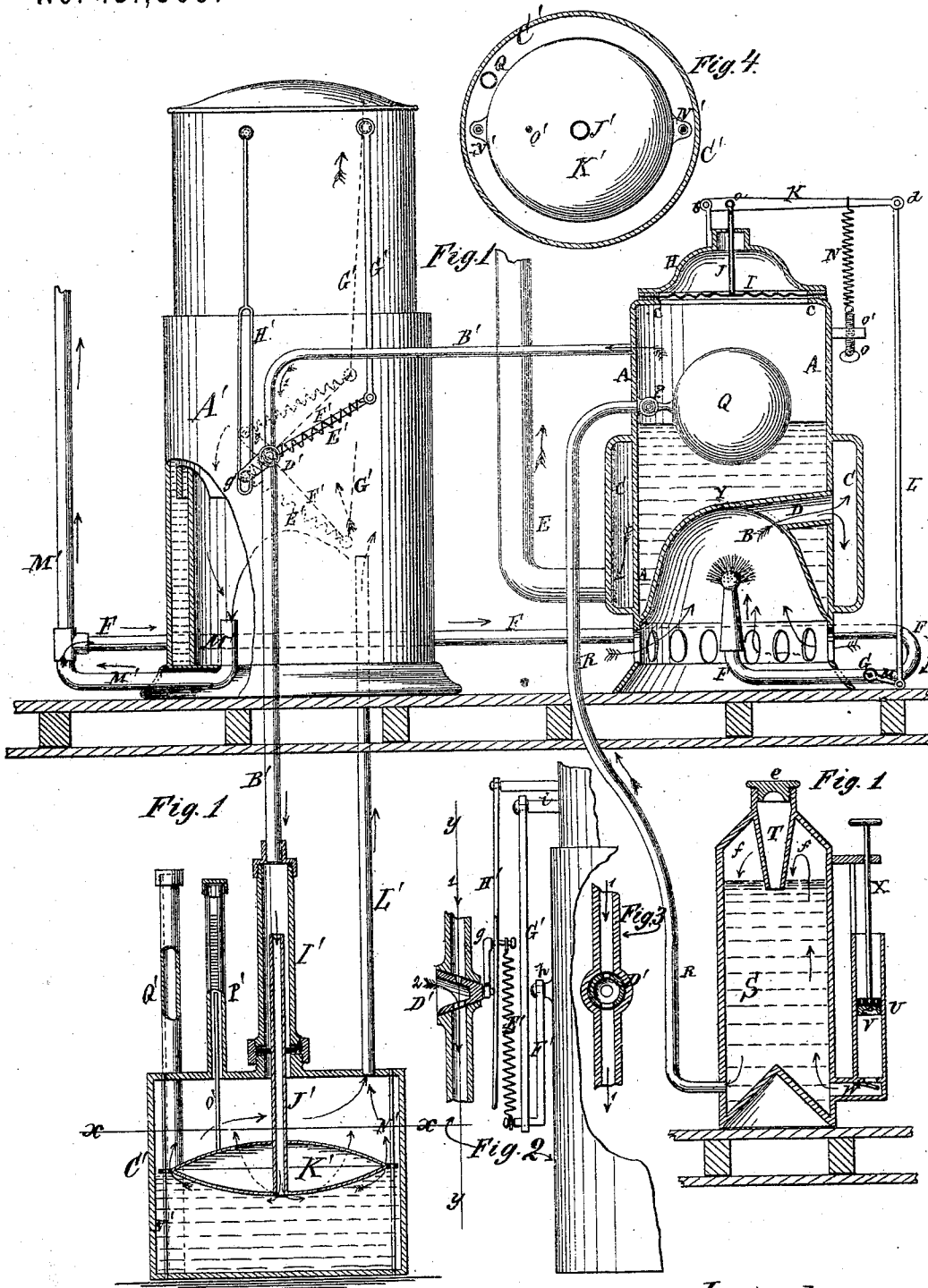


F. W. OFELDT.  
Improvement in Carbureters.

No. 131,369.

Patented Sep. 17, 1872.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FRANK W. OFELDT, OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. 131,369, dated September 17, 1872.

