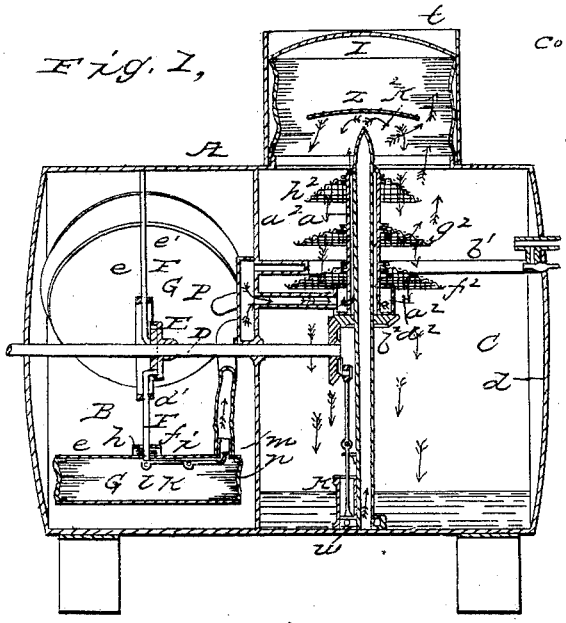
J. B. TERRY.

Apparatus for Carbureting Air.

No. 49,934. Patented Sept. 12, 1865.

Fig. 1,



Continuation of Fig. 1,

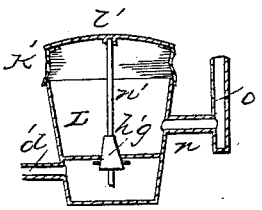


Fig. 2,

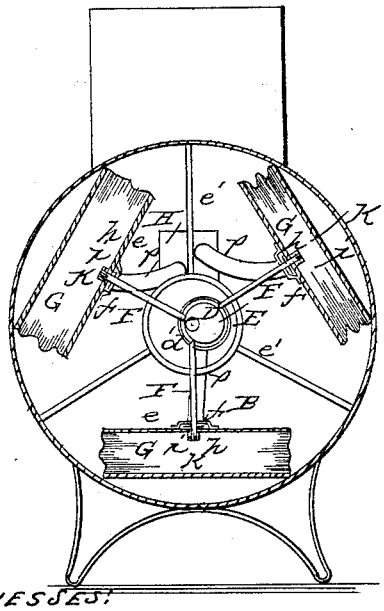
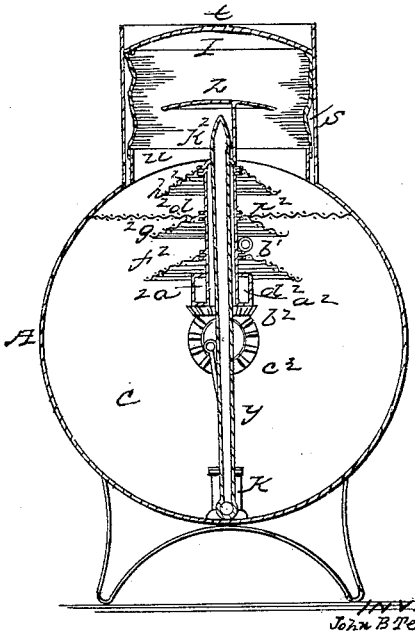


Fig. 3,



WITNESSES:
Frederick Center
C. A. Swerdfeger

INVENTOR:
John B. Terry
by his attorney
R. H. Eddy

UNITED STATES PATENT OFFICE.

JNO. B. TERRY, OF AUBURNDALE, MASSACHUSETTS.

IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **49,934**, dated September 12, 1865.

To all whom it may concern:

Be it known that I, JOHN B. TERRY, of Auburndale, in the county of Middlesex and State of Massachusetts, have invented a new and useful or Improved Apparatus for Carbureting Air or Vaporizing and Aerating a Volatile Hydrocarbon; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a longitudinal and vertical section of such apparatus; Fig. 2, a transverse section of it, such section being taken through the series of pumping-bellows to be hereinafter explained. Fig. 3 is another transverse section, taken through the air-expansive dome.

This air-carbureting apparatus is so constructed as to entirely dispense with the use of water within it. In this respect it is like the dry-gas meter in comparison with what is termed the ordinary or "wet-meter," in which water is employed in the case thereof.

