2 Sheets—Sheet 2.

W. S., G. H. & J. A. DEEDS.

AIR GAS MACHINE.

No. 175,827. Patented April 11, 1876.

Fig. 2.

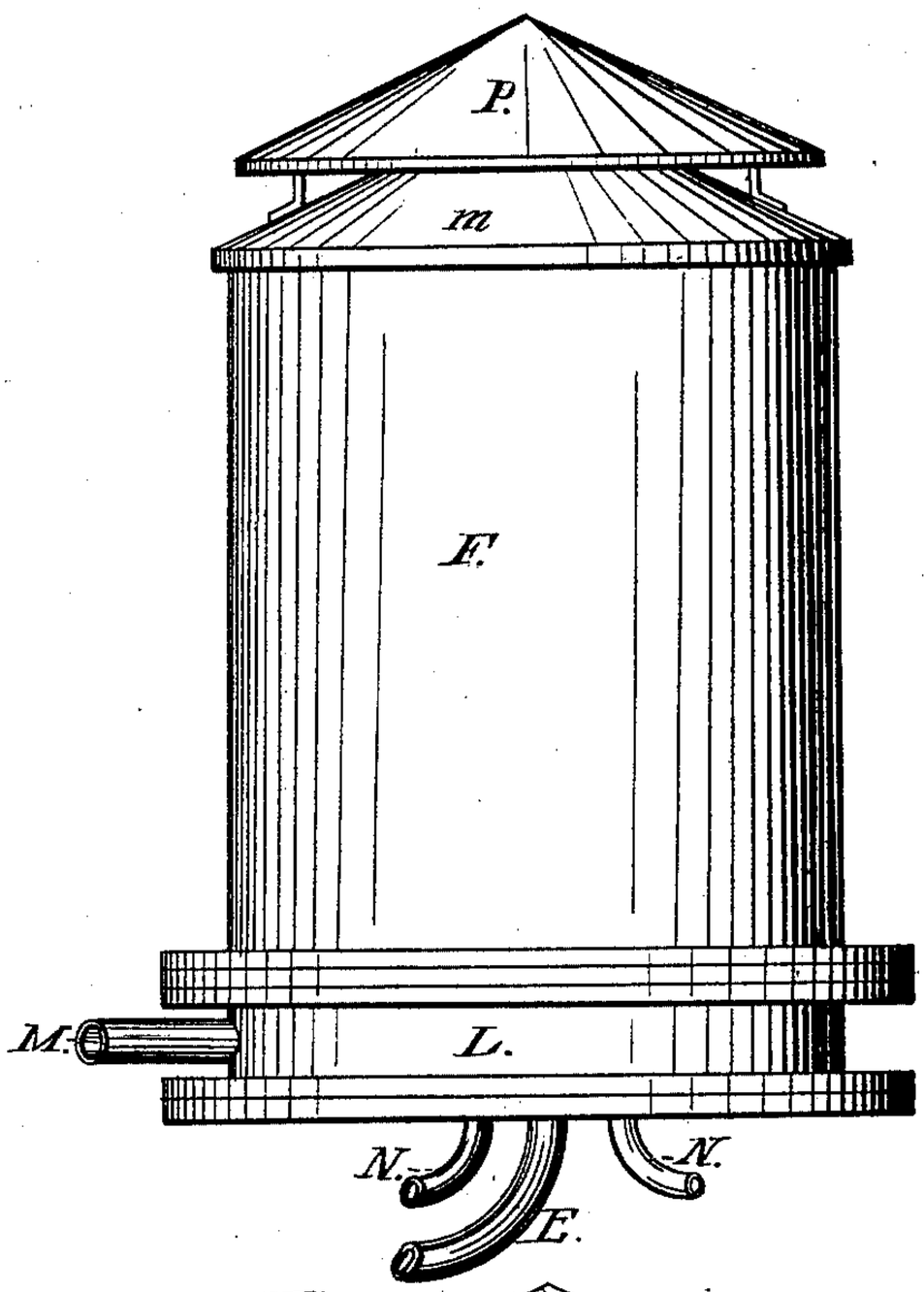
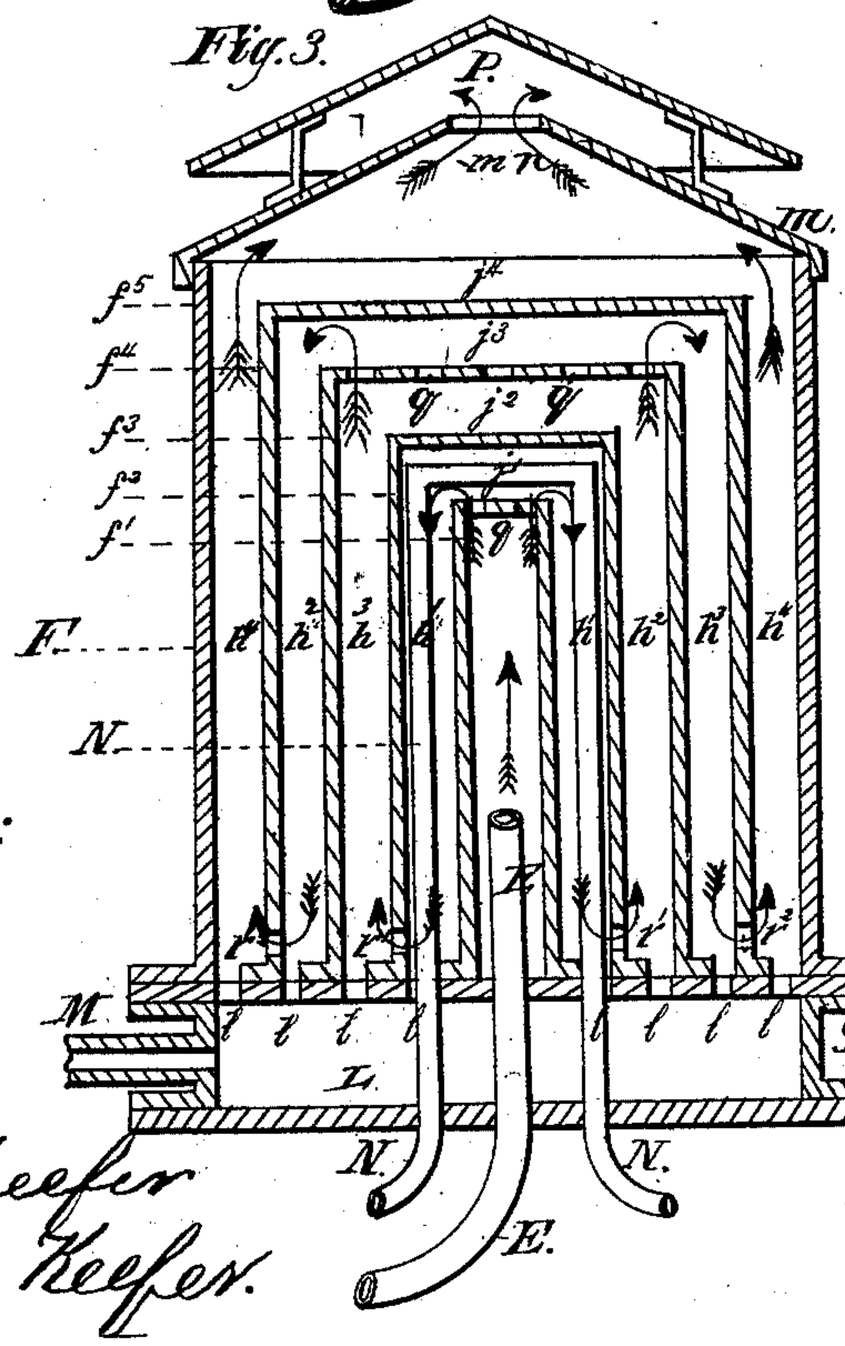


