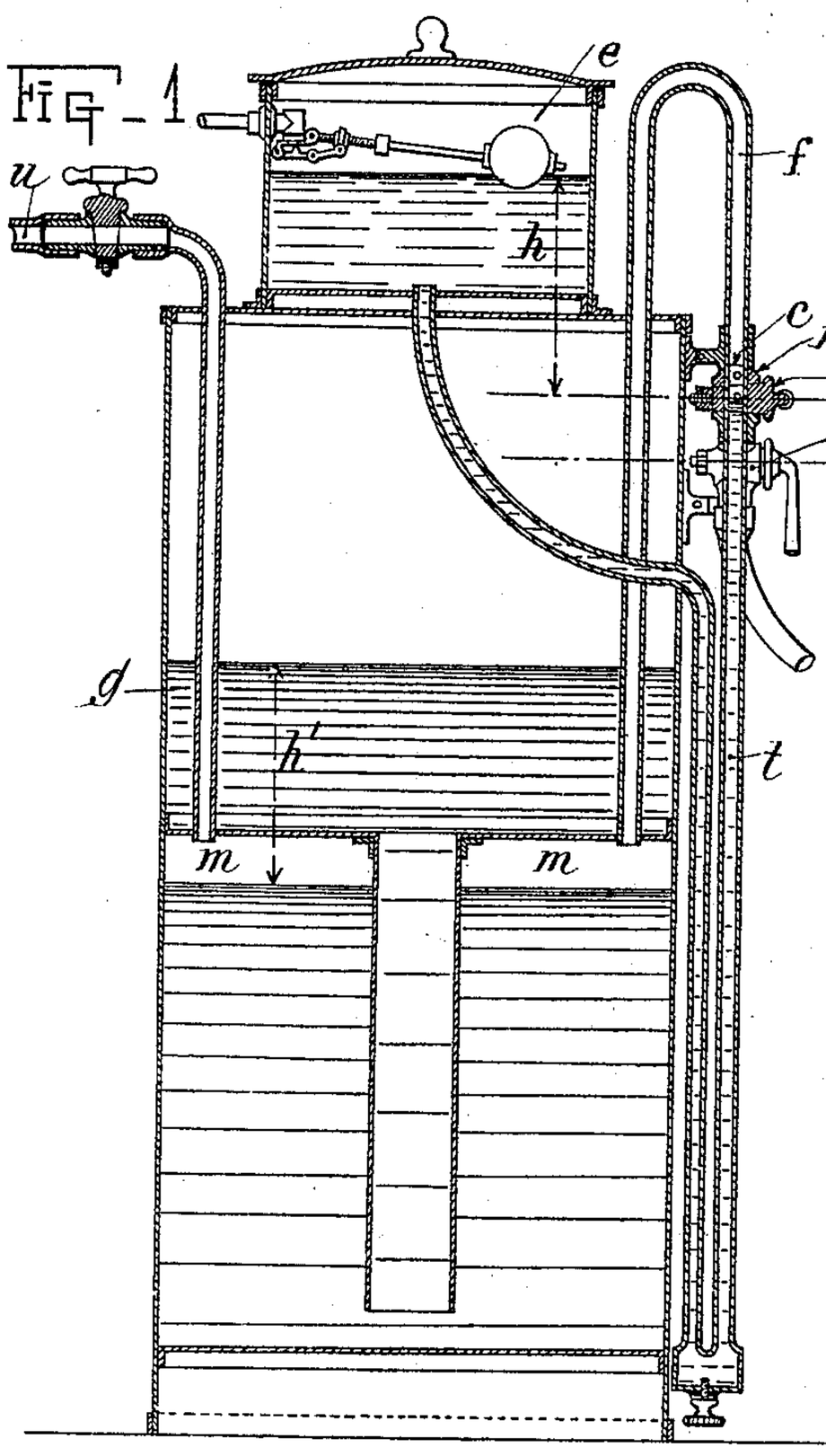


FIG. 2

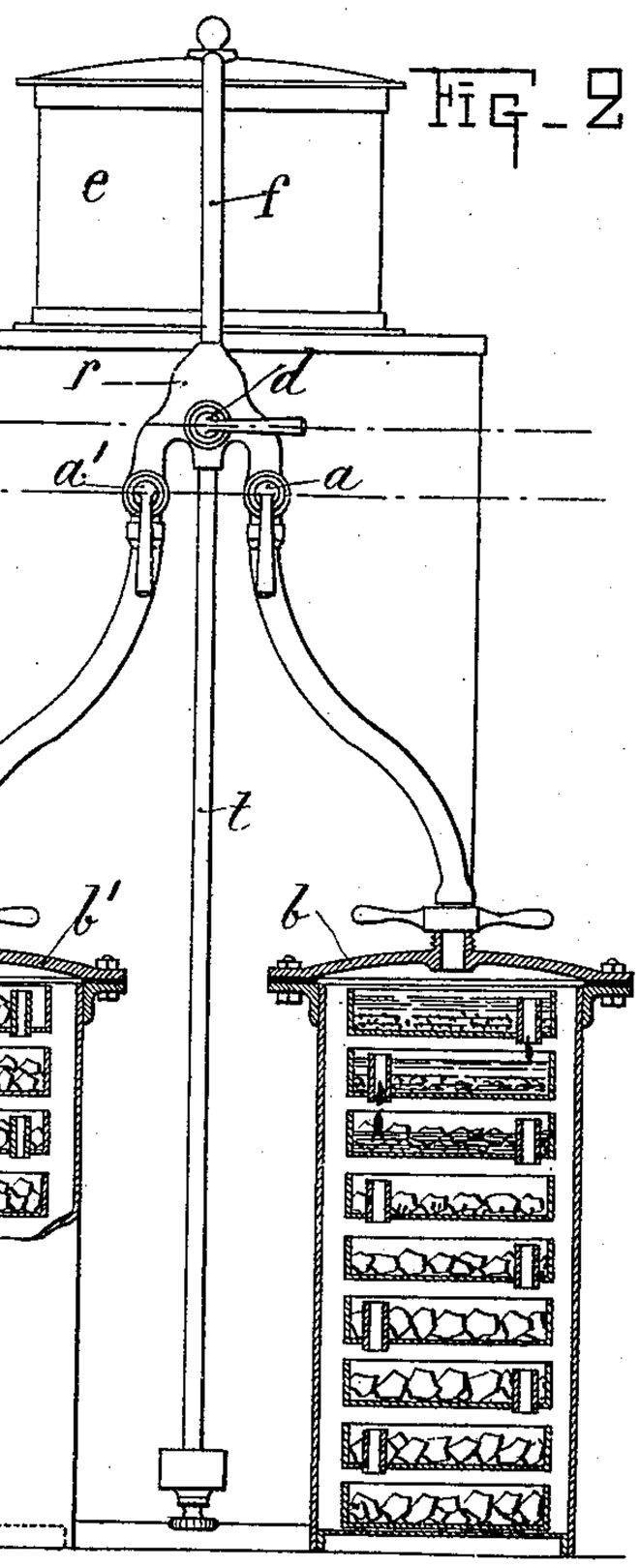


FIG. 3

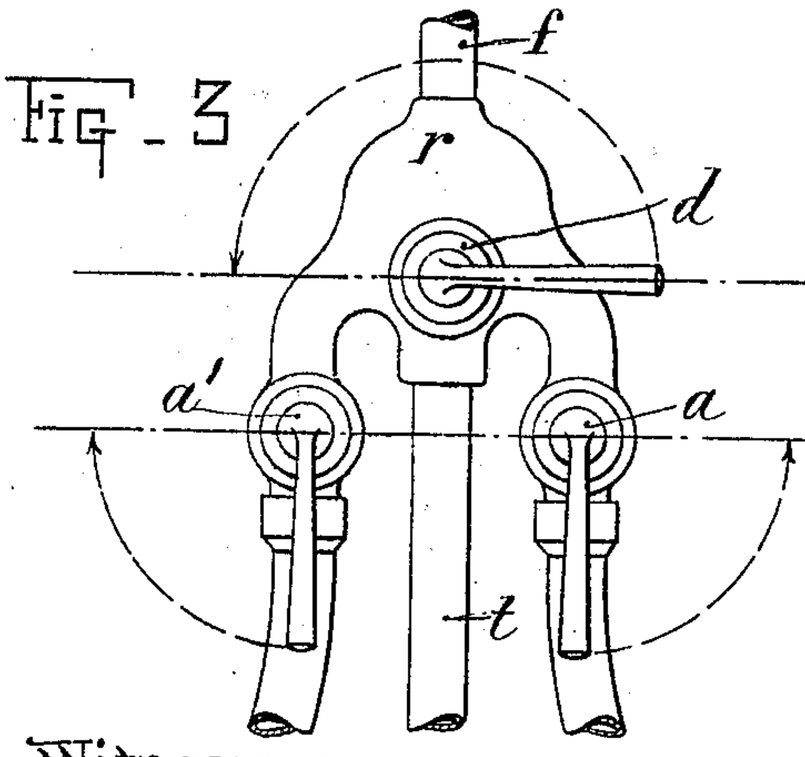
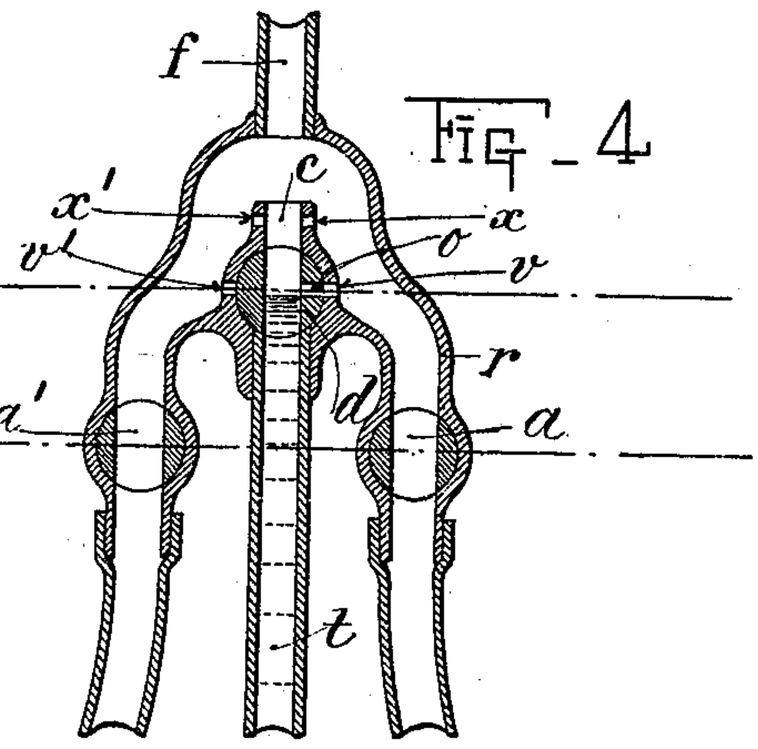


FIG. 4



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UNITED STATES PATENT OFFICE.

PAUL LACROIX, OF PARIS, FRANCE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 639,925, dated December 26, 1899.

Application filed August 2, 1899. Serial No. 725,839. (No model.)

To all whom it may concern:

Be it known that I, PAUL LACROIX, a citizen of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in Acetylene-Gas Generators, of which the following is a specification.

The improvement which forms the subject of this invention is applicable to an entire category of appliances the operation of which is based upon the principle of the fall of the water upon the calcium carbid and in which the water serving to generate the gas is not taken directly from the gasometer by the generators. In the greater number of appliances which have been devised to operate in this manner the constructors have sought to couple two or more generators in such a manner as to insure a continuous production of gas by successively rendering them operative. When this procedure is adopted, it is possible to recharge the exhausted generator while the other is operating and to avoid any loss of gas or of calcium carbid, the generators being