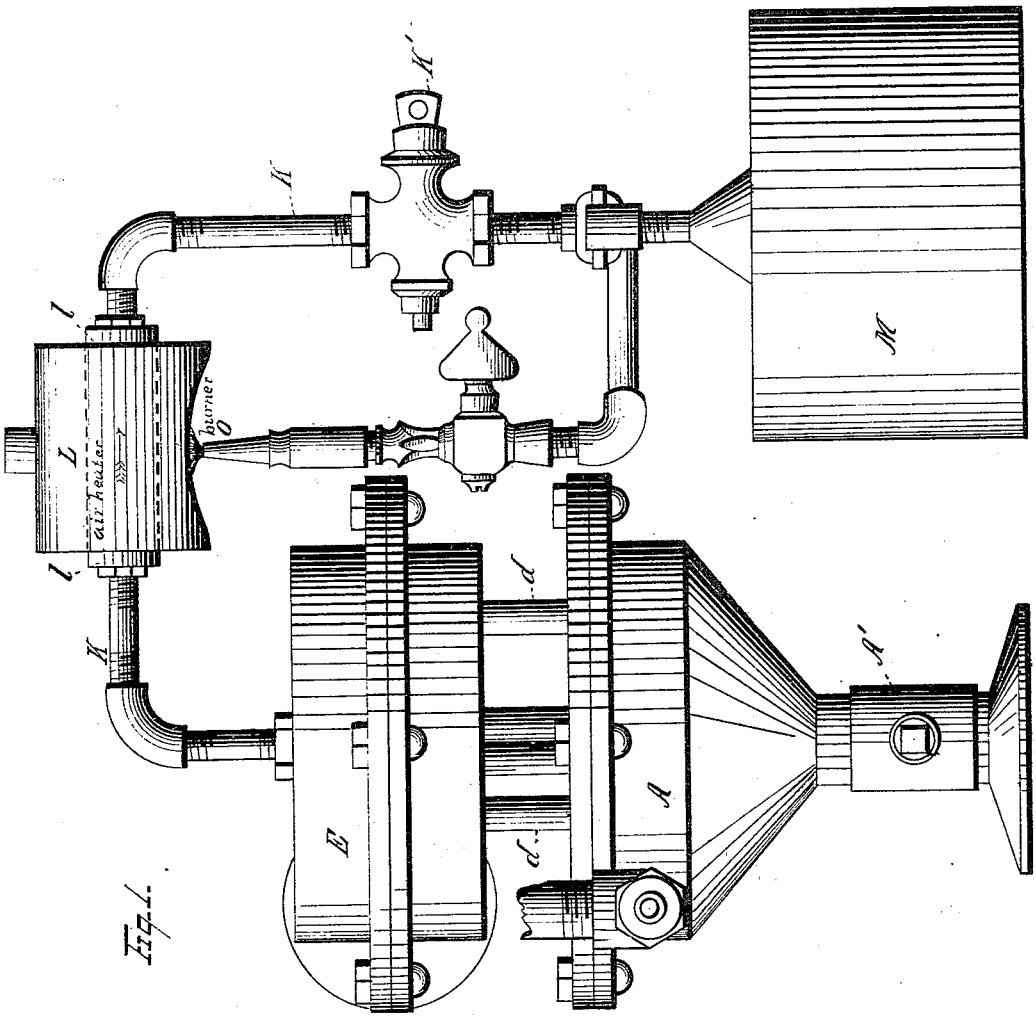
2 Sheets--Sheet 1.

T. H. HARRINGTON.

Carbureters.

No. 167,170. Patented Aug. 31, 1875.



WITNESSES
W. D. Newman,
E. F. Nottingham

By

INVENTOR
Thomas H. Harrington

Attorneys.

2 Sheets--Sheet 2.

T. H. HARRINGTON.
Carbureters.

No. 167,170.

Patented Aug. 31, 1875.

