(No Model.) 2 Sheets—Sheet 1.

J. S. PORTER.

CARBURETER.

No. 563,799. Patented July 14, 1896.

Fig. 1.

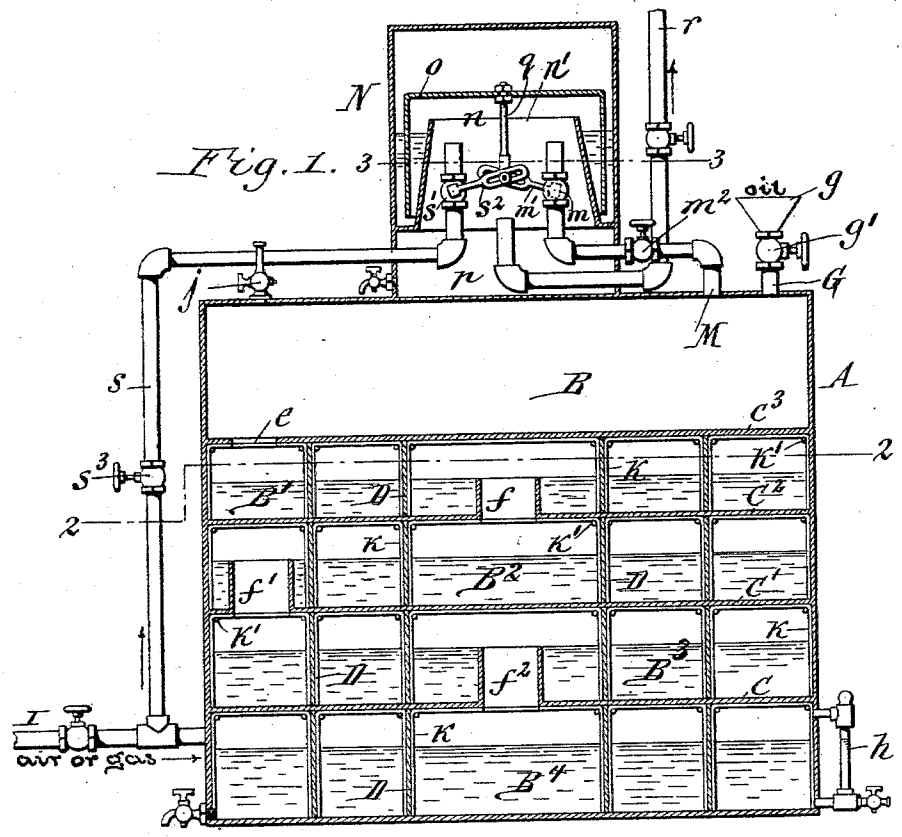
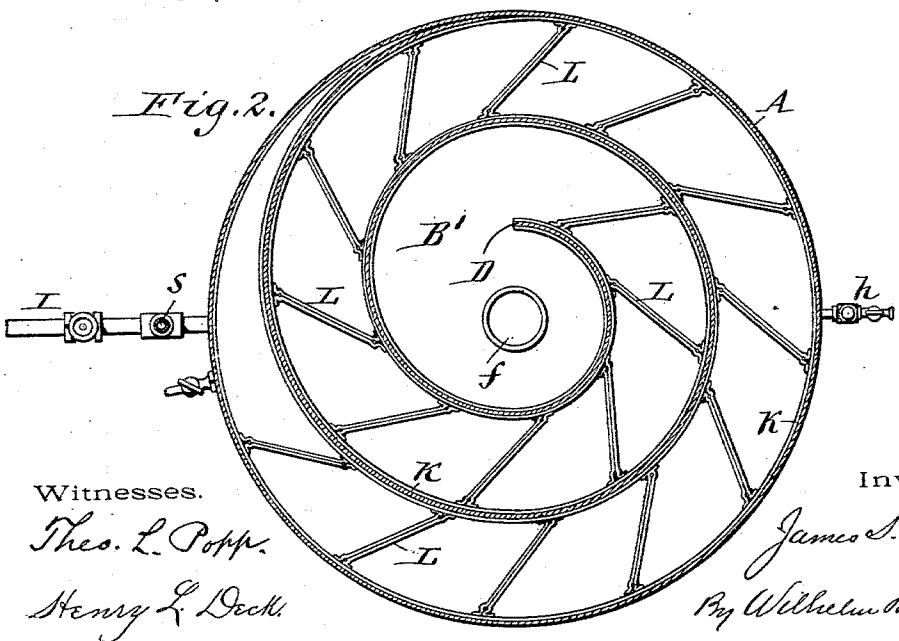


Fig. 2.