dismounted only after they have been completely exhausted. In order that this method of coupling the generators may fulfil the demands of a practical installation, it is indispensable, as will be readily understood, that the successive operation of the generators should be automatically produced by the apparatus itself without any interruption and without its being necessary to intervene in any manner or to consider at what period the second generator should be rendered operative. When the arrangement is such that the hydrating fluid is directed into one of the generators alone and is able to reach the second generator only by overflow from the first when the latter is completely exhausted, the apparatus is open to the objection that whatever may be the construction adopted an appreciable space of time will always elapse between the exhaustion of the first generator and the operation of the second, and during this interval the apparatus produces no gas, although the consumption continues. It is also objectionable in that not more than one generator can ever be attacked at one time. Now in all appliances in which the water falls upon the carbid it is necessary to adopt inlet-apertures for the water of relatively very small section in order to obviate overproduction when sudden variations in the consumption of the gas take place—that is to say, it is necessary to limit the admission-aperture to the section which is strictly necessary for the passage of the quantity of water corresponding to the maximum supply of gas for which the apparatus is constructed. If, however, for any reason it should be desired to obtain from the apparatus a production of gas which is greater than that for which it was designed, the water will enter in too small a quantity to produce all the gas required, from which will result either the extinction of the lights or at least a diminution of pressure which is incompatible with the conditions for obtaining efficient lighting. Nor will there be any equilibrium between the production of the apparatus and the supply which is required for it. It has been sought to obviate this defect by creating large reserves of gas by means of gasometers of great capacity; but the evil is only diminished and not entirely obviated. On the other hand, the device which forms the subject of this invention completely obviates the foregoing objections by enabling the water to reach the two generators simultaneously immediately this becomes necessary, whether one of them is entirely exhausted or merely inadequate to produce the volume of gas necessary for consumption, the section available for the flow of water being capable of increase, if necessary, in proportions which are practically indefinite. This arrangement is diagrammatically represented in the accompanying drawings, in which—