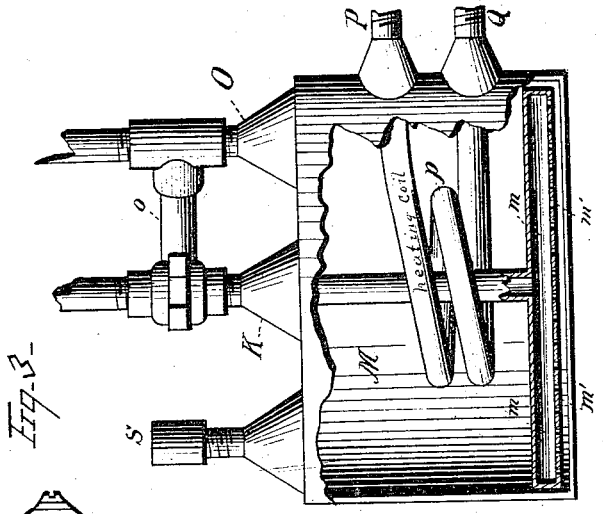


Fig-1-

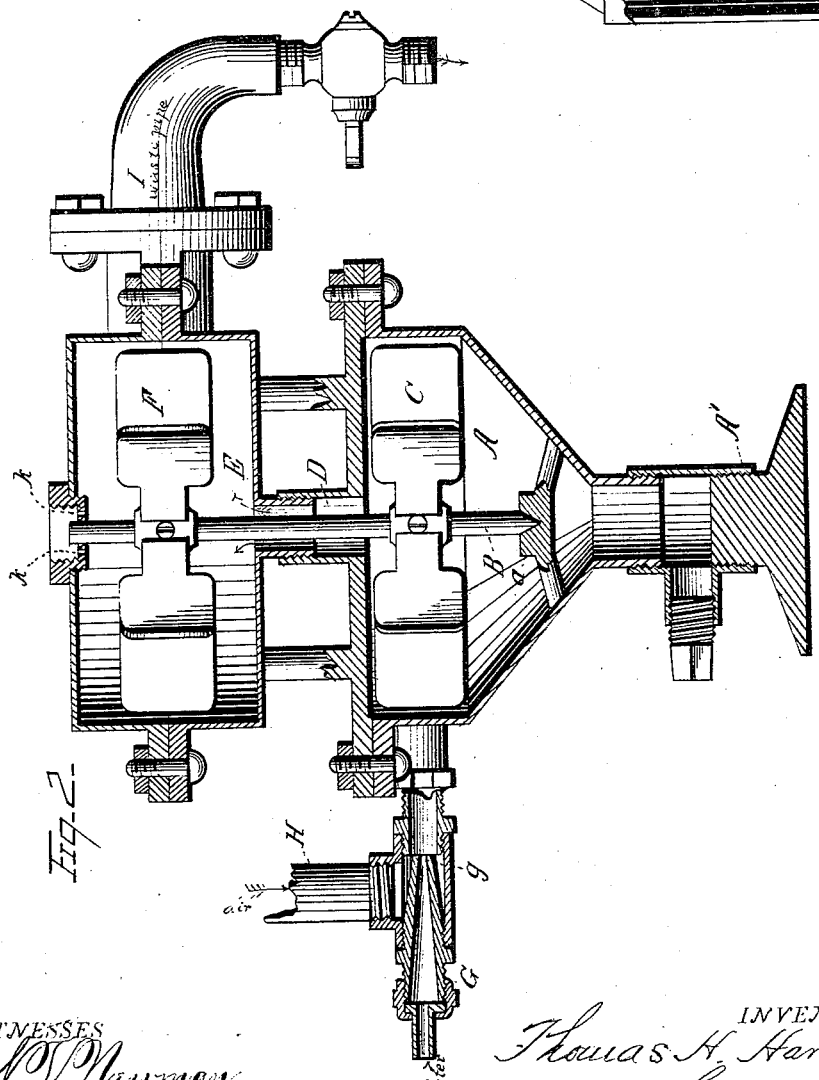


Fig-2-

WITNESSES

W. P. Newman,

E. F. Mellingham.

By

INVENTOR

Thomas H. Harrington

Leggett & Leggett

Attorneys

UNITED STATES PATENT OFFICE.

