3 Sheets—Sheet 1.

A. W. PORTER & F. M. GRIMES.

CARBURETER.

No. 174,851. Patented March 14, 1876.

Fig 1

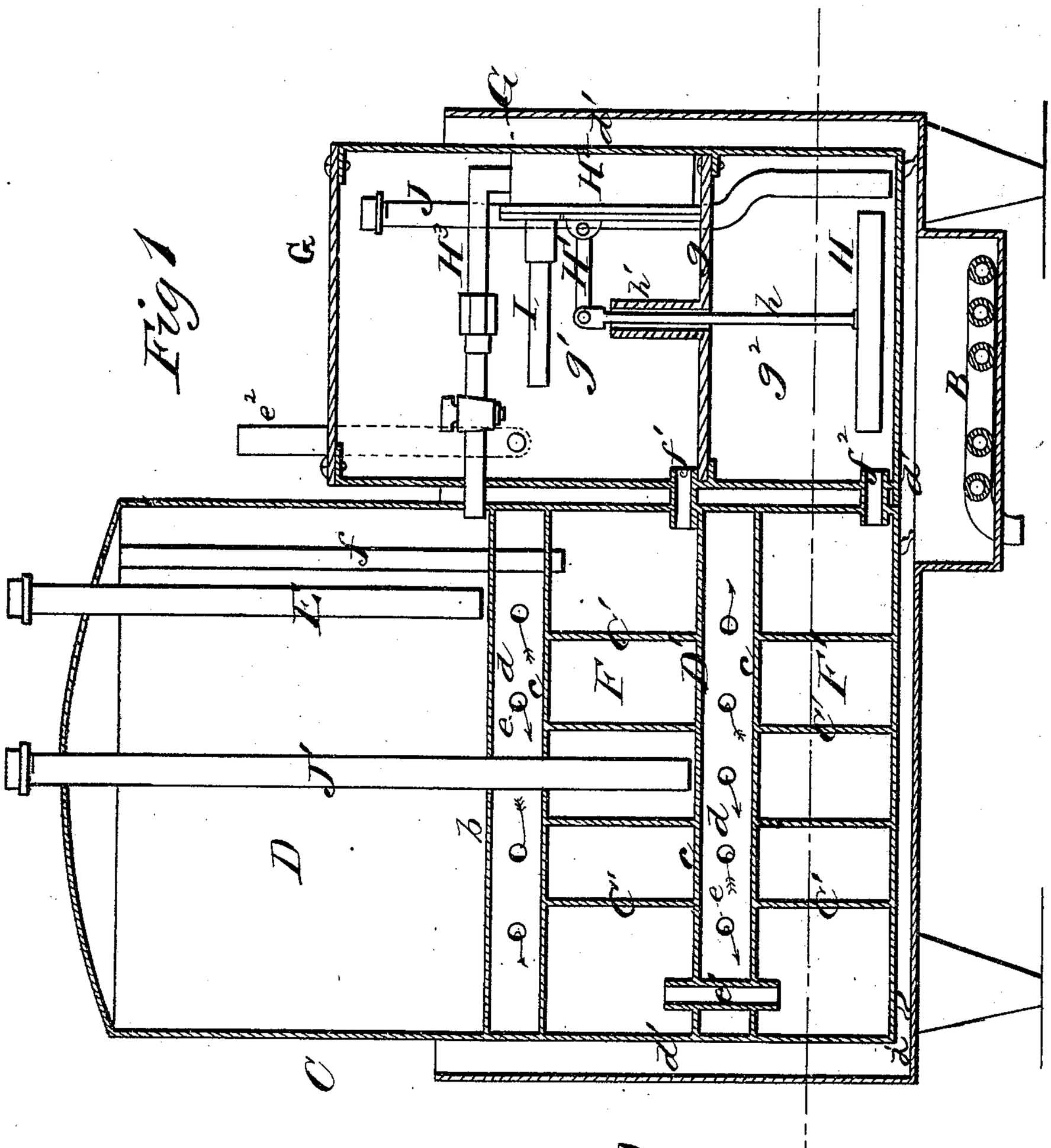

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Fig. 1.

