No. 819,074. PATENTED MAY 1, 1906.

O. V. MONROE.

GAS GENERATING MACHINE.

APPLICATION FILED MAY 15, 1905.

Fig. 1.

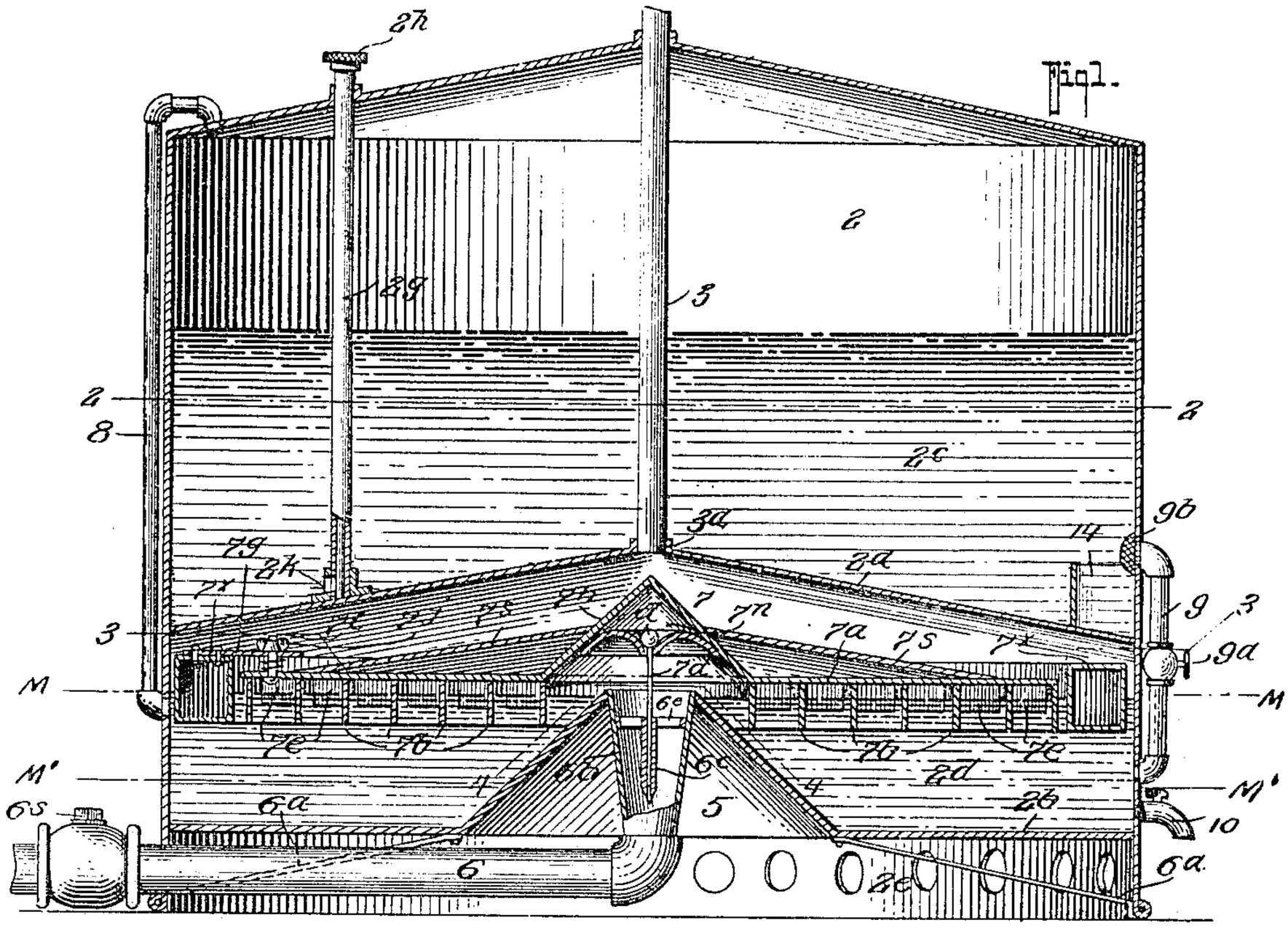


Fig. 2.