*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 certain Improvements in Gas Apparatus, of which the following is a specification:

My invention relates to that class of gas apparatus in which a retort is dispensed with and the gasoline or other volatile hydrocarbon is vaporized by air supplied by an induced current of steam; and it consists in the construction, combination, and arrangement of the various parts of the apparatus, all of which will be fully described below, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 represents a sectional elevation of the apparatus complete, with necessary appendages. Fig. 2 is a sectional side view of the air-supply faucet or valve, and the device for operating the same by the motion of the gasometer. Fig. 3 is a cross-section of the same valve through the line *yy* of Fig. 2; Fig. 4, horizontal section of the oil-tank through the line *xx* of Fig. 1.

Similar letters of reference indicate like parts.

To make a practical and efficient gasoline-gas apparatus it is desirable that the greatest possible amount of air should be supplied to vaporize a proportional amount of oil within an apparatus of the smallest possible compass. For supplying the air a Giffard injector presents a very effective means. If used, however, to lift or draw the oil upward, and to atomize the same forcibly by means of a current of air through the said injector, experience has proved it inefficient for several reasons: Too much pressure is required to lift and atomize the oil through the injector, and the necessary proximity of the oil to the gasometer, and places of combustion caused thereby, renders it dangerous as a cause of fires; and, after all, the atomized oil is not gas, but remains oil to a great extent, and returns as liquid through the pipes. The evaporation makes heat latent, and the consequent decrease of sensible heat diminishes gradually every subsequent vaporization. The two main objects to gain, and which are accomplished by my present invention, are, therefore, to replace by sensible heat that made

latent by vaporization, and to supply a large amount of air without forcibly atomizing the oil.

A is a small steam-boiler, the prime motor of the apparatus, of which boiler I will here give a brief description, as its construction is peculiarly adapted for this apparatus. The fire-place B of the boiler A is preferably shaped as seen in the drawing, and below it, all around the boiler, are perforations, like those of an ordinary lamp-burner, to admit air to the fuel. The gases of combustion pass through the flue D and the jacket C to the chimney E. The fuel (being gas from the apparatus) is admitted through the pipe F and faucet G to an ordinary gas-burner in the fire-place. H is a cap on the boiler, between which and the flange *c* a metallic diaphragm, I, is clamped, which, when raised by an excess of steam-pressure, partly closes the fuel-supply faucet G by raising the pin J attached at *a* to the lever K, which lever has its fulcrum at *b*, and between the end *d* of which and the lever M of the gas-faucet G is connected the rod L. A spring, N, adjustable by the screw O in the lug O', serves to gage the pressure at which the valve G is intended to close, and turn off the gas-supply in the fire-place B. P is a valve operated by a float, Q, to regulate the supply of feed-water through the pipe R from the tank S, which tank is supplied with water (after removing the air-tight screw-plug *e*) through the downward-projecting pipe T, leaving an air-space, *f*. The tank is charged with air through the valve W by operating the handle X of the valve-piston V of the air-pump U. The water in the tank serves as packing to prevent leakage of air through the valves W and V, and the compressed air ascends to the space *f*, acting from there upon the water with force sufficient to discharge a quantity thereof into the boiler whenever the float Q descends enough to open the valve P. Y is a fusible safety-plug. A' is an ordinary gasometer. B' is a steam-pipe leading from the boiler A past the outside of the gasometer A' to the oil-tank C', placed underground or outside the house, out of danger by fire or explosion. In the gasometer I use no oil.

The admittance of steam and air through the injector-faucet D', placed in the pipe B',

is regulated by the reciprocating motion of the gasometer in the following manner: To a stationary point, *h*, nearly in line with the axis of the valve *D'*, is pivoted the upper end of an arm, *F'*, the lower end of which is connected with the handle or lever *g* of the valve *D'* by a spring, *E'*, and also with a point, *i*, on the movable upper part of the gasometer, by means of a rod, *G'*. The cone-stem of the valve *D'* is hollow, and opens outward in the direction of its axis for the admittance of air. The hole through the valve *D'*, at right angles to its axis, is similar to that of an ordinary conical valve with the exception that it is smallest on the side at which the steam enters.

