

(No Model.)

O. S. HELLWIG.
ACETYLENE GAS GENERATOR.

No. 594,175.

Patented Nov. 23, 1897.

Fig. 2.

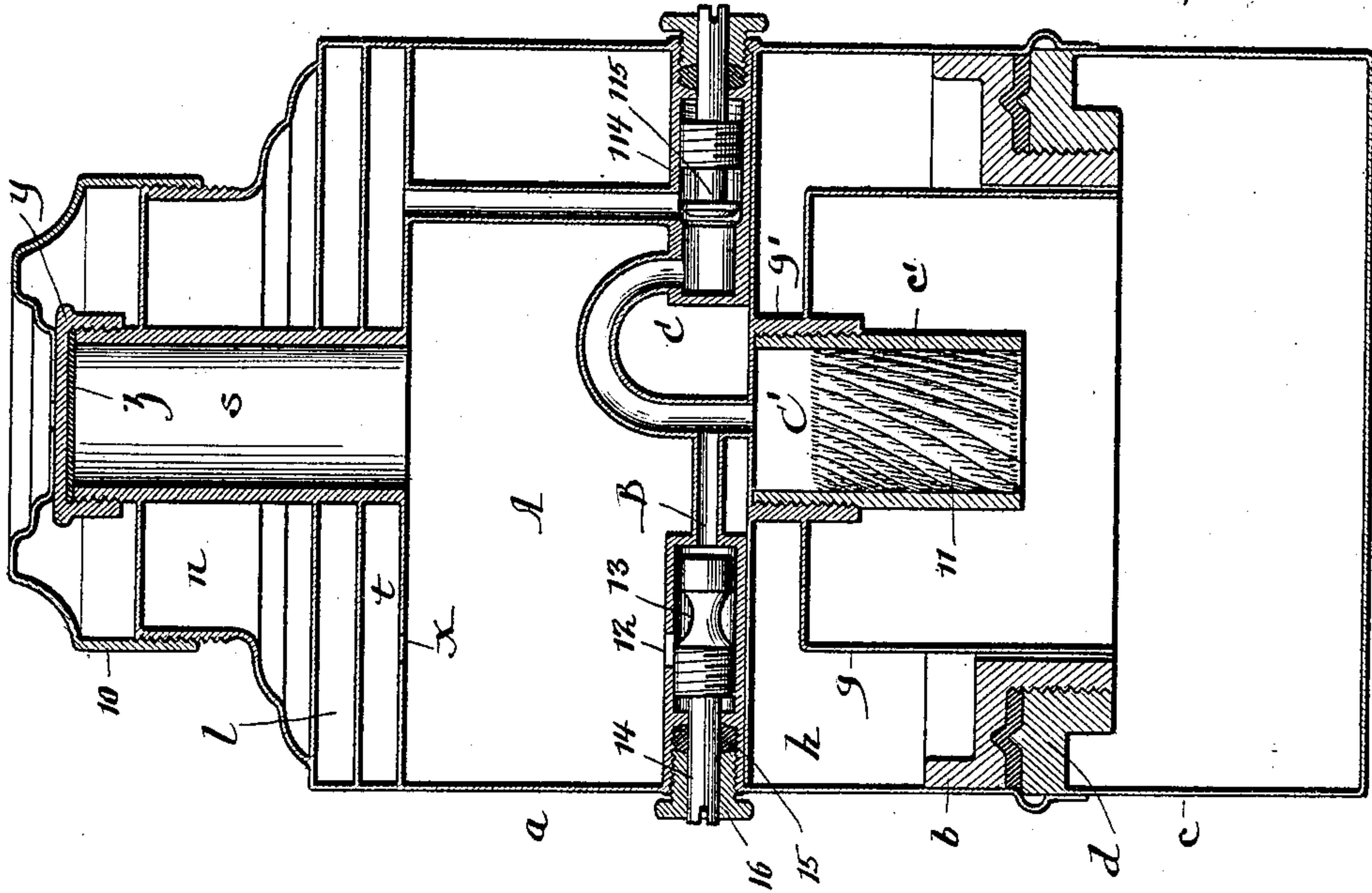
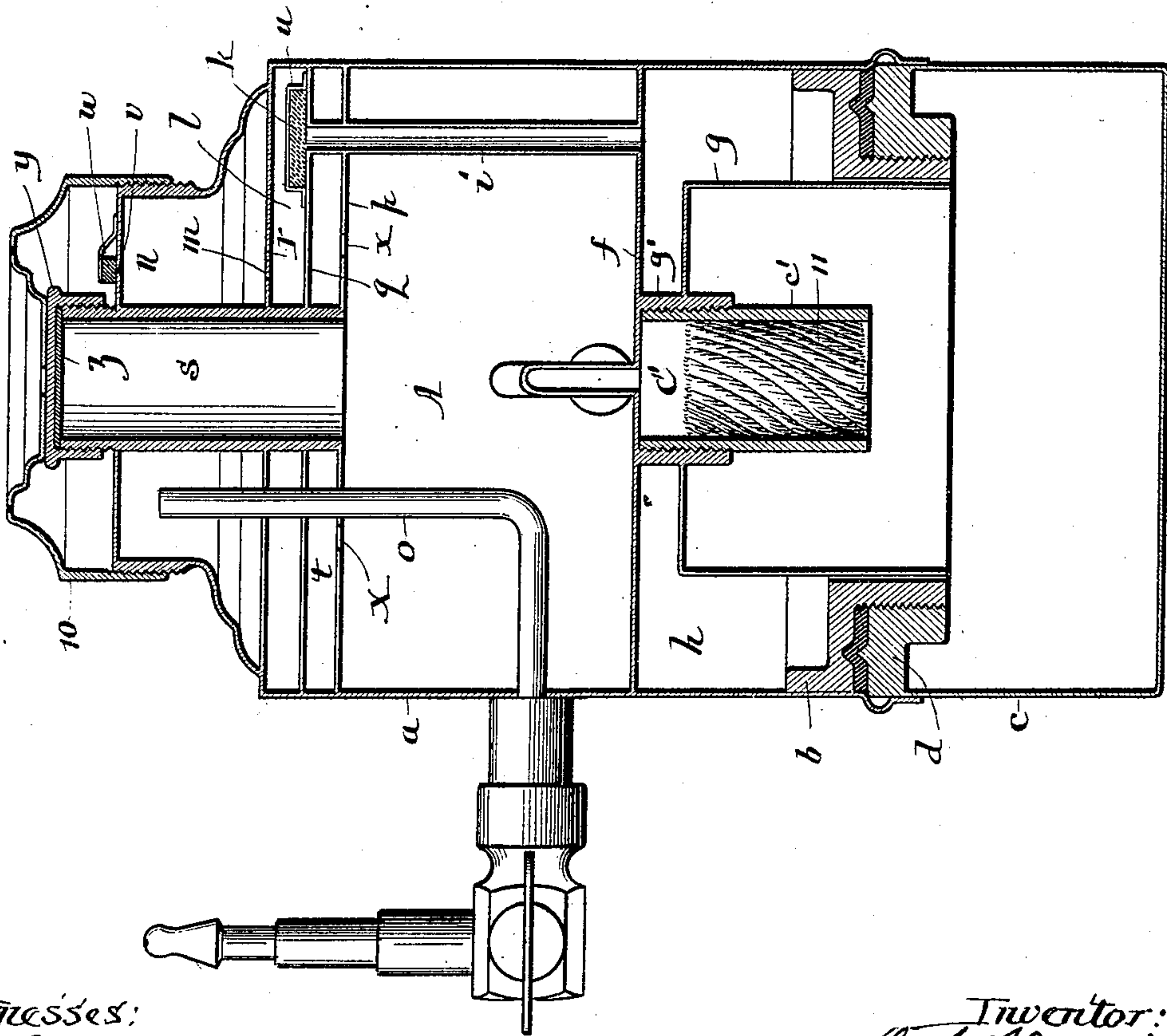


