H. L. McAVOY.

Apparatus for Carbureting Air.

No. 50,076. Patented Sept. 19, 1865.

Fig. 1.

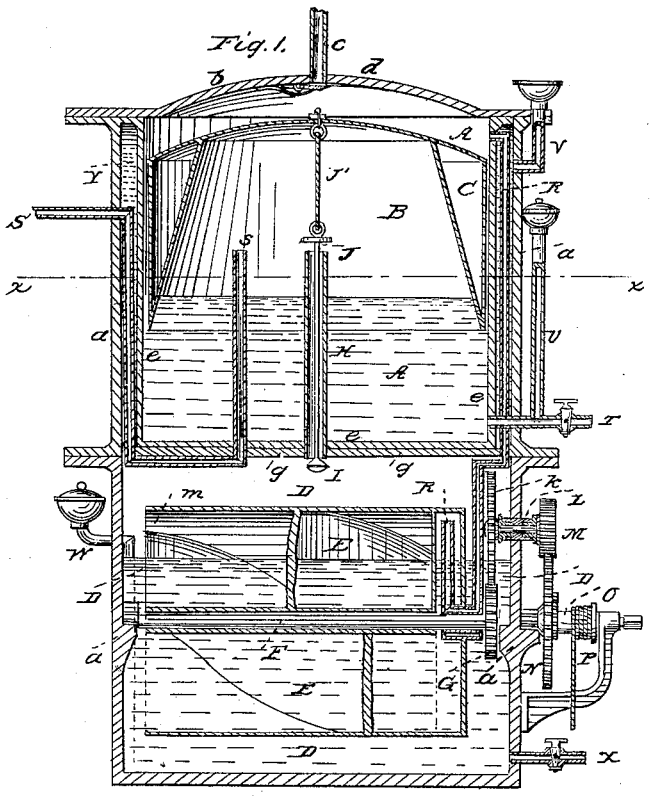


Fig. 2.

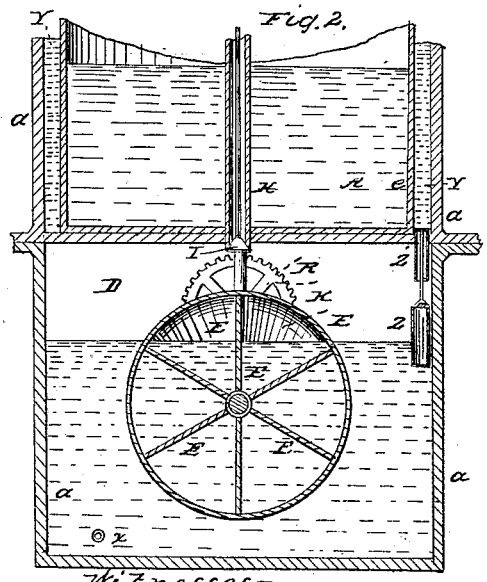
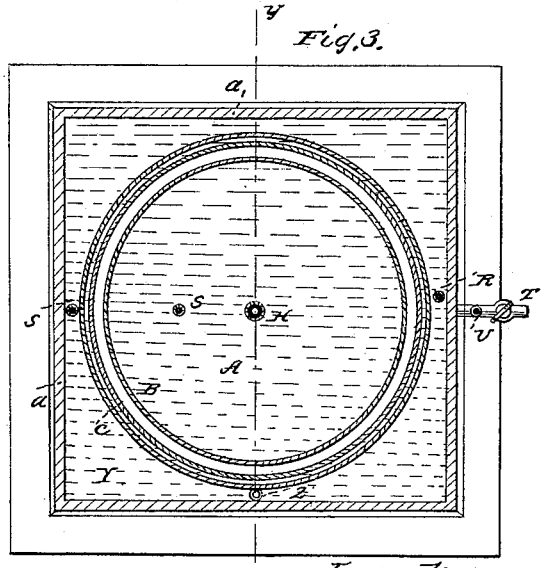


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

HUGH L. McAVOY, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF AND E. S. HUTCHINSON, OF SAME PLACE.

IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **50,076**, dated September 19, 1865.

To all whom it may concern:

Be it known that I, HUGH L. McAVOY, of the city and county of Baltimore, and State of Maryland, have made new and useful Improvements in Gas-Generators; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a central vertical section. Fig. 2 is a central vertical section in a plane at right angles to Fig. 1 and on the line *y y*, Fig. 3. Fig. 3 is a horizontal section on the line *x x*, Fig. 1.

The same letters refer to corresponding parts in the different figures.

My improvement consists, first, in the method of connecting the driving-shaft with the shaft of the air-forcing wheel by means of gearing, whose shaft enters the side of the chamber above the fluid-level; secondly, supplying the air-forcing wheel with air through a pipe communicating with the chamber in which the regulator works; thirdly, making the regulator with an exterior of a cylindrical form and the interior as a frustum of a cone, with an air-space between the said bounding-surfaces, so that as it descends in the fluid it shall have an increasing sectional area of displacement, and this for the purpose of avoiding unsteady action, which renders the light flickering; fourthly, the automatic valve to regulate the admission of air into the chamber in which the regulator operates; fifthly, the valve suspended from the regulator and regulating the influx of gas into it by its vertical movements; sixthly, the reservoir situated above the gas-generating chamber, the communication between them being regulated by the float in the lower chamber.