When, by exhaustion of gas, the gasometer has descended far enough to allow the arm *F'* to pass below the point at which it is in line with the lever *g*, the spring *E'* will trip the valve *D'* open and a jet of steam from the boiler *A* will rush through the valve *D'* in the direction of the arrow 1, carrying with it a large amount of the outer air through the hollow cone-stem of the valve *D'*, in the direction of the arrow 2. The influx of gas will then cause the gasometer to ascend until, by the rod *G'*, it has pulled the arm *F'* upward past the point at which the said arm *F'* is in line with the lever *g*, when the valve *D'* will close, assuming the position shown in the upper dotted lines in Fig. 1, and the gasometer will again descend, as the gas is consumed, until the valve-mechanism is in the position indicated by the lower dotted lines, when it will again ascend, and so on continuously. *H'* is an auxiliary slotted rod connected with the lever *g* for reversing the valve *D'* in case the spring *E'* should from any cause become inoperative. The combined steam and air pass through the pipes *B'*, *I'*, and *J'*, and the float *K'*, to the surface of the oil, and the vaporized oil (the gas) passes off through the pipe *L'* to the gasometer, and from there through the pipe *M'* to the burners. One pipe, *E*, leads to the fire-place of the boiler *A* to supply the same with fuel, the intensity of the flame being regulated by the diaphragm *I* automatically, to produce the different steam-pressures necessary to the different number of gas-lights used at a time.

In order to always cause the vaporization to take place on the very top film of the oil-surface, and thus always to present a very small and constant resistance to the slight pressure of the entering air, whatever be the depth of oil in the tank, the inlet-pipe *J'* in the oil-tank is attached to and goes through the float *K'*, which rests on the surface of the oil, and is guided, if necessary, by lugs on rods *N'*. Thus the air comes in contact with the oil at the lowest point of the float *K'* and, following the curvature of the float, rises, charged with hydrocarbon, all around the circumference of the said float to the pipe *L'*.

To prevent the gas from exerting a counter-pressure to the entering air by returning to the pipe *B'* through the annular space between

the pipes *J'* and *I'*, I surround the pipe *J'* by a soft felt packing, applied as seen in the drawing. The heat imparted to the air by the steam promotes vaporization of the oil; a portion of the steam is thereby condensed and flows down the annular space to the felt packing, serving there as a water-packing for the pipe *J'*. The portion of the steam not condensed by heating the air is condensed in the oil by imparting its heat there to compensate for the heat made latent by the vaporization of the oil.

The height of the liquid may be observed by means of the rod *O'*, attached to the float *K'*, seen through a glass gage inserted in the pipe *P'*. The water condensed in the tank *C'*, and which from its greater gravity occupies the lower part of the tank, may be drawn off at intervals, by a hand-pump attachable to the pipe *Q*, which reaches nearly to the bottom of the tank *C'*. If the oil-tank be placed too near to the gasometer it sometimes happens that a small portion of steam is only partially condensed by the vaporization of oil and enters the gasometer in shape of fine mist. This mist is then easily absorbed by a little diluted sulphuric acid poured into the gasometer.

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

1. As a means of regulating and inducing a current of steam automatically, according to pressures and air volumes required to supply different numbers of burners with gas by the vaporization of oil in the tank *C'*, placed at any distance from the gas-holder *A'*, the combination of the boiler *A* (provided with the heat and pressure regulating devices consisting of the parts *I*, *J*, *K*, *L*, *G*, *F*, *N*, *O*, and an automatic water-feeder) with the pipe *B'*, injector-valve *D'*, spring *E'*, arm *F'*, rods *G'* and *H'*, and the gas-holder *A*, all constructed and operating substantially as specified.

2. The injector-valve *D'*, constructed as shown, in combination with the spring *E'*, arm *F'*, rod *G'*, slotted auxiliary rod *H'*, and gas-holder *A'*, substantially as and for the purpose specified.

3. The lens-shaped float *K'*, provided with the upright pipe *J'* reaching through the float at its center and sliding in the pipe *I*, with the movements of the float *K* arranged in such a manner that the air descending through the pipe *B'* and the pipe *J'* will come in contact with the oil underneath the center of the float *K'* and vaporize the very surface-film of the oil, the vapor or gas, as it is formed, passing outward and upward along the convex lower side of the float *K'*, thereby causing a thorough vaporization of oil under always the same resistance whatever be the height of oil-surface in the tank *C'*, substantially as specified.

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Witnesses:

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