Fig. 1.



Witnesses:
Fredrick
O. C. Deane

Inventor:
O. S. Hellwig
By *Wm. F. Fisher*
Attorneys.

UNITED STATES PATENT OFFICE.

OTTO S. HELLWIG, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE P. FISHER, JR., OF SAME PLACE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 594,175, dated November 23, 1897.

Application filed April 30, 1897. Serial No. 634,569. (No model.)

To all whom it may concern:

Be it known that I, OTTO S. HELLWIG, a citizen of the United States, and a resident of the city of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Gas-Generators, of which I do declare the following to be a full, clear, and exact description, sufficient to enable others skilled in the art to make and use the same.

The invention relates to devices employed for automatic control of the production of gas in responsive keeping with the volume of gas consumed, and is more especially directed to that type of mechanism wherein an exciting liquid brought into contact with the basic material reacts chemically to generate the gas, as in the manufacture of acetylene from calcic carbide in the presence of water.

According to the invention the closed storage-tank for the exciting liquid is located above the level of the retort which contains the basic ingredient. The liquid tends to flow into the retort, but is held back in measure by an obstructive percolator interposed between the tank and the retort. At one side this percolator opens into the retort, while at the opposite side of such obstructive medium the percolator is established by separate passages in communication with the closed tank at points respectively above and below the free surface of its liquid contents.