Figure 1 is a vertical section of the apparatus, the generators being omitted. Fig. 2 is a front elevation of the apparatus, showing the two generators in section. Fig. 3 is a front elevation of the distributer, upon a large scale; and Fig. 4 is a sectional elevation of the same.

The improved apparatus comprises a special distributer r, connected to a stand-pipe t and placed in communication by means of a tube f with a variable-pressure gasometer g, so that the fluid contents of the stand-pipe may be subjected to that pressure and their height varied with the variations thereof.

I have adopted the water-displacement gas-

ometer; but the result would be the same with a dome-gasometer the internal pressure of which is caused to vary at the proper moment by means of a suitably-arranged excess load.

The stand-pipe *t* is connected with an elevated reservoir *e* of large section and adapted to be supplied with water by means of a ball-cock, as shown in Fig. 1.

The distributer *r*, Figs. 1, 2, 3, and 4, consists of a triple-legged coupling having cocks *a* and *a'* in the two outer legs and a cock *d* in the central leg, with clear passage-way between said cocks, the stand-pipe rising through said central leg and pipes leading from each of the outer legs to the generators *b* and *b'*. The cock *d* regulates the admission of water to the distributer and the cocks *a* and *a'* permit of its flow into the generators or serve to cut off the supply from one or the other of these latter during recharging, as the case may be.

The plug of the cock *d* is formed with a principal aperture or port, the section of which is at least equal to that of the stand-pipe, and with a secondary port *o* at right angles to the first and of greatly-reduced section to supply a maximum stream adequate to ordinary demands.

The plug of the cock *d* is provided with an operating-handle arranged in the direction of the port *o*, so that the plug may be displaced in a socket provided with two lateral apertures *v v'*, which form prolongations of the port *o* when the handle occupies a horizontal position. This socket is surmounted by a vertical tube or shaft *c*, open at its upper portion, and which may itself be provided with two other apertures *x x'* equal in section to the port *o* of the cock *d*.

The cock *d* will be suitably limited in its displacement to one hundred and eighty degrees, enabling the handle to be placed horizontally either upon the right hand or the left, as indicated in Fig. 3, or to be raised to a vertical position for the purpose of entirely blocking admission to the stand-pipe *t*.

We are now in a position to consider precisely the operation of the stand-pipe and of the distributer which have just been described as a whole.