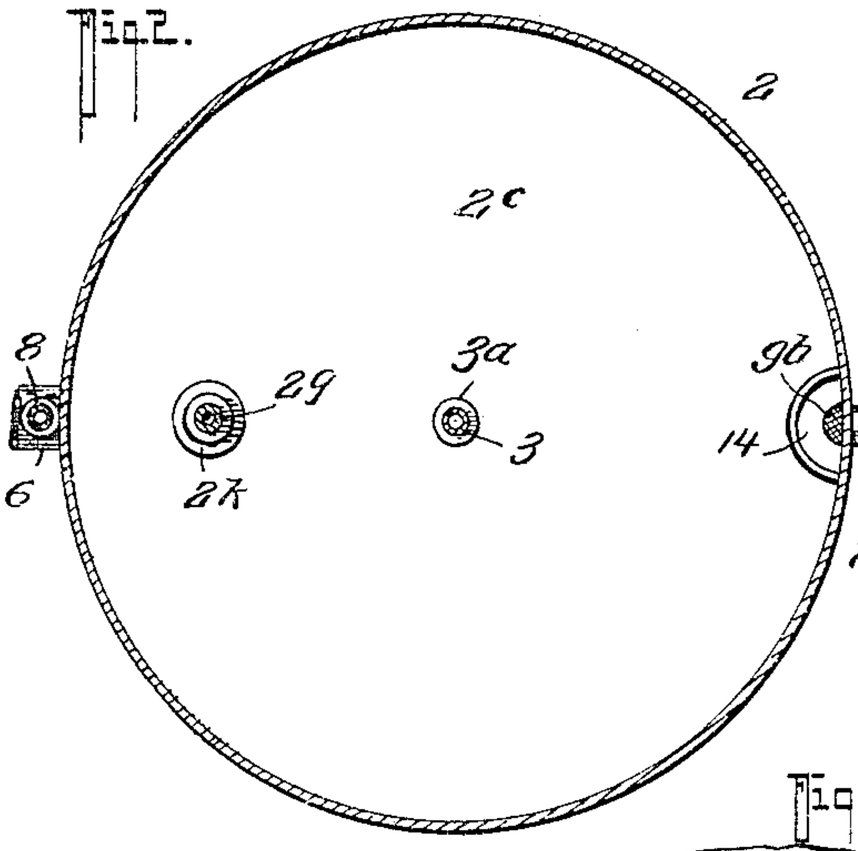


Fig. 3.

