(No Model.)

N. LIKINS.

ACETYLENE GAS GENERATOR.

No. 589,991. Patented Sept. 14, 1897.

Fig. 1.

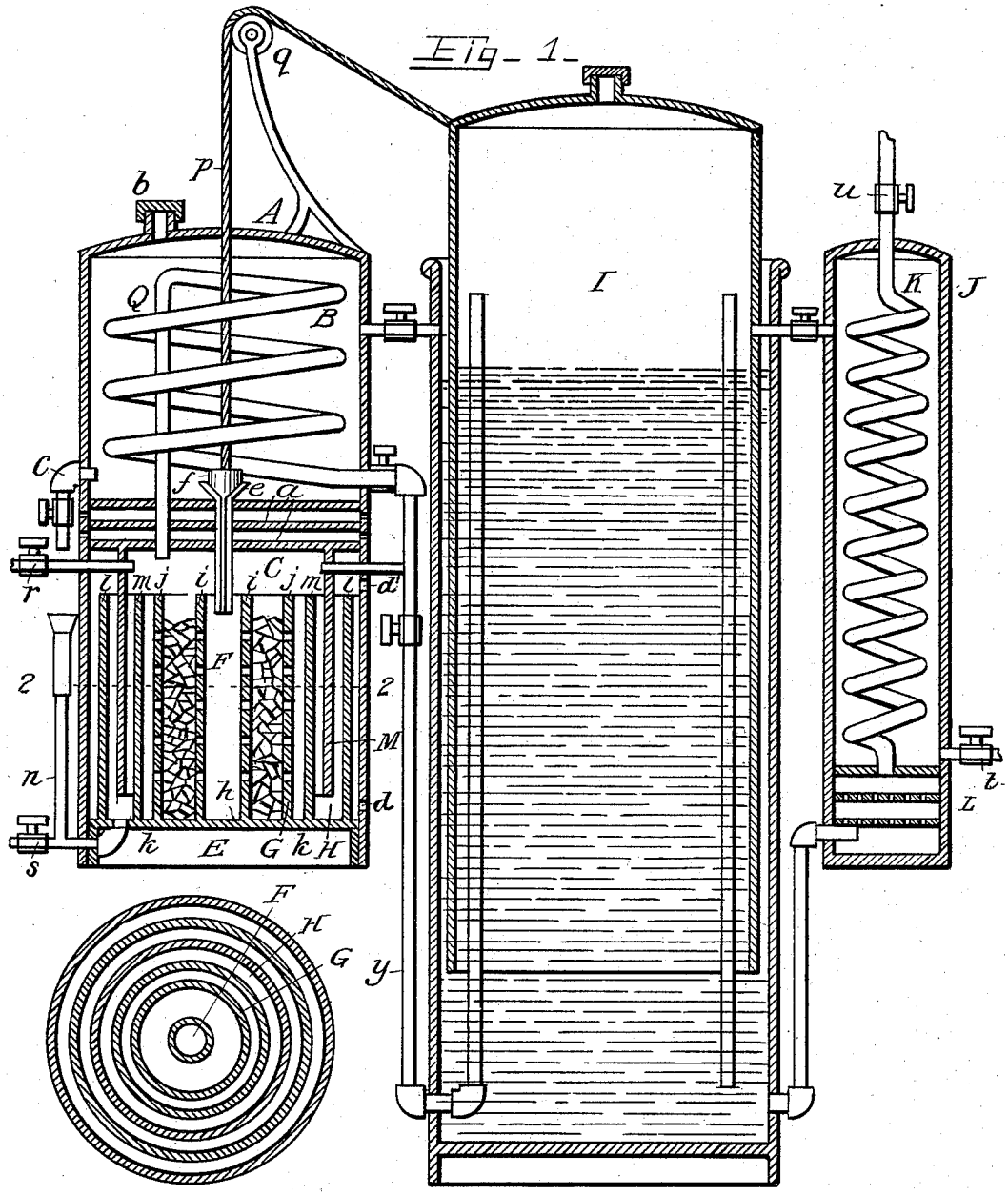


Fig. 2.

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UNITED STATES PATENT OFFICE.

NELSON LIKINS, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF TWO-FIFTHS TO F. R. SALISBURY AND W. E. SATTERLEE, OF SAME PLACE.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 589,991, dated September 14, 1897.