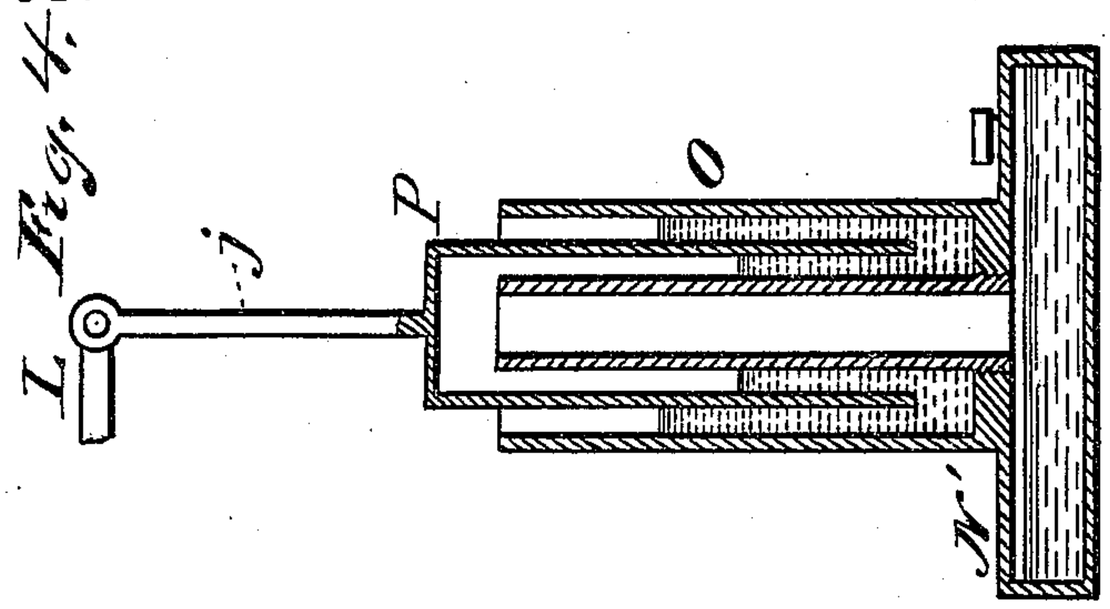

Fig. 2.