Witnesses.
Theo. L. Popp.
Henry L. Deck.

Inventor:
James S. Porter
By Wilhelm Bonner
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

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No. 563,799. Patented July 14, 1896.

Fig. 3.

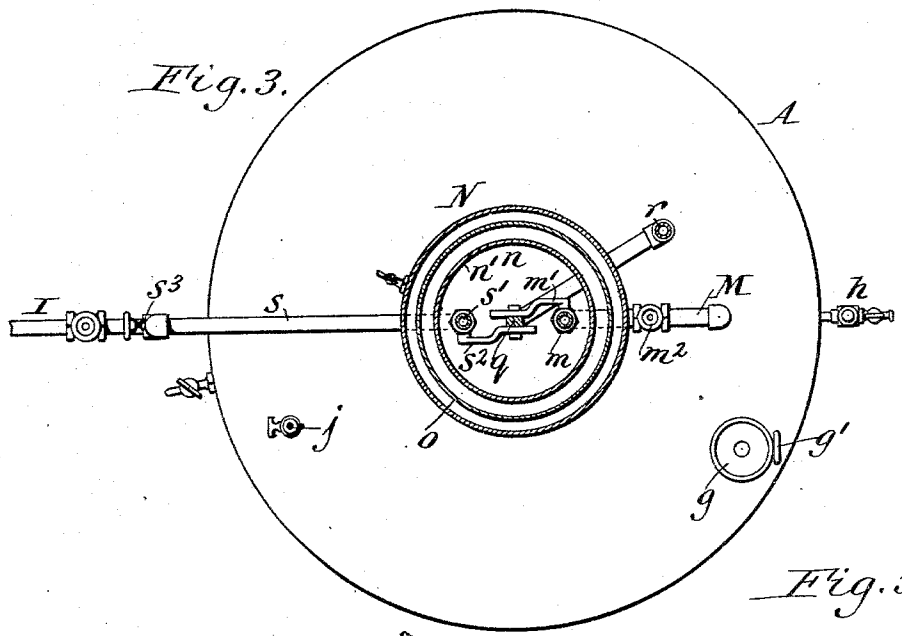


Fig. 5.

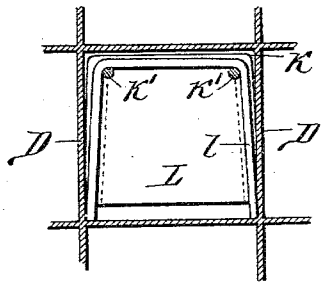
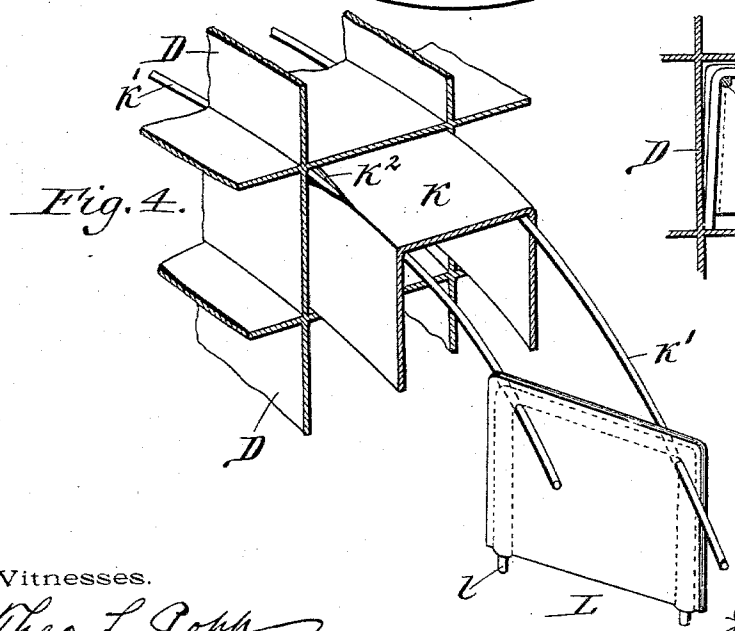


Fig. 4.



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Jas. S. Porter.

By Wilhelm & Bonner.

Attorneys.

UNITED STATES PATENT OFFICE.

