

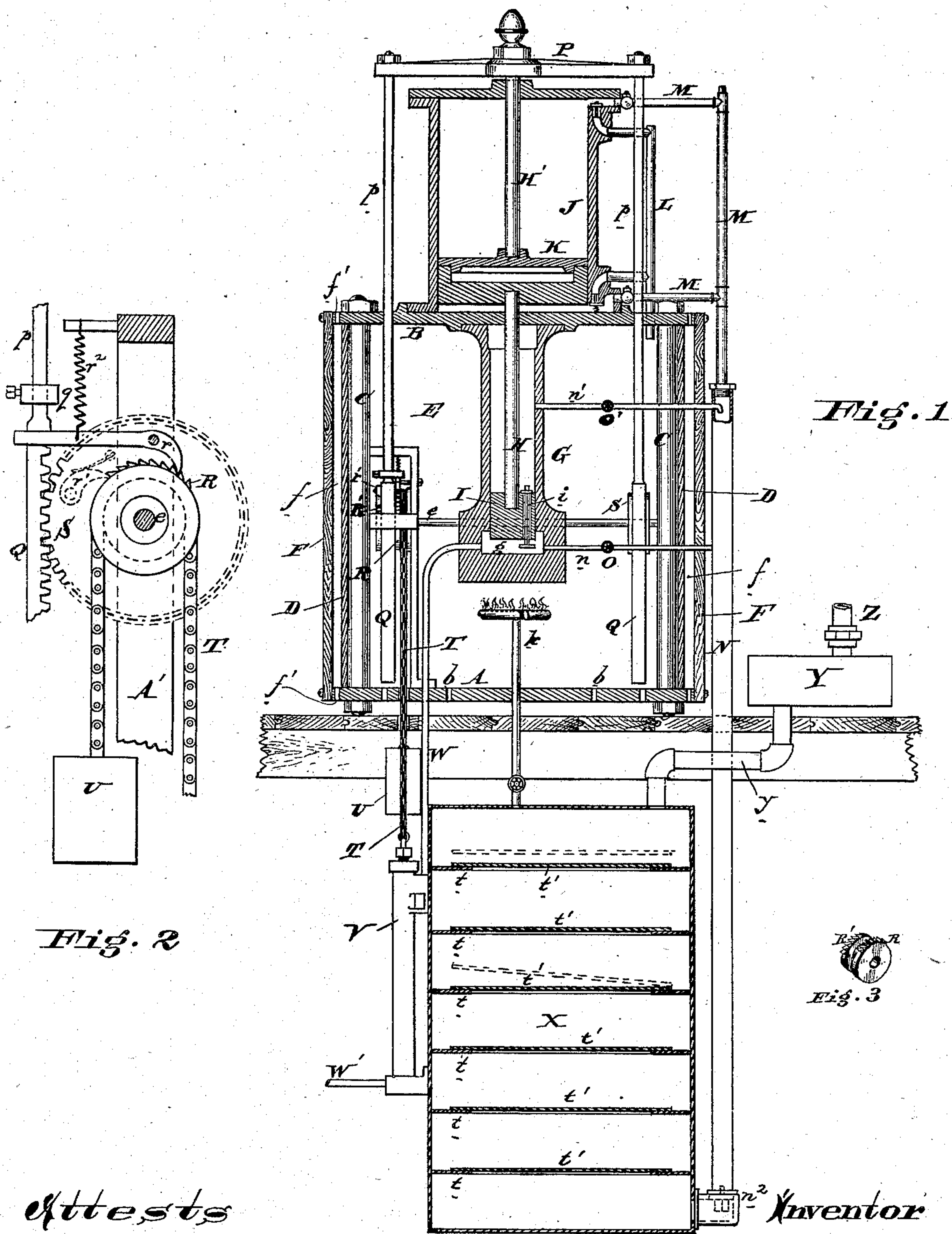
(No Model.)

E. C. BURGESS.

GAS MACHINE.

No. 255,073.

Patented Mar. 14, 1882.



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UNITED STATES PATENT OFFICE.

EDWARD C. BURGESS, OF PHILADELPHIA, PENNSYLVANIA.

GAS-MACHINE.

SPECIFICATION forming part of Letters Patent No. 255,073, dated March 14, 1882.