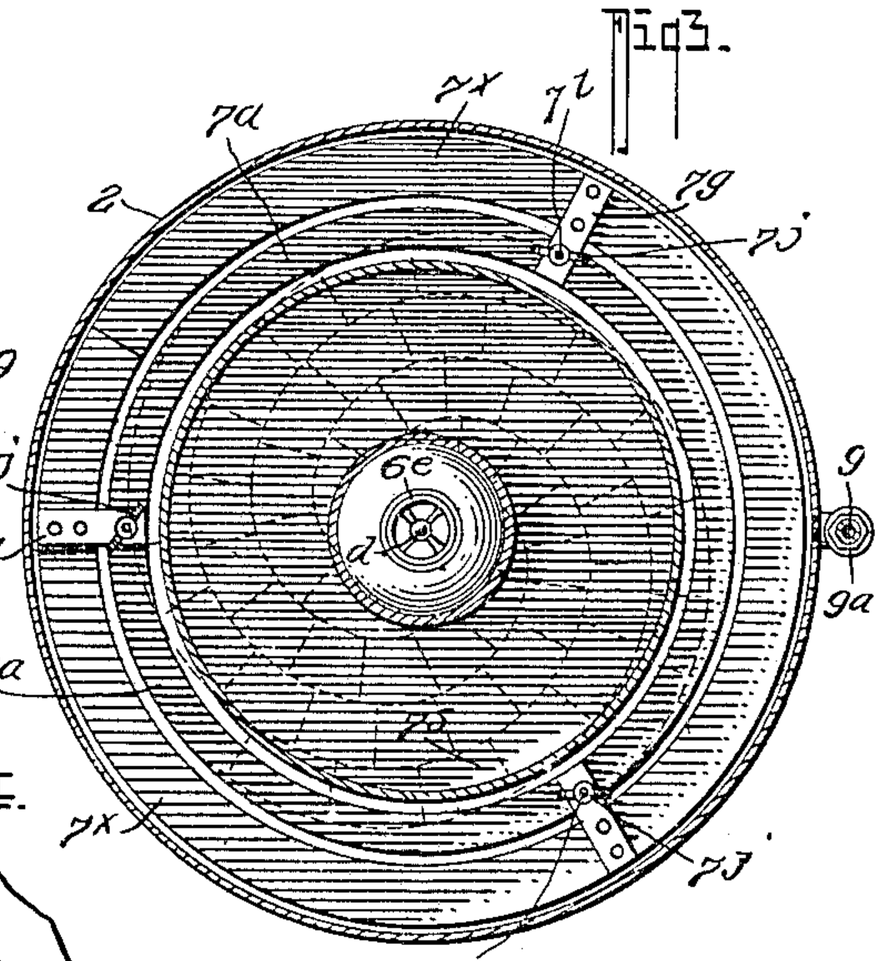
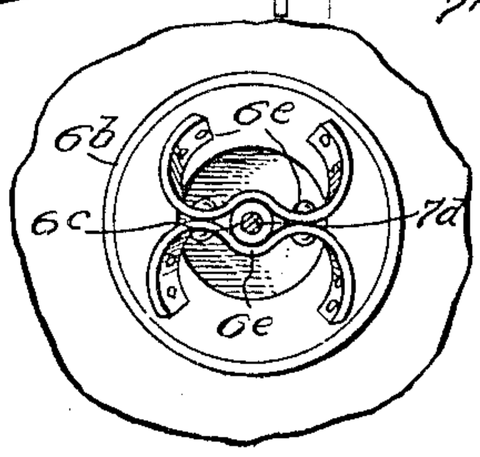


Fig. 4.



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GAS-GENERATING MACHINE.

No. 819,074. Specification of Letters Patent. Patented May 1, 1906.

Application filed May 15, 1905. Serial No. 260,519.

To all whom it may concern:

Be it known that I, ORVILLE V. MONROE, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Gas-Generating Machines, of which the following is a specification.

My present invention relates to certain new and useful improvements in gas-generating machines and apparatus for generating gas from a suitable hydrocarbon—such as gasolene, naphtha, and the like; and it more particularly seeks to provide an improved means for vaporizing the hydrocarbon and for automatically feeding the same from a storage-tank into a carbureter as needed.

The invention also has for its object to provide a means for preventing the air-supply pipe and the carbureter from freezing up during the operation of the machine.

Again, my invention provides an apparatus of this character of a very simple, effective, and properly-operating structure which will produce an intimate commingling and mixing of the air and hydrocarbon vapors to produce a good quality of gas.

Generically, my invention comprises a casing or tank divided into a plurality of compartments, the upper one of which serving as the storage reservoir or tank for the hydrocarbon fluid, the intermediate compartment serving as the carbureters and the bottom compartment serving as an air-chamber to allow free circulation of air around the air-supplying pipe and carbureters to prevent them from freezing up on account of the lowering of temperature incident to the operation of the apparatus. The carbureter-chamber and the storage-tank are connected by a feed-pipe and a vent or balance pipe, while a gas-service pipe is connected to the carbureter-chamber to lead off the generated gas and convey it to the point or points of consumption.

The invention also includes an improved form of float within the carbureter for vaporizing the hydrocarbon and causing an intimate intermixing of the air and the hydrocarbon vapors.