On initial generation of a minor volume of gas at the retort (*e. g.*, by a few drops of liquid deposited before the retort-bottom is closed) the pressure thence developed causes the gas to force its way through the percolator (thus still checking the flow of liquid) and by companion conduit finally establishing the same pressure above the contents of the closed tank as exists in the retort beneath. In such state of equilibrium there is essentially no ventage of liquid from the tank to the retort. If now a portion of the gas be withdrawn at the free or outlet side of the retort, the fall in pressure there ensuing induces a measured flow of liquid out of the tank and into the retort. The extent of such flow depends upon the range in inequality between the pressure at the retort and at the free surface of the tank contents. As the inequality noted lessens the flow ceases, and, vice versa, it in-

creases practically drop by drop as the difference in pressure widens. This latter will occur when the gas is carried off more and more for consumption. Should the consumption be constant, the drip at the percolator into the retort is constant also, from all of which it appears that by the peculiar organization of parts presently detailed there is established a pulsatory or fluctuating escape of liquid into the retort, dependent directly upon the inequality in pressure at the retort and at the free surface of the tank contents, respectively. There is no flow if the inequality be *nil*. In other words, when the gas consumption ceases its generation likewise ceases under automatic control.

The nature of the improvements will appear in detail from the description and be more particularly pointed out by claims at the conclusion.

On the accompanying drawings the invention is displayed in compact form suited for the generation of acetylene when employed for use in bicycle-lamps.

Like parts bear like designation throughout.

Figure 1 is a longitudinal section of the apparatus at the line of the burner. Fig. 2 is a like section at right angles to Fig. 1.

An inclosing case *a*, furnished with a stout ring *b*, is threaded to a base-cup *c*, having a like ring *d* to engage the companion ring *b*. A packing *e* serves to close the joint between the parts. A tight diaphragm *f*, brazed internally to the case *a* about midway of its height, constitutes the bottom of the storage-tank *A* for the exciting liquid—*e. g.*, water.

Dependent from the central portion of diaphragm *f* is a bell-like drum *g*, the outer wall of which is nearly in contact with the adjacent face of ring *b*. Sufficient space exists, however, between these parts to permit the gas generated beneath in cup-retort *c* to force its way into the reserve-chamber *h*, and thence by tube *i* past leather cap *k*, collecting-chamber *l*, and port *m* into dome *n*, where the outlet-tube *o* for the consumption-circuit opens.

Plates *p q r*, suitably spaced, as appears, and secured to the wall of case *a* and to central inlet-tube *s* for the liquid-supply, serve to form an equalizing-chamber *t*, presently de-

scribed, and as well the collecting-chamber *l* and dome *n* just mentioned.

The cap *k* is stoutly held to its seat over tube *i* at plate *q* by means of a clip *u*. The gas forces its way in large measure through the pores of cap *k*, which thus serves as a sort of regulator to keep the flame constant. A port *v*, closed by spring-valve *w* at top of dome *n*, relieves any excessive pressure.

Storage-tank A is located between diaphragm *f* and plate *p* and by ports *x* in said plate communicates with equalizing-chamber *t*. Inlet-tube *s* opens into the tank and is closed gas-tight at its top by threaded cap *y* and packing-disk *z*. A protecting-hood covers the top of case *a*, more especially to protect safety-valve *w*.

From the bottom of tank A, below the surface of the liquid, extends a passage B, which empties into a percolator C', located intermediate the tank and the retort *c* of the generator. Percolator C' consists of a short tube-section *c'*, screwed to the ring-like curtain *g'* of the diaphragm *f*. Into this tube-section *c'*, before it is mounted in place, a portion of cotton wicking or like obstructive medium is tightly stuffed, leaving generally a clear space above and next adjacent the inlet from passage B. Passage B is here shown of tube-like form, having vent 12 from the tank, controlled by piston-valve 13. Piston-stem 14 projects through packing 15 and gland 16 to the exterior and is capable of easy adjustment to regulate vent 12. The liquid from the tank flows past valve-head 13 and by passage B empties into the percolator above its obstructive wad. Leading from the percolator at the same side of its obstruction is a companion passage or conduit C, which, as here shown, attaches conveniently to tube B, and, bending in gooseneck form, is enlarged to constitute a cylindric housing 114 for piston-valve 115, threaded, as appears, and furnished with a stem which projects through a proper packing and gland to the outside of case *a* for ease in adjustment. From the valve-housing the conduit C extends upward through tank A and unites to plate *p*, whereby communication is established with equalizing-chamber *t* and in turn by vents *x* with the free surface of the liquid in the tank.

The dual conduits B C constitute in effect branching passages from the same side of the percolator to join it in closed circuit with the storage-tank respectively below and above the liquid therein.

On removal of cap *y* the tank A can be filled with liquid through inlet *s*, after which cap *y* is secured tightly to place. The liquid flows from tank A by vent 12 and conduit B past valve 13 into the top of percolator C', where it speedily saturates the stuffing 11.