Application filed October 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. BURGESS, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Gas-Machines, of which the following is a specification.

My invention has reference to automatic gas-generating machines; and it consists of two pistons working in two cylinders, one of which is kept constantly hot, said pistons being connected together, one of which is adapted to pump hot air and the other adapted to be actuated by expanding hydrocarbon vapor generated from oil; further, in devices combined with the aforesaid pistons and an oil-pump operating to feed a limited quantity of oil to the hydrocarbon-cylinder, where it is vaporized; further, in providing a constant exhaust for hydrocarbon vapor from the hydrocarbon-cylinder into the gas-main, where it is mixed with heated air, and in minor details of construction, all of which is more fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

Heretofore, so far as I am aware, a double-acting blast-cylinder adapted to pump hot air when combined with a hydrocarbon vapor generator having a constant exhaust has never been used. Neither has the constant exhaust for the hydrocarbon vapor to enable a constant mixing of the vapor with the hot air been known previous to my invention thereof. These parts, when combined with suitable oil-pumping mechanism, an intermittent hydrocarbon-vapor exhaust, a hot-air chamber inclosing the hydrocarbon-vapor generator, or a holder to prevent the pulsations of the pump affecting the light given by burning the gas taken from the mains, are also new.

Hydrocarbon-generators broadly are old, as are also gas-machines which mix air with hydrocarbon vapor. Double-acting hot-blast cylinders, when arranged with a hydrocarbon-generator, have also been used. Therefore I do not claim these features, broadly, but only in combination with other specific features, as set forth in the statement of invention and in the appended claims.

The object of this invention is to produce an illuminant from oil and heated air and construct a machine for that purpose which shall be automatic in its action.

In the drawings, Figure 1 is a sectional elevation of a gas-machine embodying in it my improvements. Fig. 2 is an enlarged detail view of the mechanism to actuate the pump to feed the oil to the generating-cylinder. Fig. 3 is a perspective view of the double ratchet-wheel in the device shown in Fig. 2.

A is the bed or base plate, and is provided with holes or apertures *b*, and carries at the top a plate, B, to which it is secured by bolts C, and located between the two is a sheet-iron casing, D, which incloses the hydrocarbon-gas-generating cylinder G.

Inclosing the casing D is a wooden casing, F, and between the two is an annular space, *f*, which is in communication at the top and bottom with the air by holes *f'* in plates A and B. Secured to the plate B, and located within the casing D, is the generating-cylinder G, which is made heavy at the bottom, as shown, to retain heat, and provided with the oil-chamber *g*.

The piston I is provided with a valve, *i*, through the same, and is secured on the bottom of a piston-rod, H, which passes through plate B and is secured to piston K, which works in the air-cylinder J. The piston-rod H, or its equivalent, H', extends up through the cylinder-head, and is secured to the cross-head P, carrying rods *pp*, having racks Q Q at the bottom. The air-cylinder is arranged to draw hot air from within the casing D through pipe L and pump it out through pipes M into the main N, into which the hydrocarbon vapor also passes from cylinder G by means of pipes *n* and *n'*, which are respectively furnished with cocks or needle-valves O O'. From the main N the mixed hydrocarbon vapor and hot air is forced into the gasometer or holder X through the check-valve *n*². The holder X is a cylindrical vessel, provided with a series of shelves, *t*, upon which rest light valves *t'*. The gas from holder X passes by pipe *y* through the regulator Y to main Z. The ring-burner *k* is located immediately under the generator-cylinder G and within casing D, and is in communication with the gas-holder, from whence it receives its gas wherewith to heat the cylinder. The racks Q mesh with gear-wheels S on shaft *e*.

The double ratchet-wheel R R' carries the chain T, to one end of which is a weight, U, and to the other the pump-rod, which works in

a pump, V, which draws oil from a well by pipe W' and forces it to the chamber *g* in the generator-cylinder G by pipe W.

The gear-wheel S is loose with reference to the ratchet-wheels, and in the upward movement of the rack Q the pawl *r'*, which is pivoted to the gear-wheel, rotates the ratchet-wheels R' and R, at the same time lifting up the weight U and lowering the pump-rod. When the weight is fully raised it is held in position by the pawl *r'*, which is pivoted to the frame A', catching the ratchet-wheel R, said pawl being pressed into contact with the wheel by spring *r*². The pump-rod and weight now remain stationary until the rod *p*, carrying the collar or step *q*, descends, when the collar presses down the end of the arm of the pawl, throwing it out of contact with wheel R, when the weight U descends, raising the pump-rod and rotating the ratchet-wheels R R' back to their original position.

