(No Model.)

E. D. SELF.

CARBURETOR.

No. 443,584. Patented Dec. 30, 1890.

Fig. 1.

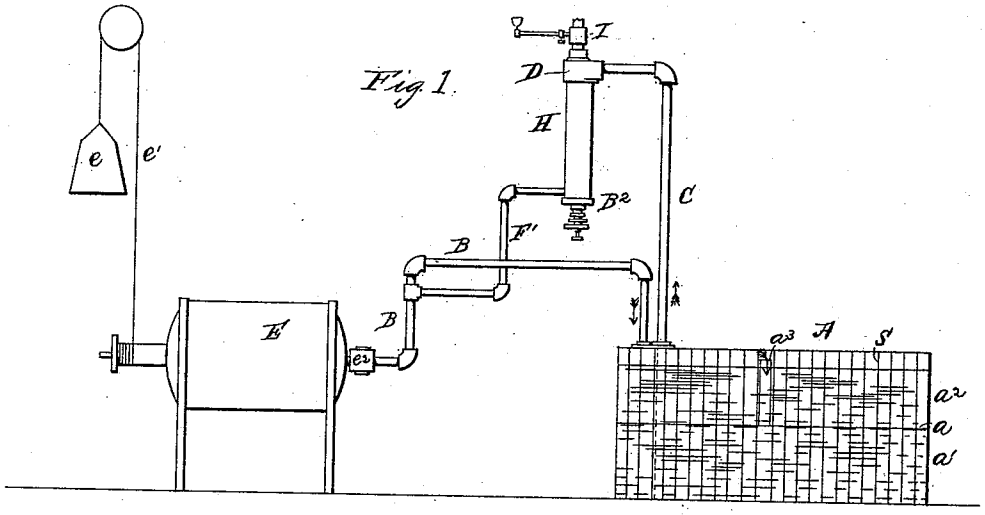


Fig. 3.

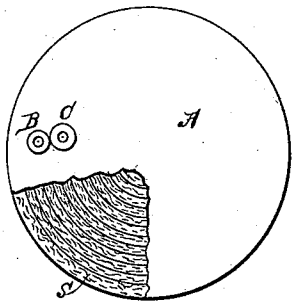
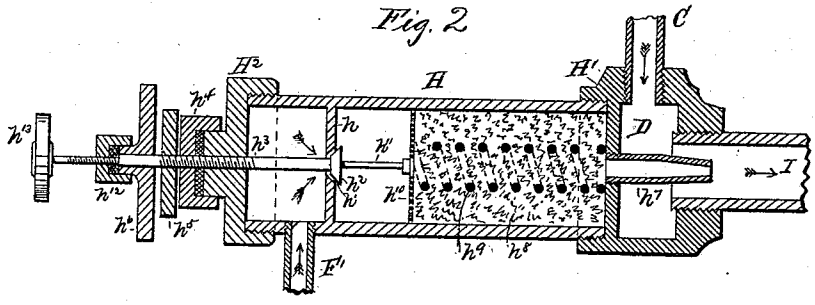


Fig. 2.



Witnesses.
C. R. Ferguson
Wm. M. Cliff

Inventor
Edward D. Self.
By his Attorneys. Gifford & Brown

UNITED STATES PATENT OFFICE.

EDWARD D. SELF, OF SOUTH ORANGE, NEW JERSEY.

CARBURETOR.

SPECIFICATION forming part of Letters Patent No. 443,584, dated December 30, 1890.

Application filed November 27, 1889. Serial No. 331,770. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. SELF, of South Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Carburetors, of which the following is a specification.

In the accompanying drawings, Figure 1 is a side view of an apparatus embodying my improvement. Fig. 2 is a longitudinal section of a part of a resistance device comprised therein. Fig. 3 is a sectional plan view of a carburetor.

Similar letters of reference designate corresponding parts in all the figures.