With other objects in view than those hereinbefore specified the invention also includes certain novel construction, combination, arrangement, and design of parts, all of which will be first described in detail and then specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of my invention. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a similar view on the line 3 3 of Fig. 1. Fig. 4 is a detail horizontal section on the line 4 4 of Fig. 1.

Referring now to the accompanying drawings, in which like numerals and letters of reference indicate like parts in all of the figures, 1 designates a complete apparatus, which comprises a tank 2, divided by horizontal partitions 2^a and 2^b into three compartments 2^c 2^d 2^e, respectively. The upper compartment 2^c serves as a storage reservoir or tank for the hydrocarbon, which is preferably gasolene, naphtha, or some other like hydrocarbon of like properties. The intermediate compartment 2^d serves as a carbureter, while the lower compartment 2^e provides an air-chamber for the free circulation of air under the carbureter-chamber and around the air-inlet pipe to prevent same from freezing up in the manner more clearly understood hereinafter.

As shown in the drawings, the partition 2^a forms the bottom of the storage-reservoir 2^c and is preferably conically formed and adapted to receive one end 3^a of the pipe 3, which passes through the reservoir 2^c and communicates with the carbureter-chamber 2^d, as clearly shown in Fig. 1. The pipe 3 at its upper end connects with a gas-supplying means for the purpose of conveying away the generated gas to the points of consumption.

2^g designates a pipe inserted through the top of the tank on the side opposite the feed-pipe and near the center of the tank, which pipe projects above the top of the tank sufficiently to receive the closure cap or plug 2^h for the purpose of keeping out air and obstruction. The pipe 2^g extends to the bottom of the tank and below the surface of the liquid at the bottom of the tank, the pipe being held in position by projecting into the open socket 2^k, attached to the bottom of the tank, so as to allow the free escape of the gasolene when poured in at the top of the pipe.

The partition 2^b, serving as the bottom of

the carbureter-chamber 2^d, is centrally apertured to receive the base of a conical or cylindrical dome or hood 5, to which it is attached and which is closed at the top, but which is open at the bottom and is in communication with the ventilated air-chamber 2^e.

6 designates the air-supply pipe, which passes through the air-chamber 2^e and connects with a discharging-funnel 6^b, which merges at its upper end with the aperture in the upper portion of the conical or cylindrical dome 5 and communicates with the carbureter-chamber 2^d, into which the air is forced by any suitable means. (Not shown.)

The dome or hood 5 and the discharge-funnel 6^b, it should be stated, project up above the maximum level of the liquid, such level being designated by M in Fig. 1. To support the pipe 6, I provide suitable braces 6^a 6^a, as clearly shown in Fig. 1.

8 designates what I term the "balance" or "vent" pipe, which connects with the carbureter-chamber 2^d at a point below the line M of maximum level and above the line M′ of minimum level of the liquid. Preferably the said pipe passes up the outside of the tank 2 and connects with the reservoir-chamber 2^c, at the top thereof, and whenever desired a cut-off valve (not shown) may be included in the pipe 8 to shut up communication between the reservoir-chamber 2^c and the carbureter 2^d whenever it may be found desirable to do so. It is apparent that the vent-pipe 8 could without impairing its efficiency be located entirely within the tank and the carbureter by locating the upper and lower ends in the same relative positions as when on the outside, in which case it would be necessary to close the stop-cock 6^s in the air-pipe 6 while storage-tank is open.

Arranged within the funnel 6^b is a bearing-ring 6^e, which carries a bearing-tube 6^c to receive the guide-rod 7^d. Arranged within the hood 7^h is an inverted conical-shaped member 7^n, centrally apertured to permit the passage of the guide-rod 7^d, which guide-rod is preferably flexible and has its upper end provided with a knob or ball *d* somewhat larger than the aperture in the inverted cone 7^n. It should be stated that the bearing member 6^c is arranged sufficiently below the upper edge of the funnel 6^b so that when the parts are shipped the evaporizer-disk and its hood will seat on the hood 5.