In carrying out my invention I make use of a drum or hollow cylinder, A, which, by means of a partition, *a*, extended across it, I divide into the two chambers B C. The first of these chambers, by an opening, *b*, made through its end, communicates freely with the external atmosphere. A shaft, D, goes centrally through the chamber B and a short distance into the chamber C. This shaft projects through and beyond the head *c* of the case, in manner as shown in the drawings. It has a bearing in such head and another in the partition. Furthermore, there is fixed on the shaft D, and within the chamber B, a grooved eccentric, E, into the groove of which projections from three or any other suitable number of rods, F, extend. Each of the said rods, near its outer end, is connected with the movable head *e* of one of a series of bellows, G G G, the other head of each of the said bellows being affixed to the interior circumference of the case. The rod passes through a clasp, *f*, fixed to the bellows, and has attached to it a valve, *h*, which covers an opening, *i*, made through the bellows-head *e*. A lever, *k*, with the bellows, and supported by a fulcrum, *l*, applied to the head *e*, is jointed at one end to the valve *h*. At its other end the lever is jointed to another valve, *m*, applied to an opening, *n*, made through the head *e*. Surrounding the valve *m*, and projecting from the head *e*, is a tube, *o*, from which a flexible hose or tube, *p*, extends to and opens into an air-chamber, H, which is applied to the partition *a* and communicates with the vaporizing-chamber C by means of the air-conduit a^2. (See Fig. 1.)

Each of the bellows, having a valve or valve-operating apparatus, as described, and being connected with the air-chamber H by means of a flexile tube, P, will be put in operation during the revolution of the shaft D and by the action of the eccentric E. In other words, the bellows will be caused to receive air from the chamber B and force it into the chamber H, from whence it will pass into the vaporizing-chamber.

It may be remarked that during each back movement of the rod E the valve *h* will not only be pulled off its seat and against the clasp *f*, so as to cause a dilation of the bellows, but it, by pulling on the lever *k*, will cause the valve *m* to close on its seat. So, during an advance of the rod F the valve *b* will be closed on its seat, the bellows will be contracted, and the lever *k* will be moved so as to force the valve *m* off its seat. During expansion of the bellows air will be drawn into it, such air being expelled from the bellows through the valve-opening *n* and the pipe *p* during contraction of the bellows.

A diaphragm, *r*, of wire-gauze extends across the chamber C. If desirable, there may be several of such diaphragms within the chamber, and each may be covered with one or more layers of cloth.

There is on the top of the chamber C, and so as to open into the chamber, an expansive dome, I, composed of a tube, *s*, of leather or other suitable flexile material and a head or disk, *t*, fixed to one end of the tube. The said tube *s* encompasses and fits closely to and is coupled to a short branch tube, *u*, erected on the case A, surrounds the dome I. It is intended for one or more weights to be placed on the top *t* of the dome. As the carbureted air within the chamber C may increase beyond what may be required for consumption from time to time, such air will inflate the dome or cause its cap *t* to rise upward. The downward pressure of the head or cap *t* will operate to expel the carbureted air from the chamber C, and with a close approximation to an equal pressure when such carbureted air may be in the act of being burned in gas-jets connected with the carbureting-chamber C.

There is within the lower part of the chamber C a force-pump, K, whose piston w is moved up and down by a crank or crank-wheel, x, fixed on the shaft D. An eduction-pipe, y, leads upward from such force-pump to and opens near to and underneath a horizontal plate or disk, z, arranged within the dome I, in manner as shown in Figs. 1 and 3. The pipe y is encompassed by an air-conduit, a^2, having on its lower end a gear, b^2, to engage with another gear, c^2, fixed on the shaft D. A conductor, d^2, extending around the lower part of the conduit a^2 and communicating with the chamber H by a pipe, e^2, leads air from such chamber into the conduit a^2.

Fixed on the conduit a^2 is a series of three, or any other suitable number, concavo-convex foraminous disks, f^2 g^2 h^2. There are openings i^2 leading out of the conduit and immediately under each of the said disks, and there are also openings k^2 at the top of the conduit. When the shaft D is in revolution the air-conduit a^2 and its series of foraminous disks will be put in revolution by the conjoint action of the gears b^2 c^2. By revolving the conduit and the disks the air will be mixed or thrown in contact to better advantage with the streams of liquid, whereby a better vaporization of the latter will be effected than were the conduit and disks to remain at rest. A volatile hydrocarbon liquid being placed in the lower part of the chamber C when the pump K is in operation will be thrown through the pipe y and will rise in a jet against the disk z, from which it will afterward fall and scatter in drops or spray and be discharged upon the wire-gauze or foraminous diaphragms or disks f^2 g^2 h^2, through which it will fall in numerous currents. In this way the liquid will be presented to the air with the chamber C and then discharged through the openings of the conduit a^2, and by contact therewith will be more or less vaporized. The vapor and air mixing together will pass to the burners by an outlet-pipe, a', leading from the head d of the chamber C, in manner as represented in Fig. 1.