Fig. 3.



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2 Sheets—Sheet 1.

W. S., G. H. & J. A. DEEDS.

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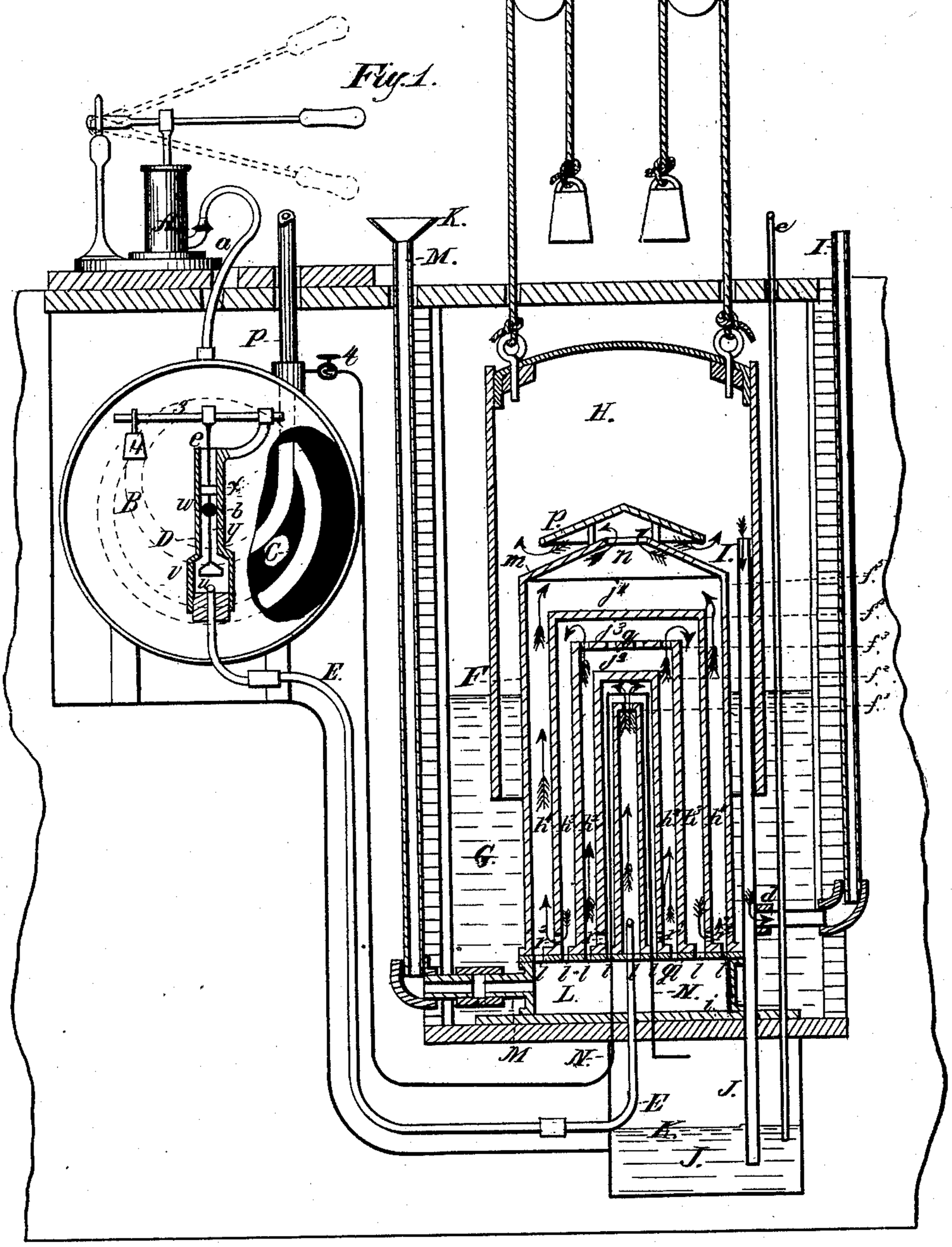
Fig. 1.



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UNITED STATES PATENT OFFICE.

WILLIAM S. DEEDS AND GEORGE H. DEEDS, OF WILKINSBURG, AND JAMES A. DEEDS, OF PITTSBURG, ASSIGNORS OF ONE-FOURTH THEIR RIGHT TO JOHN GRAZIER, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN AIR-GAS MACHINES.

Specification forming part of Letters Patent No. **175,827**, dated April 11, 1876; application filed November 3, 1875.