The vaporizer 7 consists of a horizontally-disposed disk 7^a, having a central opening to receive the base of the conical or vertical dome 7^h and having depending from its surface a spiral partition or partitions 7^b, beginning at the central opening and terminating at the outer edge, forming a spiral channel, the latter being intersected by a series of baffles 7^e, placed apart at suitable intervals. The spiral partitions should be about three nches wide and the baffles about one and one-half inches wide. In operation the lower ends of the baffles are submerged one-half to three-fourths of an inch by the proper adjustment of the disk 7^a and the annular air-tight float 7^x, which surrounds it, the spiral partitions confining the air-current to the spiral channels. Chambers are formed above the gasolene between the baffles, these being increased in height by the rush of air into the dome and under the disk and baffles. The breaking of the air-bubbles by entering the series of chambers after having passed under the baffles insures complete saturation and rich gas. The capacity of the generator of a given size can be increased by increasing the number of baffles and their submergence.

While I have described the domes 5 and 7^h as conical in shape, they may be cylindrical or any other shape desired.

To secure the disk 7^a to the float 7^x, I provide a plurality of vertically-extending bolts 7^l, which project upwardly from the disk 7^a and pass through apertures in the horizontal plates 7^g, which extend over the disk 7^a from the float 7^x, to which the plates 7^g are attached. Spiral springs surround the bolt 7^l below the plates 7^g, while check-nuts or thumb-nuts 7^j are provided for adjusting the plate 7^g with respect to the float 7^x. A suitable sloping roof 7^s is provided over the plate 7^a, as shown.

14 designates a dam or guard surrounding the upper end of the feed-pipe to prevent sediment piling up around such end of the feed-pipe and clogging the same. The feed-pipe 9 is also provided with a screen 9^b at its upper end to prevent the entrance of floating matter into the pipe 9.

So far as described the manner in which my invention operates will be best explained as follows: Assuming the apparatus to be empty, to fill the same it is only necessary to remove the plug or cap from the pipe 2^h and pour in the gasolene, it being understood, however, that the valve 9^a in the feed-pipe must first be closed. As soon as the desired quantity of hydrocarbon has been poured into the reservoir 2^c the valve 9^a is opened to allow the hydrocarbon to flow into the carbureter chamber, the flow of hydrocarbon ceasing when the lower end of the vent-pipe 8 is covered by the liquid in the carbureter-chamber having risen to its maximum level. By arranging the feed-pipe 9 and the vent-pipe 8 as shown and described as the gasolene in the carbureter-chamber evaporates and is converted into gas, thereby causing the liquid-level to drop to the minimum line of level M′, it opens the inlet of the vent-pipe 8 and allows some gas from the carbureter-chamber to flow through the pipe 8 into the storage-reservoir and permits the liquid to flow from the storage-reservoir through the pipe 9 into the carbureting-chamber 2^d, which flow of liquid will continue until the

fluid again rises to its maximum level M and closes off the inlet of the vent-pipe 8. This, as will be readily seen, affords a positive regulation in the feed of the gasolene to the carbureter at all times, maintaining a nearly uniform level, and thereby insuring a steady regulation of gas.

By providing the open dome 5, which surrounds the air-pipe 6 and the inlet-funnel 6^b, and by providing a ventilating-chamber 2^b under the carbureter I am enabled to prevent the same from freezing up during the operation of the apparatus.

By constructing the vaporizer in the manner hereinbefore explained I insure a most complete agitation of the gasolene in the carbureter-chamber, thus keeping it of uniform consistency and preventing the formation of a residue of sediment. This agitation, combined with drawing the gasolene from near the bottom of the tank and using only metal in the carbureter, insures the greatest possible uniformity of gas and almost entirely does away with the need of the expensive mixers used on most machines now known in the trade.