A bent branch pipe, b', leading from the chamber H, opens at one end into the pipe a', and has a stop-cock, c', placed within it, the handle of such stop-cock being projected through the head d. The object of such tube b' and its stop-cock, so applied to the tube a' and the air-chamber H, is to allow more or less air from the air-chamber to flow directly into the stream of carbureted air while it may be escaping from the chamber C, the same being to increase the amount of air in the outflowing stream when the vapor may be in excess in the said chamber.

The air-chamber H, by receiving the air directly from the bellows and connecting with the chamber C by a small opening, enables the due supply of air to be imparted to the current flowing through the pipe a'.

The rods F F F of the series of bellows G G G slide through and are supported by a ring, d', arranged concentrically within the chamber B, and sustained in place by means of a series of stays, e' e' e', extending from it to the inner circumference of the said chamber.

For the purpose of revolving the shaft D with a proper degree of motion for the necessary working of the apparatus a gravitating weight, applied to a cord or chain suspended from an arbor or barrel connected with the shaft D by a train of gears, may be employed, the whole being such as is in common use in various other and well-known kinds of air-carbureting apparatus. The eduction-pipe a' enters the lower part of a tub or vessel, L, and just below a partition, g', extending horizontally across such vessel and having a round hole made through its middle. A conical valve, h', is placed within such hole, and is suspended from a disk, l', by a rod, m'. This disk is connected with the top of the vessel L by means of a flexible tube, k', which may be said to be a continuation of the vessel L. A pipe, n', leads out of the vessel at a point above the partition g' and into a pipe, o', by which the carbureted air is taken from the vessel L to the burner or burners. The object of the last-described apparatus, applied to the pipe a' of the vaporizing-chamber C, is to regulate the delivery of the carbureted air according to the number of burners that may be in operation at any one time.

The faster the carbureted air may be consumed the less will be the pressure tending to elevate the disk l', and consequently the more the valve h' will descend and uncover the opening immediately around it and in the partition. The greater the opening the more the carbureted air will flow through it. Consequently the apparatus becomes a means of regulating the consumption of the carbureted air or its delivery in accordance to the number of burners that may be in operation.

I claim—

1. In the said air-carbureting machine, the air-pumping apparatus, made substantially in manner and so as to operate as described—viz., of one or more bellows, G, with its valve-openings i n, valves h m, lever k, rod F, and eccentric E, the whole being applied to the shaft D, and the case A, in manner and so as to operate substantially as described.

2. The combination of each bellows-head e with the air-receiving chamber by means of a flexible eduction-pipe, p, so applied to the two as to allow of the necessary movements of the bellows-heads e, as described.

3. The combination and arrangement of the chamber H with the air-forcing bellows, the flexible eduction pipe or pipes thereof, and the vaporizing-chamber C.

4. The flexile or expansive dome I, made substantially as and to operate as described, with the vaporizing-chamber C and the apparatus for forcing air into the latter.

5. The combination of the flexile or expansive dome I and its case v with the vaporizing-

chamber C and an apparatus for forcing air into such chamber for the purpose of being carbureted, as described.

6. The combination of the force-pump K, its jet-tube *y*, spray-disk *l*, air-distributing conduit a^2, and series of disks f^2 g^2 h^2, the same being used in the vaporizing-chamber C and with the apparatus for forcing air therein, as specified.

7. The arrangement of the tube b' and its stop-cock c' with the outlet-tube a', the air-chamber H, and the vaporizing-chamber C, provided with an apparatus for forcing air into it, as described, the tube b' in such arrangement being wholly within the vaporizing-chamber, as set forth.

8. The improved flowage-regulator, constructed as described—viz., with the flexile tube k', combined with the disk l' and the vessel L, the said vessel L having the partition g' going across it, and the valve h', suspended from the disk l', the whole being arranged and so as to operate substantially as specified.

Witnesses: J. B. TERRY.

R. H. EDDY,

F. P. HALE, Jr.