F. W. OFELDT.

GAS MACHINE.

No. 189,873. Patented April 24, 1877.

Fig. 1

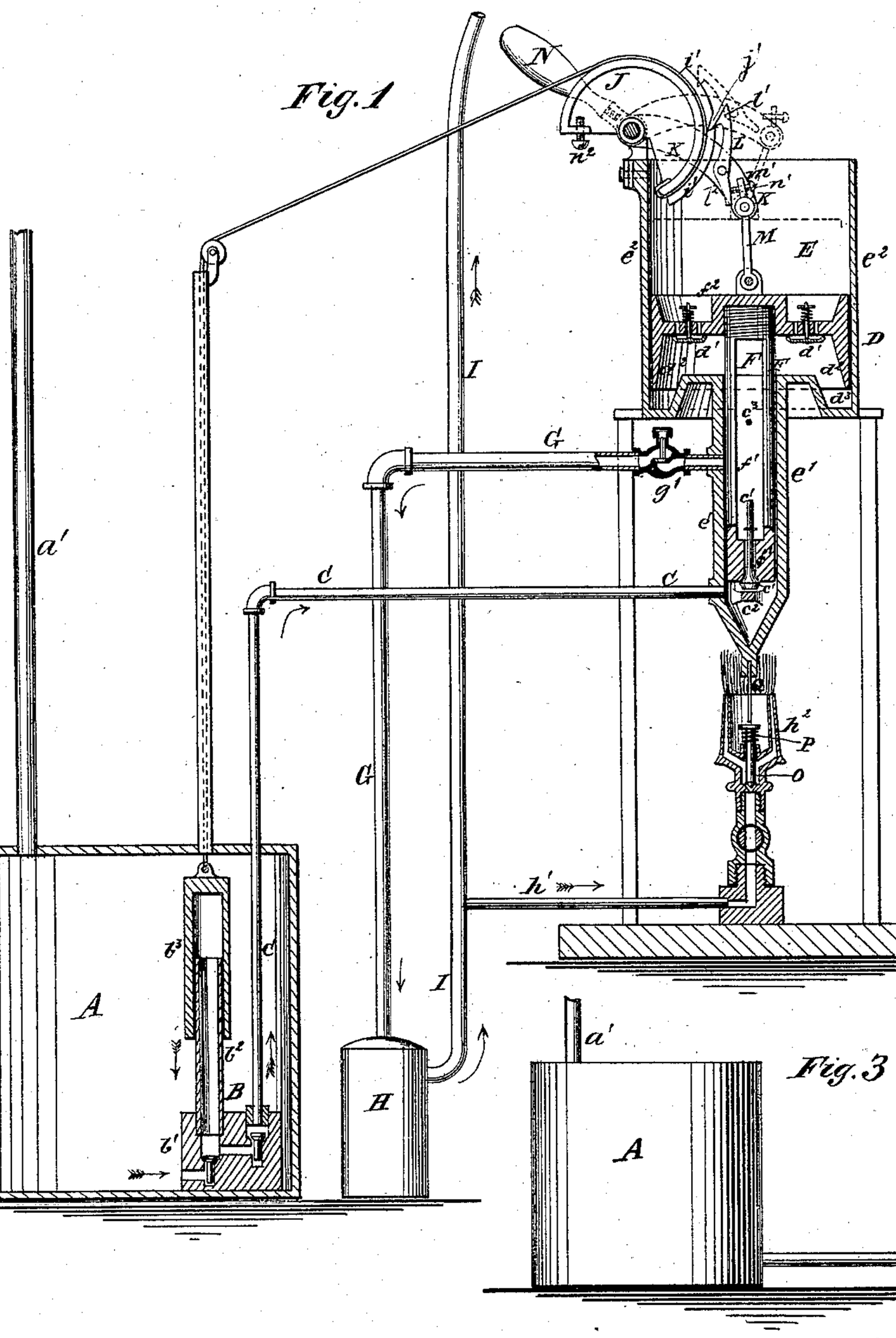
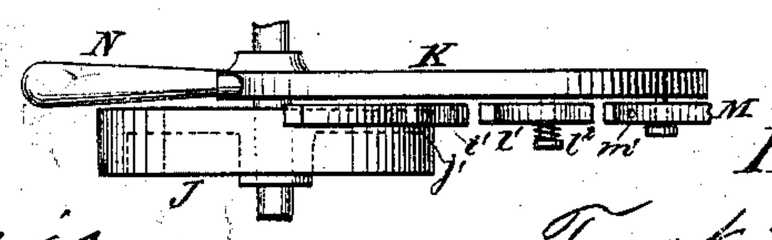


Fig. 2

Fig. 3



Witnesses.