Application filed October 3, 1896. Serial No. 607,762. (No model.)

To all whom it may concern:

Be it known that I, NELSON LIKINS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and useful Improvement in Acetylene-Gas Generators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which my invention appertains to make and to use the same.

My invention relates to generators used in the production of illuminating-gas; and it consists of a retort designed to receive calcium carbid, from which acetylene gas is evolved, of a submerged coil within a cooling-chamber, through which the gas passes to a gasometer, by means of which it is robbed of a portion of the heat evolved through chemical action, of a gasometer in which it is stored, and of a condenser by means of which it is robbed of a portion of its moisture, as will be hereinafter understood.

My invention is fully illustrated in the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a vertical section of my device; and Fig. 2 is a horizontal section of the generator, taken on the line 2 2.

Similar letters refer to similar parts in both views.

A description in detail is as follows:

A is a case (preferably cylindrical) divided horizontally into two compartments B and C. The upper one, B, is adapted to receive the coil D and to serve as a cooling-chamber, and the lower one, C, is adapted to receive the retort E and to serve as a generator, as will hereinafter be understood. These compartments B and C are separated by means of the floors *a a a*, having vented air-spaces between them.

The crown or roof of the compartment B is furnished with an aperture *b*, by means of which water may be admitted thereto, and with the pipe *c*, by means of which it may be drained. The circumferential side of the compartment C (the lower portion of the case A) is pierced near its bottom and near its top, the lower series of holes *d* being adapted to admit cold air thereto and the upper series *d'* adapted to let the heated air therefrom. The lower end of this compartment C is left open to receive the retort or calcium-carbid box E. The three floors *a a a* are pierced and the compartments B and C are connected by a duct *e*, having a cup or funnel shaped upper end. Within this duct I insert a gravity-valve *f*, having its shaft or body portion fluted or flanged and having a head adapted to fit into the funnel-shaped upper end of the duct *e*. A cord is attached to the upper end or head of the valve *f*, passes through the crown of the cooling-chamber B, thence over a pulley supported from said crown or cover, and attached to the crown of the telescope-gasometer, hereinafter mentioned.

The submerged coil D extends upward from the roof of the retort-chamber C, through the floors *a a a*, thence in a spiral form to near the crown of the cooling-chamber B, thence downward to near the bottom of said chamber, thence horizontally through its circumferential wall, where it connects with a vertical pipe *g*, leading to the before-mentioned gasometer.

Depending from the roof of the retort-chamber C is an annular wall M.

The retort or calcium-carbid holder E is detachable and may be withdrawn for the purpose of removing any residuum and for recharging it with the calcium carbid. It consists of the bottom *h*, supporting four vertical cylinders, each larger than the other, thus forming a central chamber F and two annular chambers G and H. The smallest cylinder *i* and the next in size *j* are made of perforated sheet metal, while the two larger ones, *k* and *l*, are made of imperforate sheet metal. Hence the annular chamber G has perforated walls, while the annular chamber H has solid walls. When this retort is in position, its cylinder *m* passes inside of the annular wall M, while its cylinder *l* passes outside the same—that is to say, the annular wall M shuts into the annular chamber H, thus forming (when the chamber H is filled) a water seal.

The retort is further provided with a pipe N, which serves both as a supply and exhaust. It taps the annular chamber H at its bottom, thence extends outward through a slit in the side of the case A, thence upward outside the

said case, and terminates with a glass section having a funnel-shaped open top, thus serving as a water-gage for the annular chamber H.

The gasometer I and the condenser J are not unlike those in general use and therefore need no description herein.