By using a gasometer in connection with my generator and a simple and inexpensive air-mixer I reduce the cost of the gas, as well as the cost of the machine.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided a very simple and effectively-operating gas-generating apparatus in which the feed of the hydrocarbon fluid from the storage-chamber is automatically regulated and in which means is provided for determining and indicating the level of the liquid within the carbureting-chamber.

A stop-cock 10 may be provided near the bottom of the carbureter-chamber to draw off the surplus moisture therefrom, it being understood that a certain amount of water forms in the carbureter-chamber during the operation of the machine.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation, and many advantages of my invention will be readily understood by those skilled in the art to which it appertains.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A gas-generator comprising a storage-reservoir and a carbureter, a feed and a vent pipe connecting said storage-reservoir with said carbureter, a service-pipe leading from the carbureter, means for admitting air to the carbureter, means for vaporizing the hydrocarbon within the carbureter, means for drawing off the surplus moisture from the carbureter-chamber, said air-admitting means comprising a pipe entering into said carbureter-chamber through the bottom thereof, and discharging above the level of the liquid therein, said pipe having its discharge end enlarged and having a cut-off valve for controlling the air-supply and said carbureter-bottom including a conical portion through which the air-pipe passes, said vaporizing means having a central conical dome held over the air-admitting pipe leading into the carbureter-chamber, a baffle within said conical dome, a pin passing through said baffle and projecting downwardly into the air-admitting pipe, and means within the air-admitting pipe for receiving said pin.

2. A gas-generator comprising a storage-reservoir and a carbureter, a feed and a vent pipe connecting said storage-reservoir with said carbureter, a service-pipe leading from the carbureter, means for admitting air to the carbureter, means for vaporizing the hydrocarbon within the carbureter, means for drawing off the surplus moisture from the carbureter-chamber, said air-admitting means comprising a pipe entering into said carbureter-chamber through the bottom thereof, and discharging above the level of the liquid therein, said pipe having its discharge end enlarged and having a cut-off valve for controlling the air-supply and said carbureter-bottom including a conical portion through which the air-pipe passes, and a dam within the reservoir for guarding the mouth of the feed-pipe, said vaporizing means having a central conical dome held over the air-admitting pipe leading into the carbureter-chamber, a baffle within said conical dome, a pin passing through said baffle and projecting downwardly into the air-admitting pipe, and means within the air-admitting pipe for receiving said pin.

3. A gas-generator comprising a storage-reservoir and a carbureter, a feed and a vent pipe connecting said storage-reservoir with said carbureter, a service-pipe leading from the carbureter, means for admitting air to the carbureter, means for vaporizing the hydrocarbon within the carbureter, means for drawing off the surplus moisture from the carbureter-chamber, said air-admitting means comprising a pipe entering into said carbureter-chamber through the bottom thereof, and discharging above the level of the liquid therein, said pipe having its discharge end enlarged and having a cut-off valve for controlling the air-supply and said carbureter-bottom including a conical portion through which the air-pipe passes, a dam within the reservoir for guarding the mouth of the feed-pipe, and a screen over the mouth of the feed-pipe within the reservoir, said vaporizing means having a central conical dome held over the air-admitting pipe leading into the carbureter-chamber, a baffle within said conical dome, a pin passing through said baffle

and projecting downwardly into the air-admitting pipe, and means within the air-admitting pipe for receiving said pin, substantially as shown and described.

4. A gas-generator comprising a storage-reservoir and a carbureter, a feed and a vent pipe connecting said storage-reservoir with said carbureter, a service-pipe leading from said carbureter, means for admitting air to the carbureter, a vaporizer within the carbureter, said vaporizer having a central guide-rod, means for drawing off the surplus moisture from the carbureter-chamber, said air-admitting means comprising a pipe, a funnel in said carbureter-chamber and discharging above the level of the liquid therein, said air-admitting pipe connected to said funnel, a vertically-elongated socket connected within said funnel to receive said vaporizer guide-rod, said air-pipe having a cut-off valve for controlling the air-supply, and a ventilated air-chamber beneath said carbureter and surrounding said air-admitting means, substantially as shown and described.