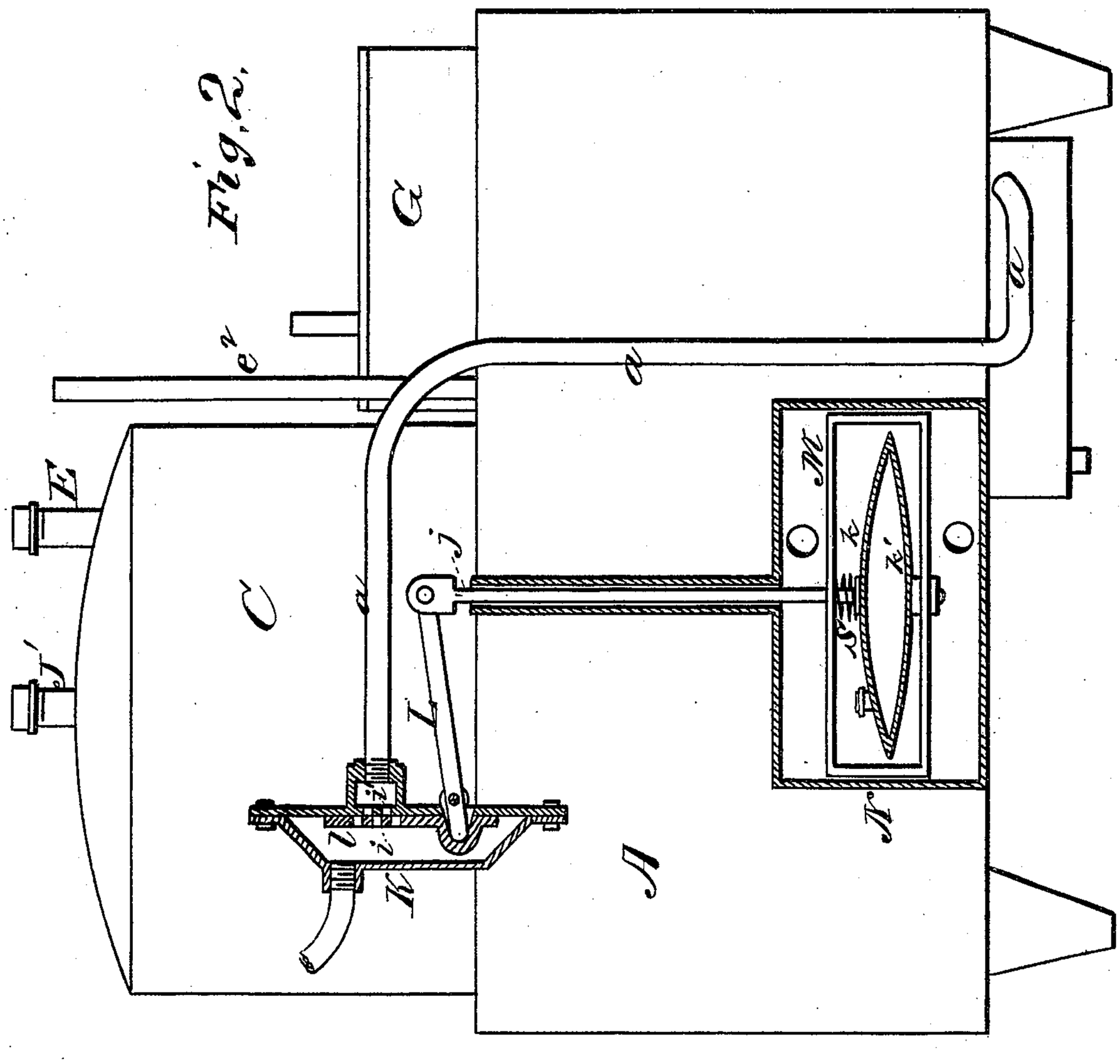

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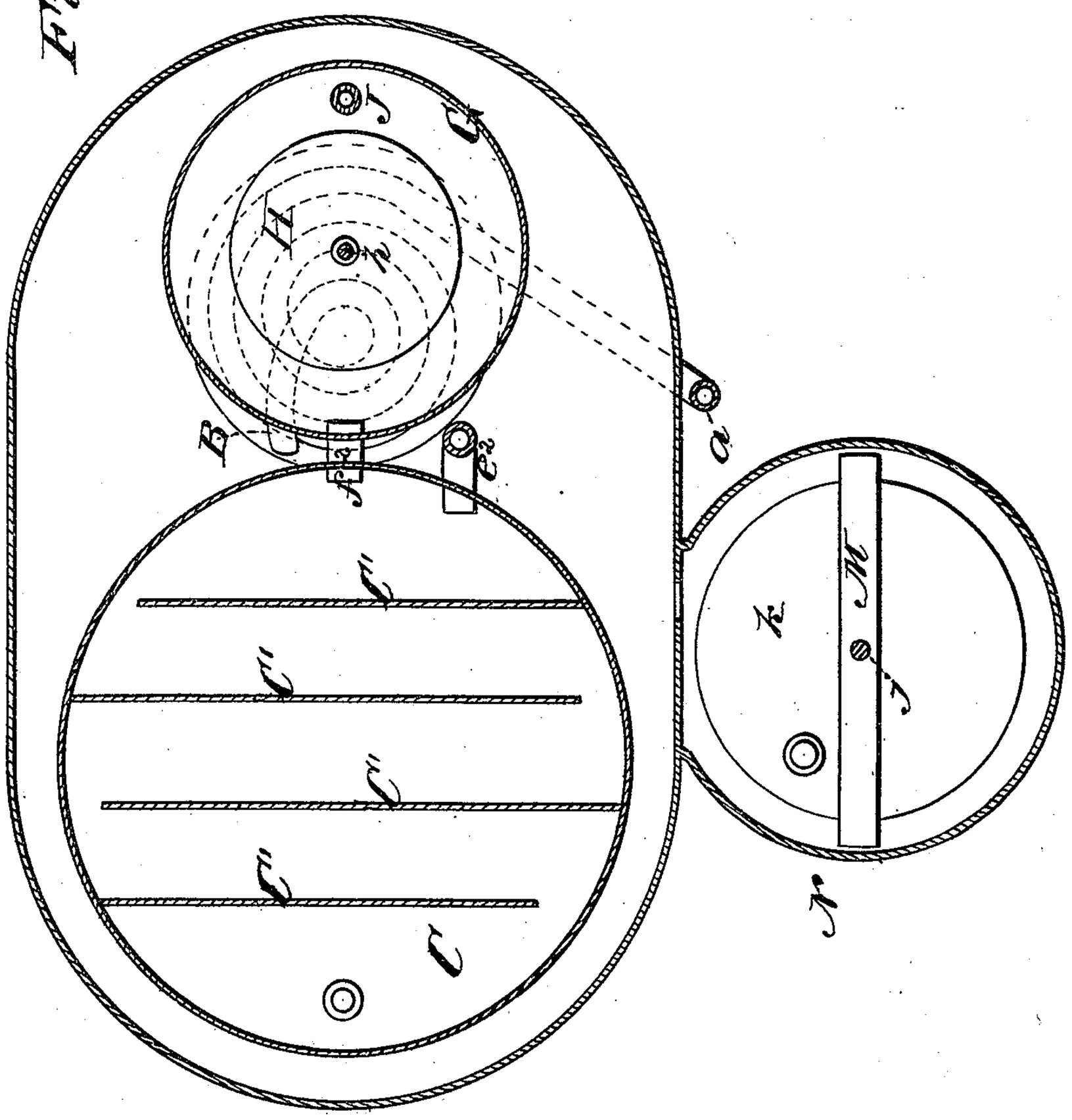
Fig. 3.



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UNITED STATES PATENT OFFICE.

ALONZO W. PORTER AND FRANCIS M. GRIMES, OF NEW YORK, N. Y.

IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. **174,851**, dated March 14, 1876; application filed December 17, 1875.

To all whom it may concern:

Be it known that we, ALONZO W. PORTER and FRANCIS M. GRIMES, of New York, in the county of New York and State of New York, have invented a new and valuable Improvement in Carbureters; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of our carbureter, and Fig. 2 is a front view thereof, part sectional. Fig. 3 is a horizontal sectional view of the same, and Fig. 4 is a sectional detail view.

This invention has relation to improvements in apparatus for carbureting air or gas by volatilizing a hydrocarbon fluid.

The object of the invention is to provide means whereby the hydrocarbons will be maintained at the temperature of about 60° Fahrenheit, being that best suited to the purpose, thereby counteracting and neutralizing the tendency of the evaporation of the hydrocarbon fluid to produce a very low temperature in the carbureting-chambers inimical to volatilization; also, to prevent the hydrocarbon spirits from reaching so high a temperature as by its too rapid evaporization to supercarburet the air or gas, cool in the pipes, and condense, as will be hereinafter more fully set forth; also, to provide means, substantially as hereinafter described, whereby the hydrocarbon fluid will be automatically fed into the carbureting-chambers, or shut off therefrom, whereby the quantity of the fluid in the said chambers will at all times be kept on a mean level and in quantity best suited to the proper enriching of the air or gas; and also, in combining with a gas or air carbureter a water-jacket surrounding the same, and a steam-coil for heating the water, a thermostat, which is operated automatically to admit steam into the coil or to shut it off therefrom, by the lowering or raising of the temperature of the water in the jacket, as will be hereinafter more fully set forth.