In operating my device I first supply the box E with a quantity of calcium carbid broken into small pieces (for illustration, the size of eggs or smaller) and insert it within the case A, as shown in the drawings. I next open the stop-cock *o* of the water-pipe *c*, thereby drawing water from the cooling-chamber B to fill the annular chamber H of the calcium-carbid box E, thus sealing the latter, the glass water-gage showing when the water is at sufficient height. I then raise the gravity-valve *f*, (by pulling down the cord *p*, which runs over the pulley *q*,) thereby letting a small quantity of water into the cylinder-chamber F, which, passing through the perforations in its circumferential sides, saturates the lower strata of calcium carbid in the box E, when acetylene gas is at once liberated therefrom, which, passing through the interstices of the calcium carbid, accumulates in the retort-chamber C, and thence flows into the coil D. This is an important feature of the invention, for when water is admitted to the lower strata of calcium carbid acetylene gas is set free, which passes through the interstices of the carbid without forming a paste upon its surface, which is the case when water is admitted to its upper strata. Now as the gas accumulates in the gasometer I above the water with which it is sealed it lifts the crown, (the moving portion thereof,) which slacks off the chain *p* and lets the valve *f* fall into its seat, thereby shutting off the water from the calcium carbid, which temporarily suspends the generation of the gas. Then when the quantity of gas stored in the gasometer shall have been reduced sufficiently to allow the crown to fall it tightens the cord *p*, thereby again lifting the valve *f* and letting on more water, when the generation will at once begin again.

It will thus be seen that my generator works automatically, and that there is therefore no great accumulation of gas in the gasometer, and therefore little danger of an explosion. The box L of the condenser J is a filter or purifier for the gas. In it I use slaked lime in the form of dry hydrates or the oxid of iron spread upon the trays. Through this the gas filters before passing into the condenser.

In thus generating acetylene gas heat is evolved through chemical action, and I therefore pass the gas through the submerged coil D, by which means I rob it of a portion of the heat generated. Water is also taken up by the gas, which tends to clog the gauze strainers used in the burners, and I therefore pass it through the second submerged coil K, by which means I rob it of a portion thereof. The stop-cock *r* is for the purpose of venting the generator B while filling the water seal H. The stop-cock *s* is for draining the water seal H. The stop-cock *t* is for draining the condenser J, and the stop-cock *u* is for turning on or shutting off the gas from the building.

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

1. In a gas-generator, the combination of a case, closed at its top and open at its bottom, horizontally divided into two compartments by two or more floors having vented air-spaces between them, the upper one of said compartments being adapted to serve as a water-tank, and the lower one of said compartments being adapted to serve as a retort-chamber; said compartments being connected by means of a duct extending through the said floors, said duct having a gravity-valve therein, through the operation of which the flow of water from the said water-tank to the said retort-chamber is automatically controlled; a removable retort chambered within the retort-chamber, said retort being fashioned with double walls whereby it may be water-sealed, and having an annular calcium-carbid holder formed with perforated interior and exterior walls, whereby water may be admitted to the lower strata of the calcium carbid; an annular wall extending downward from the said water-tank to the said retort-chamber for the purpose of sealing the retort; a pipe extending from the said retort-chamber through the said water-tank thence to a telescope gas-holder; and a chain connecting the said gravity-valve with the dome of the said telescope gas-holder, whereby the said gravity-valve is operated, all substantially as shown and described.

2. In a gas-generator, the combination of a case horizontally divided into two compartments, said compartments being connected by a duct having a gravity-valve therein; a retort chambered within the lower one of said compartments, said retort being fashioned with double walls whereby it may be water-sealed, and provided with an annular chamber having interior and exterior perforated walls adapted to hold calcium carbid or other gas-forming material, an annular wall extending downward from the upper into the lower chamber for the purpose of sealing said retort; a pipe leading from the lower through the upper of said chambers, thence to a telescope gas-holder, for the purpose of carrying off the gas, and a chain connecting the said gravity-valve with the dome of the said telescope gas-holder whereby said gravity-valve is operated substantially as shown and described.

3. In a gas-generator, the combination of the case A divided into two compartments B and C, by means of the floors *a*, *a*, *a*; the duct *e* connecting the said compartments B and C; the gravity-valve *f* operating within the said duct *e*; the pipe D extending from the said compartment C, through the said compartment B, thence to the gas-holder I; the retort E, having the annular chamber G fash-

ioned with perforated walls, adapted to hold calcium carbid or other gas-forming material, and with the annular chamber H fashioned with solid walls adapted to hold water for the purpose of sealing the same; the annular wall M incased within the annular chamber H; the chain *p* connected with, and extending from the said gravity-valve *f*, to, and over or around the pulley *q*, thence to, and connected with the dome of the said telescope gas-holder I, whereby the said gravity-valve *f* may be automatically operated; the purifying-box L and the condensing-coil K, substantially as shown and described.

NELSON LIKINS.

In presence of—
CAROLYNE PATCHIN,
L. E. CHERRY.