THOMAS H. HARRINGTON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO ANTHONY F. KEATING, OF SAME PLACE.

IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. **167,170**, dated August 31, 1875; application filed June 30, 1875.

To all whom it may concern:

Be it known that I, THOMAS H. HARRINGTON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Carbureter; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to a novel carbureter, and especially to an improvement upon that as described in Letters Patent of the United States No. 155,155, issued to me September 22, 1874; and consists in the appliances and devices hereinafter more fully set forth and claimed.

In the drawings, Figure 1 represents the mechanical part of my invention in side elevation. Fig. 2 is a section in a vertical plane on the line *x y* of the blower, through which the air or gas passes prior to its introduction into the connecting-tube K. Fig. 3 is a view in part section and part elevation of detail mechanism.

A is an inverted conical chamber, which may be supported on any suitable standard A′. At the center of the bottom of the chamber A is a small step, *a*, in which pivots the vertical shaft B, on which shaft, within the said chamber, revolves the water-wheel C. Said shaft B projects upward, passing through the tube D, into the second or upper chamber E, in which it rotates the second water-wheel F. The tube D, before mentioned, is of sufficient diameter to admit the simultaneous introduction of the shaft B, and the water and air, as may be necessary to pass from the chamber A into the chamber E. This chamber E is supported by means of the standards *d*, which connect the same with the chamber A. G is a water-supply pipe, which connects with the air-pipe H, and serves to introduce water into the chamber A. H is a suitable entry-pipe for the introduction of air into the water-service pipe G. This water-service pipe G is constructed with a diminished nozzle in that part of it which intervenes between the air-inlet pipe H and chamber A. By means of this entry-pipe H, in connection with the water-supply pipe G, which latter is constructed with the diminished nozzle *g*, an air-siphon is produced, whereby, as the water in the pipe G passes the opening of the tube H, a vacuum is formed by means of the atmospheric pressure, and the water is consequently propelled forward with great vigor, and is prevented from any tendency to return upon itself. I is a suitable waste-pipe, which serves the purpose of maintaining the pressure constant, and by its overflow insure a constant and equal pressure of air within the chamber E. K is a connecting pipe or tube, which conveys the air from the blower to the carbureting-chamber, and is of sufficiently-strong material and tight joints to insure a safe conduit of the same without loss or leak. At the point where said tube K connects with the chamber E a circular series of apertures *k* are formed, of suitable size to carry sufficient air from said chamber E into the tube K. This tube K may be suitably elbowed and jointed to connect with the carbureting-chamber M. In its passage thereto it is made to pass through an annular jacket, L, which surrounds the same, and is designed to form a casing, within which that portion *l* of the pipe K which passes therethrough may be suitably heated by means of the burner *o*, to which reference will be made hereafter. This inclosed portion *l* of the pipe K is of a diameter corresponding to the remaining portion of the pipe K in the ratio of four to one, more or less, by which means a strong head of air is constantly maintained within that portion of the pipe K which connects therewith and the carbureting-chamber M, thus insuring a steady and equal introduction of air through the inclosed body of benzine.

By means of this enlarged portion *l* the air is delayed within the heating influence of the jacket L, and is consequently caused to obtain a greater degree of heat than it would if the tube K were of equal diameter its whole length, in which latter case the air, making a quicker passage through the jacket L, would not become sufficiently heated.

There may be suitable stop-cocks K′ in con-

nection with the pipe K, so as to shut off or let on the air from the carbureting-chamber M. After the pipe K has been introduced into the carbureting-chamber M it passes down through the same, and at the bottom it subdivides into quarter-pipes *m*. These pipes *m* are provided with apertures *m'*, which are situated at the base of each, and allow the air to pass therefrom in suitable quantity. Attached to the carbureting-chamber M is a service-pipe, O, which conveys the carbureted air to the burners for use. Running out from this service-pipe O is a small local tube, *o'*, which conveys to its jet gas sufficient to heat the enlarged portion *l* of the connecting-tube K, for a purpose as hereinafter described.