The operation is as follows: The cylinder G being heated, the hydrocarbon vapor, expanding, closes the valve *i* and forces up the piston I, said vapor constantly escaping with the exhaust *n* through needle-valve O, and, after reaching its highest point, through the pipe *n'* and valve O' in the gas-main N. As the piston I ascends the piston K also ascends and forces hot air into the main N, where it mixes with the hydrocarbon gas or vapor from pipes *n* and *n'*. As the pistons ascend the weight U is raised and the pump-rod lowered, and as the pistons descend the valve *i* opens to allow the vapor to pass through the piston and out through the pipe *n'* to main N. Just as the bottom of the stroke is reached the collar *q* trips the pawl *r*, and the weight U comes into play and forces a small quantity of oil into the chamber *g* of the generator-cylinder G, and so on. The flame from the ring-burner *k* is fed with air by holes *b*, as is also the hot air from the cylinder J. The mixed hydrocarbon vapor and hot air in pipe N passes through a check-valve, *n*², into the gasometer or holder X, and rises from the bottom to the top through the valves *t'*, which prevents the pulsations of the piston K affecting the pressure of the gas in the main Z.

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

1. In a gas-machine, the combination of the cylinders G and J with their pistons I and K and piston-rods H H', cross-head P, rods *p*, carrying racks Q at their bottoms, ratchet-wheels R and R', pawls *r* and *r'*, pinions S, chain T, weight U, pump V, pipe W, and constant exhaust pipe *n*, substantially as and for the purpose specified.

2. In a gas-machine, the sheet-iron casing D and closed head B, in combination with the hydrocarbon-vapor generator G, means to heat the same located within the casing, blast-cyl-

inder J, and pipes L and M, with their respective check-valves, substantially as shown, the suction-pipe L opening into the casing D, as and for the purpose specified.

3. In a gas-machine, the combination of hydrocarbon-vapor-generating cylinder G, piston I, gas-main N, pipes *n* and *n'*, provided respectively with valves O and O', and oil-supply pipe W, substantially as and for the purpose specified.

4. In a gas-machine, the generator-cylinder G, provided at the bottom with a chamber, *g*, in combination with the piston I and a continuous exhaust, *n* O, for gas, and intermittent supply pipe W, for oil, substantially as and for the purpose specified.

5. In a gas apparatus, the casing D, solid head B, and perforated head or plate A, in combination with means to heat the air within said casing, cylinders G and J, with their pistons, the cylinder J being provided with suction-pipes communicating with the hot-air chamber, whereby hot air is supplied to the blast-cylinder before being mixed with the hydrocarbon vapor, and wooden casing F, as shown and described.

6. In a gas-machine, the sheet-iron casing D and closed head or plate B, in combination with the hydrocarbon-vapor generator G, means to heat the same located within the casing, blast-cylinder J, pipes L and M, with their respective check-valves, the suction-pipe L, opening into the casing D, gas-main N, and pipes *n* and *n'*, provided with valves, substantially as and for the purpose specified.

7. In a gas-machine, the generator-cylinder G, having the piston I, provided with a valve, *i*, in combination with the constant exhaust pipe *n*, for the hydrocarbon vapor, and the intermittent exhaust *n'*, substantially as shown and described.

8. In a gas-machine, the generator-cylinder G and its piston I, in combination with chamber E and its top plate, B, the hot-blast cylinder J, located above it, both of said cylinders being bolted to the said plate, hot-blast suction-pipes L, opening into the chamber E, surrounding the cylinder G, and piston K, both of said pistons being rigidly connected together by rod H, substantially as and for the purpose specified.

9. In apparatus for supplying oil to gas-machines, the combination of gear-wheel S, double ratchet-wheel R R', chain T, weight U, pump V, pawls *r'* and *r*, springs *r*², rod *p*, rack Q, and stop *q*, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

EDWARD C. BURGESS.

Witnesses:

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ROBERT A. CAVIN.