5. A gas-generator comprising a tank divided into compartments, the upper compartment forming a storage-reservoir, the intermediate forming the carbureter, the lower compartment forming an air space or chamber, means for admitting liquid into said reservoir, a vent-pipe connected with the carbureter and with the reservoir, a feed-pipe connected with the carbureter and with the reservoir, a cut-off valve in said feed-pipe, a dam within the reservoir adjacent the end of said feed-pipe, means for vaporizing the liquid in the carbureter, and means for withdrawing the gas from the carbureter-chamber, said vaporizing means comprising a horizontally-disposed disk, means for forcing air under said disk, said disk being centrally apertured, a dome secured over the central aperture of the disk, a central guide-rod within said dome, said air-forcing means including an inlet-pipe having a funnel-shaped discharge, discharging into the carbureter-chamber under the vaporizer-dome and means within the funnel discharge for guiding the central rod of the vaporizer-dome, a plurality of spirally-arranged partitions secured to said vaporizer-disk, supplemental strips secured to said disk between said spiral partitions, and a float adjustably secured to said vaporizer-disk, all being arranged substantially as shown and described.

6. In a gas-generator of the character stated, a carbureter comprising a casing forming a chamber, the bottom of said casing having an inwardly-projecting hood centrally apertured, a funnel-shaped member secured to said hood at its central aperture and projecting upwardly through the hood and spaced therefrom, an air-supplying pipe secured to said funnel-shaped member, a vaporizer within said carbureter comprising a disk having a central aperture, a dome-shaped member secured over said central aperture of the disk, a bearing member within said funnel-shaped member, a flexible guide-rod carried by said bearing member, means within the disk-hood for receiving said flexible guide-rod, a roof over said disk, spiral partitions depending from said disk to form spiral channels leading from the central hood to the edge of the disk, baffles depending from the disk and arranged at intervals from each other, and an annular float connected to the outer edge of the vaporizer-disk, and means for admitting liquid into the said carbureter and withdrawing the generated gas therefrom, substantially as shown and described.

7. A gas-generating apparatus comprising a tank having a storage-reservoir, a carbureter-chamber and an air-chamber, means for admitting liquid into said reservoir, means for automatically feeding said liquid from said reservoir into said carbureter, means for vaporizing said liquid within said carbureting-chamber, said means comprising a disk, a plurality of spiral partitions depending from said disk, a plurality of baffles between said spiral partitions, a float adjustably secured to said disk at its periphery, and means for forcing air into said carbureter-chamber below said disk and through the channels formed between the spiral partitions, substantially as shown and described.

8. An apparatus of the character stated comprising a tank divided into independent chambers arranged one above the other, one of said chambers serving as a storage-reservoir, another serving as a carbureter-chamber, and the other serving as an air-chamber, means for admitting liquid into the reservoir, means for automatically feeding said liquid from the reservoir into the carbureter-chamber as the gas is generated, said means comprising a feed-pipe communicating with the reservoir above and near its bottom, and with the carbureter above its bottom, a cut-off valve in said feed-pipe, a vent-pipe connecting with the carbureter at a point opposite and above the carbureter end of the feed-pipe, said vent-pipe having its other end communicating with the reservoir at its top, means for admitting air into the carbureter-chamber, means for vaporizing liquid within the carbureter-chamber, means for maintaining said air-admitting means from freezing up, means for drawing off the gas from the carbureter-chamber, said vaporizing means comprising a disk, spiral partitions secured to said disk to form spiral channels, baffles within said spiral channels, an annular float, means for adjustably securing said annular float to said disk, said last-named means comprising bracket-plates secured to the float, bolts secured to the disk and projecting through said bracket-plates, coil-springs on said bolts below said bracket-plates, and adjusting-nuts

above said bracket-plates on said bolts substantially as shown and described.