Horace Hollis

John C. Young.

Inventor.

Frank. W. Ofeldt.

UNITED STATES PATENT OFFICE.

FRANK W. OFELDT, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF AND CHANDLER C. COATS, OF SAME PLACE.

IMPROVEMENT IN GAS-MACHINES.

Specification forming part of Letters Patent No. **189,873,** dated April 24, 1877; application filed December 28, 1876.

To all whom it may concern:

Be it known that I, FRANK W. OFELDT, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Gas-Machines, of which the following is a specification:

My invention relates to that class of gas-machines in which the gas is formed by vaporization of gasoline or other volatile hydrocarbons.

In the machines of this class previously patented by me the air for vaporization of gasoline is supplied by an induced current of steam from a small boiler, the latent heat of the steam, when liberated by condensation, replacing the sensible heat of the gasoline made latent by vaporization.

To accomplish the same result without the use of steam and its necessary accompaniment, the feed-water, and thus materially to simplify the construction of and lessen the attention necessary for the management of the machine, is the main object of this my present invention.

The invention consists in the construction and combination of a gas-generating pump and an oil-supply pump, the movements of the former operating the latter, which again supplies the gasoline, by the vaporization and consequent expansion of which the former receives its motion, the heat to compensate for that made latent by vaporization being supplied by a burner from the gas thus made, said burner being regulated automatically and applied to heat the oil-supply as it enters the generating-pump, as will be hereinafter described with reference to the accompanying drawing, in which—

Figure 1 represents a vertical section of a complete gas-machine constructed according to this my present invention. Fig. 2 is a top view of details thereof. Fig. 3 shows a modification of the arrangement of the oil-supply pump relative to the oil-tank.

Similar letters of reference indicate like parts in the different figures.

a is the oil-tank, placed under the ground, and charged with gasoline through the pipe *a'*, as usual. B is the oil-supply pump, placed either inside of the tank *a*, as shown in Fig. 1, or outside and connected thereto by a pipe, as shown in Fig. 3. The pump B consists simply of a valve-chest, b^1, having two ordinary check-valves for regulating supply and discharge, a stationary piston, b^2, secured to the valve-chest, and a movable cylinder, b^3, sliding on the said piston. To the upper end of the pump-cylinder b^3 is attached a cord running over a guide-pulley placed at a suitable distance above the pump to guide the cord to the oscillating ratchet-wheel or band-wheel, operated by the generating-pump, to alternately lift and drop the cylinder b^3, and thus operate the oil-pump B. C is the discharge-pipe from the oil-pump and supply-pipe to the generating-pump. D is the gas-generating pump, of which E is the pump-barrel, and F the piston. The lower part f^1, or elongation of the piston F, which works in the elongation e^1 of the barrel E, is the working area for the expansion of the oil vaporized in the barrel e^2 on entering through the pipe C. The upper part f^2 of piston F, which works in the upper and larger part e^2 of the barrel E, forms, with the said barrel e^2, the air-chamber for oxygenating the hydrocarbon vapor into illuminating-gas. f^1 and f^2 are rigidly connected together, and the former is slotted or open through its entire length, with exception only of its extreme lower end, where it is provided with a check-valve, c^1, closed by a pin or stop, c^2, on reaching its lower position, and remaining closed until the piston has ascended to its highest position, when it is opened by striking another stop, c^3. To prevent a too sudden concussion, the valve c^1 is supplied with a cone of concave shape, so as to close gradually when striking the stop c^2. To the upper part of the piston F are attached air-valves d^1, opening inward. The piston f^2 is provided with a deep flange, d^2, which, as the piston descends, dips into an oil cup or recess, d^3, to lubricate the piston and keep it tight.

G is the gas-pipe from the generating-pump to an ordinary gas regulator and holder, H, which, to provide against any danger, I place underground outside the building. g' is a check-valve to prevent the back-flow of gas. h^1 is a small pipe for leading gas to the burner

or set of burners, or Argand burner h^2, to heat the lower end of the barrel e^2 and the gasoline therein.