JAMES S. PORTER, OF BUFFALO, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, OF FIVE-SIXTHS TO HIMSELF, PHILIP W. SPRINGWEILER, AND PETER T. EINHELLIG, OF SAME PLACE.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 563,799, dated July 14, 1896.

Application filed May 6, 1895. Serial No. 548,219. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. PORTER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Carbureters, of which the following is a specification.

This invention relates more particularly to that class of carbureters or gas-machines which consist of a casing divided into a number of connected chambers, conduits, or compartments containing oil or any other suitable hydrocarbon and having absorbent diaphragms or partitions through which the air or gas to be carbureted passes and whereby the same is impregnated with the hydrocarbon.

My invention has for its objects to increase the area of the absorbent surfaces of the various compartments in a simple manner, to improve the means for supporting the absorbent diaphragms in the compartments, and to provide the apparatus with a governor of simple construction for automatically regulating the supply of gas to the burners connected with the apparatus.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional elevation of my improved carbureter. Fig. 2 is a horizontal section thereof on line 2 2, Fig. 1. Fig. 3 is a similar section on line 3 3, Fig. 1. Fig. 4 is a sectional perspective view of a portion of the casing, showing the absorbent lining of one of the compartments, one of the absorbent diaphragms, and the supporting-wires thereof. Fig. 5 is a transverse section of one of the compartments on an enlarged scale.

Like letters of reference refer to like parts in the several figures.

A represents the casing of the carbureter, which is divided into a number of superposed chambers or compartments B B′ B^2 B^3 B^4 by horizontal diaphragms C C′ C^2 C^3, the uppermost compartment forming a gas-collecting chamber, while the remaining compartments are carbureting-chambers. Each of the latter is preferably provided with a volute partition D, closely fitted to the top and bottom of the compartment and forming a spiral conduit or passage. The gas-collecting chamber B is connected with the outer end of the uppermost conduit by an opening *e*. The several carbureting-compartments are connected by upright overflow-pipes *f f′* f^2, which also form passages through which the air or gas passes from one compartment to the next. These tubes are arranged alternately at the inner and outer ends of the conduits of the several compartments, so that the air or gas is compelled to course through the entire length of each conduit before entering the conduit of the next compartment.

G is the oil supply or filling pipe connected with the gas-collecting chamber B and having a funnel *g* and a valve *g′*. The oil introduced through this filling-pipe enters the gas-collecting chamber and flows through the opening *e* in the bottom thereof into the conduit of the uppermost compartment B′ until it rises to the top of the pipe *f* of said compartment, when it overflows into the compartment next below, and so on through the remaining compartments, each of the three upper compartments being filled to the top of its overflow-pipe. The level of the liquid in the lowermost compartment is observed by a glass gage *h*, connected therewith.

I is the air or gas inlet pipe which communicates with the outer end of the lowermost compartment. This pipe is connected with a blast-fan or other suitable air-forcing device, whereby the air or gas is forced through the space in the several compartments above the oil in a well-known manner, the air or gas passing through the several conduits in a direction contrary to that in which the oil passes through the same in filling the apparatus. In filling the machine the air is permitted to escape through a vent-cock *j*, and after filling the same the cock is closed.

The conduit of each compartment has its top and side walls covered with an absorbent lining *k* of canvas, cotton, or other suitable material, which is submerged with its vertical portions in the oil of the compartment. The top, as well as the side portions of the lining, thus become saturated by capillary attraction and the air or gas is brought in contact with the oil on all sides, causing it to take up or absorb a correspondingly greater

quantity thereof, and producing a better and richer gas. This lining *k* has the form of an inverted trough and is held in place in the conduit by horizontal parallel wires or bands *k'*, arranged in the upper corners of the lining and bent spirally to conform to the conduit. These wires are secured to the interior of the conduit, preferably by soldering, the lining being for this purpose slitted or cut away at intervals, as shown at k^2 in Fig. 4, to permit the wires to come in contact with the metallic walls of the conduit.