In the annexed drawings, the letter A designates a tank of suitable dimensions, in the lower part of which is arranged a steam-coil, B, communicating, by means of a pipe, *a*, with a suitable steam-generator. Within this tank is supported, by means of suitable legs, a carbureting-vessel, C, of similar form, which is divided, by means of a metallic partition, *b*, into two parts, D D′, the upper one being designed as a tank for storing the hydrocarbon fluid, which is fed into it through a pipe, E. The lower compartment D′ is provided with a number of spaced partitions, *c*, by means of which it is divided into an upper and a lower carbureting-chamber, designated respectively by the letters F F′, so spaced as to form a water-space, *d*, between the oil-tank D and chamber F, and between the latter and chamber F′, which chambers communicate with the water-space *d*′, between the vessel C and tank A, by means of perforations *e*. Chambers F F′ communicate with each other by means of an overflow-pipe, e^1, the object of which will hereinafter appear.

C′ represents vertical-spaced partitions arranged across chambers F F′, and attached to its walls alternately at one side and the other, whereby a serpentine passage in each chamber is formed from the air or gas inlet in the lower chamber to the pipe e^1, and across the upper chamber to an outlet-pipe, e^2, through which the enriched gas will be fed to the burners or let into the upper part of tank D.

G represents a second closed vessel, arranged beside vessel C in tank A, which vessel communicates with carbureting-chambers F F′ by means of pipes f^1 f^2, which open into the said vessel, the one above and the other below a horizontal partition, *g*, which forms in the said vessel two chambers, g^1 g^2.

H represents a float of suitable material, arranged in chamber g^2, the shaft H of which passes through a sleeve, *h*′, on partition *g* into chamber g^1, and is pivoted to the power end of a lever, H^1, operating the slide of a valve arranged in a valve-box, H^2. This box communicates, by means of a pipe, H^3, with the lower part of tank D, which pipe is provided with a pet-cock, by means of which

his communication is interrupted when requisite.

The operation of automatically feeding the ydrocarbon to the carbureting-chambers is as follows: The said chambers being empty, he float will hold the valve in valve-box H^2 pen, and if the hydrocarbon be poured into ank D through feed-pipe E, it will pour hrough pipe H^3 into the said box, and hrough an outlet-pipe, I, into chamber g^1, rom which it will flow into carbureting-chamber F, and, having attained a certain level hrough overflow-pipe e^1 into the lower chamber F′, from this chamber it will escape, hrough pipe f^2, into the lower chamber g^2 of essel G, and, having accumulated in sufficient uantity, will raise float H, thereby closing he valve in box H^2, and cutting off the supply of hydrocarbon from the said box until he level of the latter in chamber g^2 has been ufficiently lowered, when the float will fall, eopening the valve, and automatically restoring and regulating the flow of hydrocarbon.

In practice, the residuum accumulating in hambers F′ and g^2 will be exhausted through suitable pipe, J′, and from chamber F and ^{1} through a pipe, J.