The carbureting-chamber M may be further provided with a worm-coil, *p*, having its entrance-pipe P, and its waste-pipe or port Q, the entrance-pipe P of which may be connected with any adjacent steam-generator, whereby heated steam is passed through the coil, and finds a waste-entrance from the exit-tube Q, thus warming the inclosed body of benzine within the chamber M.

S is a feed-port, connected with the carbureting-chamber M, and through which the benzine is passed into the carbureter.

The operation of my invention is as follows: The carbureting-chamber M is first filled with benzine from the feed-port S. Water is introduced into the supply-pipe G, and from thence forced into the chamber A by means of the air-siphon formed by the combination of the air-entrance pipe H with the diminished nozzle *g* of the pipe G, causing both air and water to pass through into the chamber A, where, striking against the buckets of the water-wheel C at their periphery, a rotation ensues, a constant pressure being maintained by means of the described air-siphon H *g*, and the water and air together are forced up through the pipe D into the chamber E. As the pressure within this upper chamber E increases the surplus water finds vent by means of the exit-pipe I, while the air, on account of its less specific gravity, rises above the upper part of the tube I, thus preventing its escape, and is forced up through the apertures *k* into the connecting-pipe K, in which it passes through the enlarged portion *l* inclosed by the heating-jacket L, in which passage it becomes heated and expanded, so that on subsequent introduction into the carbureting-chamber M by means of the quarter-pipes *m* it immediately rises up through the liquid benzine, thereby becoming perfectly saturated with the same, taking on itself the volatile hydrocarbon element.

This waste-pipe I will also carry off the surplus air as well as water when the stop-cock K' is closed, thus freeing the chamber E from too great pressure.

When the air is thoroughly carbureted or carbonized it finds an exit in the service-pipe O, from which it is suitably conducted off for use. A small portion of it, however, may be used in connection with the local tube *o*, which serves to heat the air within the jacket L. At the first passage of the air through the carbureting-chamber the burner *o'* will burn with a bluish jet, which will be changed into the usual white flame as soon as its action upon the inclosed portion *l* of the pipe K becomes manifest.

By the herein-described process I am enabled to carburet common air at a less initiative cost than I am aware that the same has ever before been accomplished, at the same time producing a first-class merchantable article.

Prior to the discovery of my process it has been necessary to use a more expensive petroleum fluid of greater specific gravity in order to obtain a successful result, while by my invention I am enabled to use a fluid of less specific gravity, and of consequent cheaper first cost, with as good an accomplishment.

It is evident that my mechanism, as before described, may be used for either of the two purposes—the one before mentioned of carbureting common air, thereby producing illuminating-gas, and, secondly, enriching or carbonizing the commercial carbureted hydrogen—since the service-pipe G may be suitably connected with the gasometer, and the coal gas will pass through the same steps as before described, resulting in a richer illuminating-gas.

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

1. The carbureter consisting of the air-chambers A E, containing a suitable air-forcing device, heating-jacket L, and carbureting-chamber M, all arranged substantially as and for the purpose described.

2. In a carbureter, the air-entry pipe H, water service-pipe G, connecting-pipe D, in combination with the water-wheels C F and apertures *k*, substantially as herein set forth.

3. The connecting-pipe K between the blowing and carbureting chambers E M, provided with an enlarged section, *l*, having a diameter as of four to one, more or less, with the remaining pipe K, and inclosed in an annular heating-jacket, L, substantially as herein set forth.

4. In a carbureter, the tube K, provided with the apertures *k* connecting the air-chamber E, enlarged section *l*, and stop-cock K', all substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of June, 1875.

THOMAS H. HARRINGTON.

Witnesses:
ROBT. M. BARR,
E. J. NOTTINGHAM.