L represents absorbent partitions or curtains arranged at intervals in the conduits of the several compartments and extending across the air or gas space above the oil in the conduit. The lower portions of these curtains are submerged in the oil and their upper portions, which stand in the path of the air or gas, become saturated by capillary attraction, whereby the air or gas absorbs a portion of the oil in passing through the curtains. Each of these curtains consists of an inverted-**U**-shaped frame *l*, preferably of wire, which is covered with a suitable absorbent material, such as cotton. The curtain is preferably provided in its upper and side edges with a hem or pocket, as shown, in which the wire frame is confined, and the legs or side members of the frame extend below the curtain and are secured to the bottom of the compartment by soldering or by other suitable means. The retaining-wires of the conduit-lining *k* pass through the upper corners of the curtains L, on the inner side of their frames, as shown in Figs. 4 and 5, thereby aiding in holding the curtains in place. The curtains are preferably arranged obliquely in the conduits and at an acute angle to the inner wall of the conduit, so as to direct the air or gas inwardly or toward the center of the machine and counteract the tendency of the same to pass along the outer wall of the conduit under the influence of centrifugal force. By this arrangement the entire surface of the curtains is effectually utilized.

M is the gas-outlet pipe through which the carbureted air or gas is discharged from the gas-collecting chamber B. The escape of the gas from this outlet-pipe is preferably controlled by a governor or automatic regulator constructed as follows:

N is a closed tank or vessel, which may be mounted on the main case of the carbureter and which is partly filled with a non-freezing liquid, such as glycerin. This tank is provided in its bottom with a comparatively large opening *n*, which is surrounded by an upright tube *n'*, extending above the surface of the liquid in the tank.

o is an inverted cylindrical vessel or cup surrounding the tube *n'* and dipping with its open lower end below the surface of the liquid in the tank, so as to form a gas-seal. The chamber or space *p* below the tank, the tube *n'*, and the upper portion of the cup *o*, form a gas-chamber with which the outer or upper end of the gas-pipe M communicates. This pipe is provided with a regulating-valve *m*, the arm *m'* of which is connected with the cup *o* by a stem *q* depending from the top of the cup and having a transverse pin which engages in a longitudinal slot of the valve-arm, as shown in Fig. 1.

r is a gas-supply pipe which leads from the gas-chamber of the regulator to the place of consumption.

When the gas-pressure rises, owing to a reduced consumption of gas, the cup *o* is raised, thereby partly closing the valve of the gas-pipe M and diminishing the supply of gas to the burner accordingly; while when the gas-pressure is reduced by an increased consumption the cup descends by gravity and farther opens said valve, whereby the supply to the burner is increased. The gas supply is thus automatically regulated in accordance with the consumption.

s is an auxiliary air-pipe, whereby a quantity of air may be mixed with the carbureted gas in case the same is richer than desired. This pipe leads from the main air-pipe I to the gas-chamber of the regulator and is provided with a valve *s'* for regulating the passage of air through the same. The arm s^2 of this valve is connected with the stem of the cup *o* in the same manner as the arm of the valve *m*, so that both valves are operated simultaneously as the gas-pressure rises and falls, thereby admitting the same relative proportion of gas and air to the gas-chamber of the regulator at all times, irrespective of the fluctuations of the gas-pressure.

The gas-outlet pipe M and auxiliary air-pipe *s* are provided with hand-valves m^2 and s^3 for varying the proportion of gas and air admitted to the gas-chamber of the regulator, as may be desired.

When the quality of the gas is such as to require no final admixture of air, the hand-valve of the air-pipe *s* is closed.

It is obvious that the conduits of the carbureting compartments may not necessarily be spiral in form, but may be constructed in any other suitable form which provides a continuous passage for the air or gas to be carbureted.

I claim as my invention—

1. The combination with a conduit or passage for a carbureter adapted to contain a hydrocarbon, of an absorbent lining applied to the top and sides of said conduit, a transverse partition arranged in said conduit and consisting of an inverted-**U**-shaped frame secured at its lower ends to the conduit and a covering of absorbent material applied to the frame, longitudinal retaining-wires arranged in the upper corners of the conduit and passing through the upper portion of said partition, substantially as set forth.

2. The combination with a carbureter, of a gas-regulator consisting of a tank adapted to contain a liquid and having a gas-tube ex-

tending above the liquid therein, an inverted cup arranged in said tank around said tube, having its open lower end immersed in the liquid of the tank, and forming with the tube a gas-chamber, a gas-outlet pipe leading from the carbureter to said gas-chamber, an air-pipe connected with said gas-chamber, regulating-valves arranged in said gas and air pipes and having actuating-arms both connected with the inverted cup of said regulator whereby said valves are operated simultaneously, and a burner-supply pipe connected with the gas-chamber of the regulator, substantially as set forth.

Witness my hand this 27th day of April, 1895.

JAMES S. PORTER.

Witnesses:
JNO. J. BONNER,
C. A. MANN.