In order to automatically keep the water in vater-spaces *d d′* at a sufficiently high temperature adequate to counteract the low temperature produced in vessels F F′ by evaporaion, and thus to facilitate and hasten the olatilization of the hydrocarbon fluid, I have evised the following: Pipe *a* is connected with valve-box, K, within which is arranged a slide-alve, *l*, having a number of spaced perforaions, *i*, adapted to register with similar perorations *i′*, opening into pipe *a*. Slide *l* is perated, to open or close the communication etween the generator and the steam-coil, by vertically-vibrating lever, L, to the power nd of which an endwise movable and guided od, *j*, is pivoted, the lower end of which is igidly secured to a flat metallic disk, *k*, formng, with a second disk, *k′*, a hollow vessel, esigned to hold spirits or other expansible uid, gas, or air. This vessel is arranged in a rame, M, within a preferably metallic vessel, , communicating with the water-space of the ank A by suitable connections, and is held n a state of partial collapse by means of a pring, S, arranged between the frame M and late *k* on rod *j*. When thus collapsed comunication is opened between the generator nd steam-coil, and the current of steam passng through the said coil will speedily raise he water in the tank to a sufficient temperaure—say, 60° Fahrenheit—to counteract the old produced in chambers F F′ by the evapoation of the hydrocarbon fluid. As the ater rises in temperature it will cause the pirits in vessel or disks *k k′* to expand, thus aising rod *j*, and actuating slide *l* to cut off the ommunication between the coil and generaor. The steam being thus cut off the temerature of the water in spaces *d d′* will speedily lower, when the vessel *k k′* will collapse—this movement being expedited by the recoil of spring S—and reopen the valve and readmit the steam to the coil. In lieu of using the disks *k k′* for opening and closing the valve, I may sometimes substitute the following device: The spirit will be placed in a vessel, N′, adapted to be received in the chamber N, and provided with a double-walled, preferably cylindrical, tube, O. Between the walls of tube O a quantity of mercury will be placed, in order to form a seal for a cylindrical inverted cup, P, the lower end of which is buried in the mercury, as shown in Fig. 4.

As before stated, when the temperature of the water in spaces *d d′* is raised the expansion of the spirit in vessel N′ will raise cup P, and, through the medium of rod *j* and lever L, close the valve and cut off the steam, when the contraction of the spirit in the said vessel, consequent upon the fall of the temperature of the water-jacket, will allow cup P to fall and reopen communication between the coil and generator.

In lieu of the employment of expansion fluids or spirit in the chamber N′, or between the disks *k k′*, any of the gases, or ordinary air, may be used, preferably the latter.

The tank or open jacket A should extend up so as to allow the water contained therein to pass between the passages *d d′* formed in and around the carbureting-vessel. By this means we are able to disperse the latent heat caused by evaporation of the hydrocarbon fluids in the carbureter-chambers with more rapidity and uniformity.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a carbureter the combination of a sealed air, gas, or expansible liquid box, N, steam-valve K, and intermediate devices, with a steam-coil, B, said parts being operated only by expansion and contraction of air, gas, or liquid in the box N, through the action of heat from the water surrounding the carbureter and box, without the intervention of an auxiliary flame or fire attached to the apparatus, whereby the temperature of an air or gas carbureting chamber is automatically controlled, substantially as described.

2. The carbureter-vessel C, having carbureting-chambers F F′, water-passages *d*, and overflow-pipes *e*, in combination with a water-jacket, an automatic hydrocarbon-fluid feeder, and a thermostat, substantially as and for the purpose set forth.

3. The thermostat, consisting of the spirit, air, or gas vessel N′, the double wall-tube O, and the inverted cup P, floating in mercury, substantially as described.

4. The thermostat, consisting of the vessel N′, the double wall-tube O, and the inverted cup P, in combination with a carbureting-vessel having water passages or spaces *d*, and the water jacket or tank, all co-operating sub-

stantially as described, and for the purpose set forth.

5. The combination, with a carbureter and a tank, of a thermostat having at its upper end a lever, L, and a steam or water-valve, K, operating substantially as described.

6. The steam-coil B, in combination with a carbureting-vessel and a thermostat, substantially as specified.

In testimony that we claim the above, we have hereunto subscribed our names in the presence of two witnesses.

ALONZO W. PORTER.
FRANCIS M. GRIMES.

Witnesses:
WALTER C. MASI,
GEORGE E. UPHAM.

2,500 words.