This machine has an upper chamber, which contains the fluid and the air for the supply of the lower chamber, in which the wheel operates which forces the air through the fluid. The carbureted air then passes from the upper part of the lower chamber by a pipe, which discharges it under an inverted vessel, which, by its gravity, being partially immersed in the fluid of the upper chamber, exerts a certain pressure upon the contained carbureted air and forces it out for the purposes of illumination, &c.

a a are the outer walls of the apparatus, and the space thus inclosed is divided by a diaphragm, *g*, so as to constitute an upper chamber, Y, and a lower one, D. These communicate in a manner to be hereinafter described, and are represented as rectangular, which, of course, is not necessary to their functual character.

The upper chamber has an inner jacket inclosing a cylindrical space, and which is marked A, and both this space and the chamber Y are supplied with hydrocarbon fluid, the former by means of the pipe T and the latter by means of the pipe V; but the said spaces A and Y have no direct communication with each other.

The roof *b* of the chamber A is provided with an automatic valve, which opens to admit air into said chamber as may be required, the air being exhausted therefrom by means to be presently described.

In the chamber A is an inverted vessel, with a cylindrical exterior, C, and an inner frustum-shaped wall, B, inclosing between them an air-space, which modifies the specific gravity by increasing the displacement of the vessel which I term the "regulator," and, further, by the conformation of its sides, has an increasing sectional area of displacement as it sinks in the fluid. The space inclosed by B receives carbureted air by means of the valved pipe H from the lower chamber, D, and discharges its said contained air by means of the pipe S, which has its reception-orifice opening upward into the interior of the inverted vessel, and, passing downward and upward and through the intervening plates and walls, is conducted to the place where the gas is stored or used, generally the latter, for the apparatus is specially intended for carbureting air for immediate use and in the quantities required.

The lower chamber, D, is supplied with fluid through the pipe Z′, and has within it an open-ended cylindrical wheel, whose interior has spiral wings E, and which, as it revolves, draws in air through the pipe R from the upper part of chamber A, discharging it at *m* into the chamber D over the surface of the fluid, from whence it passes valve I and through pipe H to the inside of the inverted regulator, as previously mentioned. The float

Z regulates the passage of fluid from the upper chamber, Y, to the lower chamber, D, by raising and closing the orifice in the pipe Z′ when the chamber D is full enough.

X is a discharge-pipe for emptying the apparatus on occasion. The lower chamber, D, may be supplied with fluid through pipe W.

I do not here enter into the details as to the particular form of the air-forcing wheel, as it forms the subject of a separate patent; but it is necessary to mention that it is attached to the shaft F and revolved by means of the gearing G K M N and the weighted rope P. The gear-wheel N is attached to the shaft O, the wheel G to the shaft F, and these wheels are connected by means of the wheels M K, which are on the shaft L, which passes through the side *a* of the chamber D at a point above the level of the fluid contained in said chamber.

The valve I, which is at the lower end of the tube *I*, regulates the orifice connecting the lower chamber with the regulator, so that when the latter is sufficiently full the cord *f*, drawing upon the rod J, closes the valve and stops the supply.

It may now be proper to trace the course of the air, premising that the revolution of the wheel E under the impulse of the weight attached to the cord P is the cause of the circulation of the air, whose final exit is regulated by the inverted vessel or regulator B C.

The air enters through pipe C into the chamber A, passing the valve *d*, which is pressed open by the external air, as a partial vacuum is created inside the said chamber. From the latter it passes by pipe R to the air-forcing wheel E, and, passing from thence at *m* in a carbureted state, is collected above the fluid in chamber D, and, admitted by valve I to the regulator, is by the gravity of the latter driven out by the pipe S to the place where it is utilized.

The means of supply of the fluid to the various chambers have already been described, the lower chamber receiving its supply through the pipe Z′, guarded by the valved float Z, and the chambers Y and A by means of their connections with a suitable reservoir. (Not shown in the drawings, but constructed and attached in any suitable manner.)

No water is used about the apparatus; but the regulator floats in hydrocarbon fluid, above which is the air which feeds the forcing-wheel. The glass pipe V indicates the height of fluid in the chamber A, and the circular flange above J prevents the valve I from dropping so far as to interfere with the wheel E.

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

1. The described gearing and shafting by which the motor-shaft O is connected with the forcing-wheel shaft F through a point in the side of the chamber above the fluid-level.

2. The air-pipe R, which supplies the air to the wheel from the chamber in which the regulator operates.

3. The described form of regulator, inclosing an air-space between a cylinder and conical frustum, and whose sectional area of displacement is increased as it sinks in the fluid.

4. The automatic valve *d*, in combination with the chamber A, pipe *c*, and supply-pipe R.

5. The valve I, suspended from the regulator and controlling the lower orifice of the pipe H, which supplies carbureted air to the regulator.

6. The reservoir Y, situated above the gas-generating chamber and communicating therewith by the pipe Z′, guarded by the valved float in the chamber D.

7. The combination of the upper reservoir, Y, chamber A, and regulator B C with the lower chamber, D, and air-forcing wheel E, communicating with each other by the passages for fluid, air, and carbureted air, substantially as described.

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Witnesses:
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