To all whom it may concern:

Be it known that we, WILLIAM S. DEEDS and GEORGE H. DEEDS, of Wilkinsburg, and JAMES A. DEEDS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Air-Gas Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

Our improvement consists of a carbureter, in combination with an air-pump and air-reservoir, having a coil of hot-air or steam pipe to heat the air in the reservoir prior to its admission to the carbureter, the said coil being connected with a main pipe leading to the range or other heating apparatus of a dwelling, and having a lateral pipe-connection with the carbureter to heat the hydrocarbon liquid therein; and the said coil and the lateral pipe having valves in them for allowing the hot air to pass into the reservoir or carbureter independently, so that either the hydrocarbon in the carbureter or the air in the reservoir may be heated independent of the other; and the carbureter being constructed of vertical chambers, cylindrical in form, and having different lengths and diameters, and arranged concentric with each other and having perforations alternately at their tops and bottoms, in such a manner that the air which shall enter the carbureter by means of an air-pipe leading from the air-reservoir into the center chamber of the carbureter shall ascend in the said center chamber through the hydrocarbon liquid therein and pass through the perforations at the top of said center chamber into the next adjoining or second chamber, wherein it shall be deflected by means of a deflecting-top in the said second chamber, and be caused thereby to pass downward through the liquid in the second chamber to the bottom of the chamber, whereat it shall pass through perforations leading into the next adjoining or third chamber, and pass up through the liquid therein to the top of the chamber, which has perforations to admit the air into the fourth chamber, wherein it shall be again deflected; and so on alternately in each chamber until it shall reach the last or outside chamber, which has an eduction-port at its top leading into the gas-holder; and the said carbureter having an independent chamber at the bottom, which has port-connections with the annular spaces formed by means of the concentric arrangement of the aforesaid cylindrical chambers, whereby the heaviest portions of the hydrocarbon liquid may be drawn from the carbureter whenever necessary when the liquid becomes reduced in gravity, by means of a pipe connected with the said independent chamber and leading to the exterior side of the apparatus, the said pipe also answering the purpose of filling the carbureter with the hydrocarbon liquid, all as hereinafter described.

Figure 1, Sheet 1, is an elevation, partly in section, of our improvement placed in the earth beneath its surface. Fig. 2, Sheet 2, is an enlarged view, in elevation, of the hydrocarbureter. Fig. 3, Sheet 2, is a vertical section of Fig. 2.

Like letters of reference in all the figures indicate the same parts.

In Fig. 1, Sheet 1, A represents an air-compressor or air-forcing apparatus, connected by means of a pipe, *a*, with an air-reservoir, B, which contains a coil of hot-air or steam pipe, C, (represented by the dotted lines in Fig. 1,) and having a pipe-connection, *b*, with the regulator D, which has a pipe-connection, E, with the hydrocarbureter F, which is placed within and upon the bottom of the water-reservoir G of an ordinary gas-holder, H. I is the gas-main, leading from the gas-holder H to the places to be lighted, and has a lateral pipe-connection, J, with a water-tank or receiver, K, by which means the water which may condense in the gas-mains shall be drawn into the said receiver, it being only necessary to place the main or mains on a plane or planes elevating from a point, *d*, in the water-reservoir G. A pump attached to a pipe, *e*, shall draw the water from the tank K.

Figs. 2 and 3, Sheet 2, are enlarged views of the hydrocarbureter F, and in which f^1, f^2 f^3, f^4, and f^5 are concentric cylindrical ves-

sels having one common bottom, *g*, closed at their upper ends, and having different diameters to form the annular spaces h^1, h^2, h^3, and h^4, and different lengths to form the horizontal spaces j^1, j^2, j^3, and j^4. The bottom *g* of the concentric vessels f^1, f^2, &c., forms the top of a cylindrical chamber, L, which has a bottom, *i*, and a hydrocarbon-liqid pipe-connection, M, by which means the hydrocarbon liquid shall be poured into the hydrocarbureter at the mouth K, Fig. 1, Sheet 1, from which it shall flow down through the pipe M into the chamber L, and from thence up into the annular spaces h^1, h^2, h^3, &c., through the small holes *l*, *l*, *l*, &c., in the bottom *g*, the said small holes *l*, *l*, *l*, &c., allowing the liquid to flow back into the chamber L whenever it may be desired to draw the hydrocarbon liquid from the hydrocarbureter by means of a pump having a rubber-hose attachment with the pipe M at the mouth K. The first and third of the concentric cylinders have perforated tops, as indicated at *q q*, and the second and fourth have perforations around their sides near the bottom. By this means the air which enters the inner and smaller cylinder f^1 by means of the pipe E passes through its foraminous top into the space j^1 of cylinder f^2, where it is deflected and thrown downward to the bottom of the said cylinders f^2 and passes through the perforations at r^1 r^1 into the bottom portion of the cylinder f^3 and ascends therein to its perforated top, passing through the perforations into cylinder f^4, where it is again deflected by the solid top of the cylinder f^4 and thrown to its bottom, where it shall pass, by means of the perforations at r^2 r^2, into the cylinder f^5, and shall ascend therein to the mouth *n*, where it shall pass into the receiver H, all as indicated by the arrows in Figs. 1 and 3. The outer cylinder f^5 of the carbureter has a conical top, *m*, having the open mouth *n*, over which a conical cap, P, is placed for the purpose of breaking the force of the current of the gas while passing into the receiver, and also for the purpose of preventing the water which may condense at the top of the receiver H dropping into the open mouth *n* of the hydrocarbureter. The annular chamber h^1 has a pipe-connection, N, with the hot-air or steam pipe P of the coil C, for the purpose of heating the hydrocarbon liquid, the admission of the hot air or steam to the pipe N being regulated by means of a valve, *t*, Fig. 1.