There is no drip of liquid from the percolator into cup-retort *c*. The air displaced by this initial flow of the liquid escapes equally into the retort beneath and as well by conduit C and chamber *t* into the upper side of

tank A overhead. Since the inlet-tube *s* and the cup-retort *c* at opposite ends of the system are both tightly closed, the air-pressure is in equilibrium. It is no greater over the tank, and in consequence above the percolator, than it is beneath at the under face of the percolator-stuffing—*i. e.*, on the retort side. The liquid stays suspended despite gravity, much as if it were in a familiar pipette with the upper end closed by thumb.

Only when the pressure at the retort is less than the pressure at the tank—*i. e.*, at the upper side of the percolator-wad—will there be a flow of liquid to the retort. The extent of such flow depends upon the inequality in pressure noted, and by adjustment of the valves can be reduced to a drip-supply into the retort, as desired.

To generate the gas, cup-retort *c* is taken off, filled with a quantity of basic material—*e. g.*, calcic carbide—a little of the exciting liquid—*e. g.*, water—being added, and the retort then tightly restored to place. As first given off the gas forces passage through the percolator and conduit C into equalizing-chamber *t*, thus holding the liquid-flow in check, and as well finds its way by reserve-chamber *h*, tube *i*, collecting-chamber *l*, and dome *n* to the shut outlet-tube *o*. This distribution of the gas maintains the pressure practically constant at both ends of the percolator—*i. e.*, at the retort and at the tank sides. Hence the drip of the liquid is prevented. But if escape-tube *o* be opened, as in usual burning of a lamp or lamps supplied with the gas, then the pressure at the retort beneath the percolator is less than at the upper side thereof. The flow of the liquid is no longer prevented, and it accordingly proceeds to pass through the percolator and to fall drop by drop into the retort in aid of further production of gas. On closing the outlet-tube *o* the equilibrium of pressure is quickly restored and the further dropping of the water is at an end.

Manifestly the details can be varied according to the mechanic's skill without departure from the essentials of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In gas-generators, the combination with the retort and with the closed tank for the exciting liquid located at a level relatively higher than the retort, of an obstructive percolator interposed between said tank and retort, said percolator discharging at one side into the retort and at the opposite side communicating with the tank by dual passages respectively above and below the free surface of its liquid contents, the passage that extends above the tank's contents being for the escape of gas from the retort, and the other being for the passage of the liquid from the tank into the retort, substantially as described.

2. In gas-generators, the combination with the retort and with the closed tank for the

exciting liquid located at a level relatively higher than the retort, of a percolator with obstructive wad therein and located between said tank and retort; said percolator opening
 5 at one side of its wad into the retort, and at the opposite, by branching passages communicating with the closed tank, respectively above and below the level of its liquid contents, the passage that extends above the
 10 tank's contents being for the escape of gas from the retort, and the other being for the passage of the liquid from the tank into the retort, and independent means for regulating the size of each passage, substantially as de-
 15 scribed.

3. In gas-generators, the combination with the inclosing case having removable cup-retort at its base with escape-vent therefrom, of the cross-diaphragm with dependent bell pro-
 20 jected into said retort, the percolator having an obstructive wad and extended within said bell to open into the retort, the tank located above said diaphragm and having a closed in-
 25 let to admit the liquid-supply, and branched conduits furnished with regulating-valves, leading out from the percolator over its ob-
 30 structive wad and respectively communicating with said tank above and below the level of its liquid, substantially as described.

4. In gas-generators, the combination with the inclosing case having cross-diaphragm therein to define a retort below and a tank for

liquid above said diaphragm, of an interposed percolator dependent from said diaphragm, furnished with an obstructive wad, and open- 35
 ing into said retort beneath the wad, a regulated conduit uniting the lower part of the tank with the percolator above its wad, and a separate regulated conduit joining the like
 40 end of the percolator with the upper part of said tank, substantially as described.

5. The combination with the inclosing case *a*, the cup-retort *c* secured at the base thereof and with the cross-diaphragm *f* having de-
 45 pendent bell-drum *g* projected in close proximity to the adjacent retort-wall thereby establishing a reserve gas-chamber *h* between
 50 said retort and diaphragm, of the tank *A* with closed inlet for the liquid, the percolator *C'* carried beneath from said diaphragm, fur-
 55 nished with an obstructive wad *11* and opening below such wad into the retort, the branching dual conduits *B*, *C* uniting the percolator above its wad with the upper and lower parts
 of said tank respectively, the distributing-
 dome *n* having outlet *o* for the gas and a tube
i establishing communication between gas-re-
 serve chamber *h* and dome *n* through porous
 check *k*, substantially as described.

OTTO S. HELLWIG.

Witnesses:

FRED GERLACH,
 ALBERTA ADAMICK.