A designates a carburetor. It may be of any desired construction. In the present instance it is of cylindric form and has two compartments a' a^2, arranged one above the other and separated by a partition a. In each compartment is a spiral partition extending between the top and bottom and forming a spiral passage. At the center of the carburetor the spiral passages of the two compartments communicate through a pipe a^3, which extends from a hole provided in the partition a just above the termination of the spiral passage of the compartment a' upwardly into the central termination of the spiral passage of the upper compartment a^2 and nearly to the top of this compartment. The spiral passages of both compartments are to be supplied with a hydrocarbon and any suitable absorbent material.

B designates an air-pipe extending to the upper compartment a^2 of the carburetor opposite the outer extremity of the spiral passage in the latter. From this pipe B air passes into and through the spiral passage of the upper compartment, finally reaching the central termination of this passage, and passing thence through the pipe a^3 into the central extremity of the spiral passage of the lower compartment and through the latter to the outer extremity. By its passage through the material contained in the central passages of the carburetor the air will be carbureted. It will escape from the carburetor through a pipe C, leading from the outer extremity of the spiral passage in the lower compartment, which may, for convenience, be called a carbureted-vapor pipe. As shown, this pipe C extends from the lower compartment upwardly through the upper compartment. It leads to a chamber D, which is termed a "mixing-chamber."

Air will be caused to flow through the pipe B by any suitable means—as, for instance, by a pump or blower E of the kind usually termed a "meter-wheel pump," operated by a weight e, attached to a cord e', passing over a guide-pulley and wound upon a windlass comprised in the pump or blower. The flow of air produced by the pump or blower may be regulated by a cock e^2.

F′ designates a pipe constituting what may be termed a "by-pass." The pipe F′ leads from the pump or blower E or from the air-pipe B to a resistance device hereinafter explained.

The pipe or section F^2 of the by-pass leads to a resistance-chamber H. This is shown as of cylindric form and closed at the ends by caps H′ H^2, retained in place by screw-threads. The cap H′ has formed in it the mixing-chamber D, to which I have previously referred as being in communication with the carbureting-vapor pipe C. A diaphragm h extends across the resistance-chamber H near the end that receives the cap H^2. This diaphragm has a central opening h', in which a valve h^2 can be seated. The valve h^2 is affixed to a stem h^3. This stem is screw-threaded and engaged with a tapped hole in the cap H^2. A stuffing-box h^4 is combined with the cap H^2 where the stem h^3 passes through the latter. In this way leakage through the cap is avoided. Combined with the valve-stem h^3 and the stuffing-box h^4 is a jam-nut h^5. This serves to secure the same in position. The valve-stem has affixed to it a hand-piece h^6, whereby it may be turned. By rotating the stem h^3 the valve may be made to close the diaphragm h or to uncover more or less its opening h'.

That end of the resistance-chamber H which is closed by the cap H′ is in communication with the mixing-chamber, the communication being established by means of a nozzle h^7, that extends through that part of the cap H′ which is adjacent to the resistance-chamber. The pipe or section F^2 of the by-pass communicates with the resistance-chamber H between the diaphragm h and the cap H^2. Hence the valve h^3 serves to control the passage of the diluting stream of air to the mixing-chamber.

The resistance-chamber between the cap H′, which in effect constitutes a diaphragm, and the diaphragm h has arranged within it pieces of sponge h^8, asbestus, cotton-waste, cloth cut to form diaphragms, or other analogous substances through which air can pass and which is capable of compression. A spiral spring h^9 is arranged within the mass of sponge or analogous material and axially within the resistance-chamber.

h^{10} is a follower consisting of a perforated plate. This extends across the resistance-chamber. By moving it toward the cap H′ the sponge or analogous material may be compressed so as to offer greater resistance to the passage of air through the chamber. If the follower is moved in the reverse direction, the pressure upon the sponge or analogous material will be relaxed and the spiral spring will expand and loosen such material, so as to afford the air greater facility for passing through the material. The follower h^{10} has a stem h^{11}. The stem h^3 of the valve h^2 is hollow, and the stem h^{11} of the follower passes through it. The hand-piece h^6 of the valve-stem h^3 has combined with it a stuffing-box h^{12}, and the stem h^{11} of the follower passes through this stuffing-box. The stuffing-box prevents leakage. The stem h^{11} of the follower is screw-threaded and engages with the hollow valve-stem h^3 or with the stuffing-box h^{12}, so that by rotating the stem of the follower by means of a hand-wheel h^{13}, with which it is provided, the follower may be adjusted along the resistance-chamber.