To regulate the heat-supply automatically I provide the burner h^2 with a valve, O, held open by a spiral spring, P, and in the end of the elongation e^1 of the pump-barrel E I fasten a pin or small rod, Q, with its lower end immediately above the valve O, in such a manner that, should the heat become excessive, the expansion of e^1 and of the pin Q, caused by such heat, will cause the pin to press upon and gradually to close the said valve O, and lessen the gas-supply to the burner. I is the gas-supply to the burners of the building. J is a segment band-wheel, and K an arm pivoted on a shaft mounted in bearings in a bracket attached to the pump-barrel E. A band attached to the rim of the wheel J connects with the cord of the oil-pump cylinder b^3. On the rim of the wheel J, at the edge of the band, is a smooth flange, i', on which a hook, l^1, of a pawl, L, pivoted to the arm K, rides on the ascending end of the piston F, until it engages in a notch, j', on the flange i, in order to turn the wheel J on again descending, and thus raise the oil-pump cylinder b^3. The arm K is connected to the piston F by an intermediate arm, m, pivoted at its upper end to the arm K, and at its lower end to a lug on the piston F. The pawl L, below its pivot, has an extension, l^2, and the arm M, above its upper pivot, has an extension, m', provided with a set-screw, n', which latter engages with the extension l^2 of the pawl L, and unhooks it from the notch in the wheel J when the piston F has completed its desired stroke downward. A spring may be used, if found necessary, to keep the pawl L against the wheel until released by contact with the screw n'.

In dotted lines in Fig. 1 are shown the relative positions of the arms K M and pawl L, when the latter, at the completion of the upward stroke, is about to engage again with the notch j'. Instead of the segment-wheel J, a bell-crank lever or other equivalent device may be used.

The desired distance of fall of the oil-pump cylinder b^3, and thereby the quantity of oil to be supplied at each stroke, is regulated by the set-screw n^2 on the segment-wheel J, which screw may be adjusted to shorten or lengthen the stroke of the wheel J and the pump-cylinder b^3 by sooner or later contact with the bracket of the segment-wheel J.

N is a handle attached to the hub of the arm K to form a lever for operating the pump D in starting the machine.

Starting from the positions shown in the drawing, the oil-pump being at the upper and the generating-pump at the lower end of their respective strokes, the operation is as follows: The limit of the downward stroke of the piston F being reached, the valve c^1 is closed by the stop c^2; the pawl L is released from the notch j' of the wheel J; the pump-cylinder b^3 drops, and forces a portion of the gasoline into the lower end e^1 of the pump-barrel E, where, heated by the gas-jets h^2, it is rapidly vaporized, and, expanding against the lower end f^1, raises the piston F. Air enters through the valves d^1, and fills the barrel E down to the valve c^1 until the said valve c^1 is opened by contact with the pin c^3. The vapor from underneath the valve c^1 commingles with the air above, closes the valves d^1, and opens the valve g'. The pawl L, having then reached the position shown by the dotted lines, engages in the notch j' on the segment-wheel J. The piston F descends, and, being much heavier than the oil-pump cylinder, lifts the latter by oscillating the segment-wheel J. The gas generated is forced onward to the regulator and burners, and a new portion of oil enters the valve-chest b^1, and so on continuously.

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

1. A gas-machine effected by the combination of a gas-generating-pump, D, and an oil-supply pump, B, with a supply-tank, A, the supply-pump B being operated by the movements of the generating-pump D, thus acting as a feed-pump to the latter, which again is operated by the expansion of the vapor of the oil thus supplied, the vaporization being continually promoted by heat from the burning of gas derived from said generating-pump, substantially as specified.

2. The feed-pump B, constructed of the combination of the valve-chest b^1 and stationary piston b^2 with the sliding cylinder b^3, in combination with the generator D of a gas apparatus, substantially as and for the purpose specified.

3. The generating-pump D, consisting of the piston F, (formed of the two main parts f^2 and f^1, with their respective valves d^1 and c^1,) in combination with the pump-barrel E, formed of the two parts e^2 and e^1, the latter being provided with the stops or trip-pins c^2 c^3, substantially as specified.

4. The arm K, provided with the pawl L, and the arm M, provided with the set-screw n', in combination with each other, and with the piston F and segment-wheel J, for operating the feed-pump B, substantially as specified.

FRANK W. OFELDT.

Witnesses:

HORACE HARRIS,

JOHN C. YOUNG.