We prefer to use with our carbureter the form of regulator D shown in Fig. 1 of the drawing, in which *u* is a valve-chamber and *v* the valve, which has a stem, *w*, connection with a small piston, *x*, in a small cylinder, *y*, having a pipe-connection, *b*, and the said chamber *u* having a pipe-connection E, and in which stem *e* connects the piston *x* with a lever, 3, upon which is a weight, 4. But we make no claim to the regulator here, as it is the subject of a separate application.

A spring, having a screw-attachment for varying its pressure, may be used in lieu of the weighted lever.

In operating the apparatus any suitable hydrocarbon liquid shall first be poured in at the mouth K, until the carbureter becomes as well filled as may be desired, after which air shall be forced into the reservoir B by means of the pump A until the pressure of air in the air-reservoir rises to any desired point. The weight 4 shall then be placed at any point upon the lever 3 according to the pressure of the gas in the gas-holder H required. The apparatus will then continue in operation until the air in the reservoir B becomes exhausted, when the operation of pumping will be again required.

The main object of the carbureter F, constructed as above described, is to cause the air to ascend through the hydrocarbon liquid in one chamber and descend in the next, following alternately through or in all the chambers until it reaches the holder H through the mouth *n;* this being done by means of the chambers f^1 f^3, having perforated tops, while the chambers f^2 and f^4 have deflecting-tops and perforations near their bottoms, all as indicated in the drawings in *q q* and *r r*, &c.

Another object of the carbureter having the chambers f^1, f^2, f^3, &c., constructed of different lengths is to cause the air to pass through the densest portion of the hydrocarbon liquid, which will always stand in the shortest chambers, prior to passing through the more volatile liquid at the tops of the longest or highest chambers.

Another object of the carbureter constructed with the chamber L is to allow the heaviest portion of the liquid, which will always fall to the bottom, to be conveniently drawn off through the pipe M, without disturbing the more volatile liquid at the top of the carbureter, this being done by means of the ports *l*, *l*, *l*, &c., allowing the sediment and other heavy bodies of the liquid to pass from the chambers f^1, f^2, f^3, f^4, and f^5 into the said chamber L.

Instead of five concentric cylinders in the carbureter F, the said carbureter may be constructed with seven, nine, eleven, &c.

We are aware that heater-pipes have been used in air-gas machines; but in our arrangement the heater-coil is placed within an independent air-reservoir, and has a lateral pipe-connection, N, with the carbureter, by which means we are enabled to heat the air or gasoline, or both at the same time, but independent of each other and according to their separate conditions, or as either may require, independent of the other.

What we claim as our invention is—

1. The carbureter F, having the cylinders f^1, f^2, f^3, f^4, and f^5, constructed of different lengths to form the spaces j^1, j^2, j^3, &c., and having alternate foraminous and deflecting

tops, in combination with the air-pipe E, reservoir B, having heating-coil C and pump A, substantially as and in the manner set forth.

2. The auxiliary chamber L, having ports *l*, *l*, *l*, &c., in combination with the annular chambers h^1, h^2, h^3, and h^4 and pipe M, substantially as and for the purpose specified.

3. The compound hot-air or steam pipes C, P, and N and valves *t*, in combination with the air-reservoir B and carbureter F, substantially as and for the purpose described.

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