9. A gas-generator comprising a tank having a plurality of partitions divided into three compartments, the upper compartment serving as a storage-reservoir, the lower compartment serving as an air-chamber and the intermediate compartment serving as a carbureter-chamber, the bottom of said carbureter-chamber having a central aperture, a conical hood secured over said central aperture and projecting upwardly into the carbureter-chamber, said conical hood having its apex truncated to form an aperture, an air-inlet pipe having a portion projecting up through said conical hood and secured to said aperture of the conical hood, a valve in said air-inlet pipe for controlling the air admission, a gas-offtake pipe communicating with said carbureter-chamber, a feed-pipe connecting said carbureter-chamber to said storage-reservoir, a screen over the reservoir end of said feed-pipe, a dam within said reservoir adjacent the reservoir end of said feed-pipe, a vent-pipe connecting the reservoir with the carbureter-chamber, a vaporizer within the carbureter-chamber comprising a centrally-apertured disk, a cone-shaped hood secured to said disk over said central aperture, an inverted-cone-shaped member secured within said conical hood of the disk, a guide-rod passing through said inverted-cone-shaped member for said guide-rod, depending partitions secured to said disk and forming channels, baffles within said channels secured to said disk, an annular float surrounding said disk at its periphery, and means for adjustably securing said annular float to said disk, substantially as shown and described.

10. A gas-generator comprising a tank having a plurality of partitions divided into three compartments, the upper compartment serving as a storage-reservoir, the lower compartment serving as an air-chamber and the intermediate compartment serving as a carbureter-chamber, the bottom of said carbureter-chamber having a central aperture, a hood secured over said central aperture and projecting upwardly into the carbureter-chamber, said hood being truncated to form an aperture, an air-inlet pipe having a portion projecting up through said hood and secured to said aperture of the hood, a valve in said air-inlet pipe for controlling the air admission, a gas-offtake pipe communicating with said carbureter-chamber, a feed-pipe connecting said carbureter-chamber to said storage-reservoir, a screen over the reservoir end of said feed-pipe, a dam within said reservoir adjacent the reservoir end of said feed-pipe, a vent-pipe connecting the reservoir with the carbureter-chamber, a vaporizer within the carbureter-chamber comprising a centrally-apertured disk, a hood secured to said disk over said central aperture, an inverted member secured within said hood of the disk, a guide-rod passing through said inverted member for said guide-rod, depending partitions secured to said disk and forming channels, baffles within said channels secured to said disk, an annular float surrounding said disk at its periphery, and means for adjustably securing said annular float to said disk, substantially as shown and described.

11. A gas-generator comprising a tank having a plurality of partitions divided into three compartments, the upper compartment serving as a storage-reservoir, the lower compartment serving as an air-chamber and the intermediate compartment serving as a carbureter-chamber, the bottom of said carbureter-chamber having a central aperture, a conical hood secured over said central aperture and projecting upwardly into the carbureter-chamber, said conical hood having its apex truncated to form an aperture, an air-inlet pipe having a portion projecting up through said conical hood and secured to said aperture of the conical hood, a valve in said air-inlet pipe for controlling the air admission, a gas-offtake pipe communicating with said carbureter-chamber, a feed-pipe connecting said carbureter-chamber to said storage-reservoir, a screen over the reservoir end of said feed-pipe, a dam within said reservoir adjacent the reservoir end of said feed-pipe, a vent-pipe connecting the reservoir with the carbureter-chamber, a vaporizer within the carbureter-chamber comprising a centrally-apertured disk, a cone-shaped hood secured to said disk over said central aperture, an inverted-cone-shaped member secured within said conical hood of the disk, a guide-rod passing through said inverted-cone-shaped member for said guide-rod, depending partitions secured to said disk and forming channels, baffles within said channels secured to said disk, an annular float surrounding said disk at its periphery, and means for adjustably securing said annular float to said disk, and a roof or cover secured to said disk and to said disk conical hood substantially as shown and described.

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