It will be seen that the resistance-chamber affords a control over the passage of the diluting stream of air not only by reason of the fact that it comprises an adjustable valve, but also owing to the fact that it contains a resistance material whose density may be varied at will.

It will be seen that the carbureting vapor-pipe C extends into the side of the mixing-chamber D and that the nozzle h^7 extends axially through this chamber. The diluting stream of air therefore induces a flow of gas with an injector-like action. This is advantageous, for if the diluting stream of air should have any greater tendency to flow at any time than the gas it would impart some of this tendency to the gas.

I designates a service-pipe. This receives the gas diluted with the air and conveys it to the building where it is to be used. It will be seen that the pipe leads from the end of the mixing-chamber D.

I desire to be protected in the use of my improvement for the enriching of gas. When the apparatus is used for this purpose the gas will flow in the same way as I have hereinabove described the air as flowing. I make reference to air simply for convenience, intending to cover equally the treatment of illuminating-gas, and as air is a gas I shall use the term "gas" to include both.

It will be understood that the resistance of the carburetor varies in proportion to the amount of air passing through, because the area of all its parts remains fixed and of course will offer a larger resistance to the passage of a great volume of air than to the passage of a small volume of air. The resistance device, consisting of the chamber H and its appurtenances, is intended to compensate for variations of this kind in the carburetor and to afford a means whereby the resistance of the by-pass may be from time to time adjusted. The amount of the hydrocarbon with the carburetor diminishes, and, owing to the variation in its amount, there will be a variability in the resistance of the carburetor. It will be seen that the by-pass leads directly into the chamber H and that the resistance material is between the by-pass and the mixing-chamber. The resistance will therefore vary in accordance with the air passing through it.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a carburetor, a pump or blower, a pipe connecting the carburetor with the pump or blower, and a mixing-chamber having connection with the carburetor, of a by-pass leading from the pump or blower, and a resistance device connected with an intermediate of the by-pass and mixing-chamber, consisting of a chamber having a porous material therein through the interstices of which air passes to the mixing-chamber, and means for compressing the said porous material, substantially as specified.

2. The combination, with a carburetor, a pump or blower, a pipe connecting the carburetor with the pump or blower, and a mixing-chamber having connection with the carburetor, of a resistance device connecting with the mixing-chamber and pump or blower, the said resistance device consisting of a chamber having a porous material therein through which air passes to the mixing-chamber, means, substantially such as described, for compressing the porous material, and means, substantially such as described, for loosening the porous material when the compression is relaxed, substantially as specified.

3. The combination, with a carburetor and an air-supply device having connections substantially such as described, of a resistance device consisting of a porous material within a chamber, a perforated follower for compressing said porous material, and a spiral spring arranged within the porous material to expand it when the follower is moved to relax the pressure, substantially as specified.

4. In a resistance for a gas and air mixer, the combination of a resistance material within a resistance-chamber, a perforated movable diaphragm for compressing said material, means, substantially such as described, for moving the diaphragm, and an adjustable valve for controlling a passage of air to the resistance material, substantially as specified.

5. In a resistance device for a gas and air

mixer, the combination of a resistance-chamber having a cap at each end and a porous resistance material within the chamber, a perforated follower within the chamber, having a stem extended through a cap of the chamber, a diaphragm within the chamber, having a valve-seat, and a valve for engaging in said seat and having a stem passing through a head of the resistance-chamber, substantially as specified.

EDWARD D. SELF.

Witnesses:
EDWIN H. BROWN,
S. O. EDMONDS.

Correction in Letters Patent No. 443,584.

It is hereby certified that in Letters Patent No. 443,584, granted December 30, 1890, upon the application of Edward D. Self, of South Orange, New Jersey, for an improvement in "Carburetors," an error appears in the printed specification requiring correction, as follows: In line 97 page 2, the word "an" should read *and;* and that the said Letters patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 6th day of January, A. D. 1891.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.