We will assume that the apparatus is set for operation, as represented in Fig. 2, with the cocks *a* and *a'* both open, establishing free communication between the distributer and each generator, and with the cock *d* turned to the right to cause port *o* to register with aperture *v*, so that the initial flow of hydrating fluid may be toward the generator *b* on that side. We will also assume, as shown in Fig. 1, that the gasometer and the stand-pipe are in equilibrium of pressure beneath a column of water *h* equal to the difference of height between the level of the water in the vessel *e* and the center of the port *o* of cock *d*, this port being opposite the aperture *v* in the socket of the cock, and therefore that water is standing in the pipe just level with the horizontal diameter of said aperture *v* and flowing thence to about half its capacity into the generator *b*, hydrating just sufficient carbid to maintain the pressure under the current demand. If now there is an increased drain from the gasometer, the pressure will diminish and the water in the stand-pipe will rise past port *o*, increasing the flow through aperture *v*, even to its full capacity, if demanded, resulting in a more rapid decomposition of the carbid and increased production of gas until an equilibrium is again reached. Should, however, the drain from the gasometer become too great for a single generator to replace or should the carbid in generator *b* be so far exhausted that this alone is inadequate to keep up the supply, the constant fall in pressure will result in the rise of the water in the stand-pipe until it reaches the apertures *x* and *x'*, when not only will a limited additional stream flow through *x* toward generator *b*, but a similar stream, equivalent in amount, will flow through *x'* to generator *b'*, starting action in the latter. Should the demand still increase, the water may even rise to and flow over the top of the stand-pipe to both generators. After a sufficient interval for the generator *b* to have become absolutely exhausted the cock *d* may be thrown over to the left, as indicated by the arrow in Fig. 3, causing port *o* to register with aperture *v'*, discharging toward generator *b'*, and the cock *a* closed by turning its handle to the horizontal, as also indicated by arrow in Fig. 3, when the generator *b* can be recharged, after which cock *a* will again be opened in order that generator *b* may be automatically brought into action in its turn.

It will be noticed that the recharging of the generator *b* has no influence upon rendering the generator *b'* operative, this being effected not by an overflow of water in excess from the generator *b*, but because the diminution of pressure in the apparatus, resulting from the continuity of the consumption of the gas, has enabled the water to rise in the vertical tube or shaft owing to the difference of the sections of the ways or apertures in the cock *d*, since the port *o* is inadequate to discharge more than a fraction of the rising column of water in the stand-pipe when the pressure is relieved beyond a given point.

The apertures *x x'* are not indispensable. The flow by way of the top of the shaft would be sufficient. The object of such apertures is to regulate the flow of water into the second generator more efficiently than would be done by the upper orifice of the shaft.

It is evident from the foregoing that the characteristic feature of this invention consists in the relation between the apertured stand-pipe and the flow-aperture or port *o* of the cock *d*, the section of which should be small enough relatively to the caliber of the stand-pipe to become readily submerged as soon as for one cause or another the pressure

diminishes abnormally in the gasometer with which the stand-pipe and distributer are in constant pressure communication.

This apparatus affords a certainty of operation such that it enables the reserve of gas of the gasometer to be suppressed to a certain extent, the rôle of the gasometer being limited to that of a regulating fly-wheel, (so to speak,) assuring by means of the mass of water that it contains the complete cooling of the gas and collecting the overproduction which is always inevitable when an important part of the consumption is suddenly stopped. The results are especially remarkable in the case of the adaptation of the device which has just been described to a water-displacement gasometer, as shown in Fig. 1 of the accompanying drawings. In gasometers of this kind the pressure supported by the gas increases in direct ratio with the storage. Now it follows from the construction of this gasometer that when the gas forces the water into the upper compartment the water rises in this latter by a quantity equal to that which it has fallen in the lower compartment. It follows from this that the pressure supported by the gas varies in the ratio of twice the displacement of the water in the gas-chamber *m*. On the other hand, as the section of the stand-pipe with respect to that of the reservoir *e* may be considered as negligible it follows that any displacement of water in the lower compartment of the gasometer will cause twice that displacement in the distributer, owing to the equilibrium of pressure. The flow of water into the generators will thus be regulated with the greatest sensitiveness.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In combination with a plurality of generators, a stand-pipe for fluid-supply, exposed to the gas-pressure and having apertures at different heights, and independent channels to which said apertures discharge said channels leading to independent generators, whereby the fluid discharged from an upper aperture of said stand-pipe may be directed to a generator other than that supplied by a lower aperture.

2. The combination to form a fluid-distributer for acetylene-gas generators, of the multi-legged coupling, the stand-pipe apertured at successive heights and discharging into said coupling, the pipe connection between said coupling and the pressure-chamber of the gas-receptacle, and the cock with large and small ports in said stand-pipe.

3. The combination to form a fluid-distributer for acetylene-gas generators, of the multi-legged coupling, the stand-pipe apertured at different heights and discharging into said coupling, the pressure-pipe extending between the pressure-chamber and said coupling, the cocks *a*, *a'*, in the distributing-legs, and the cock *d*, with its port *o* and central passage alining with the stand-pipe.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of July, 1899.

PAUL LACROIX.

Witnesses:
EDWARD P. MACLEAN,
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