No. 672,854.

Patented Apr. 23, 1901.

J. M. GOLDSMITH.

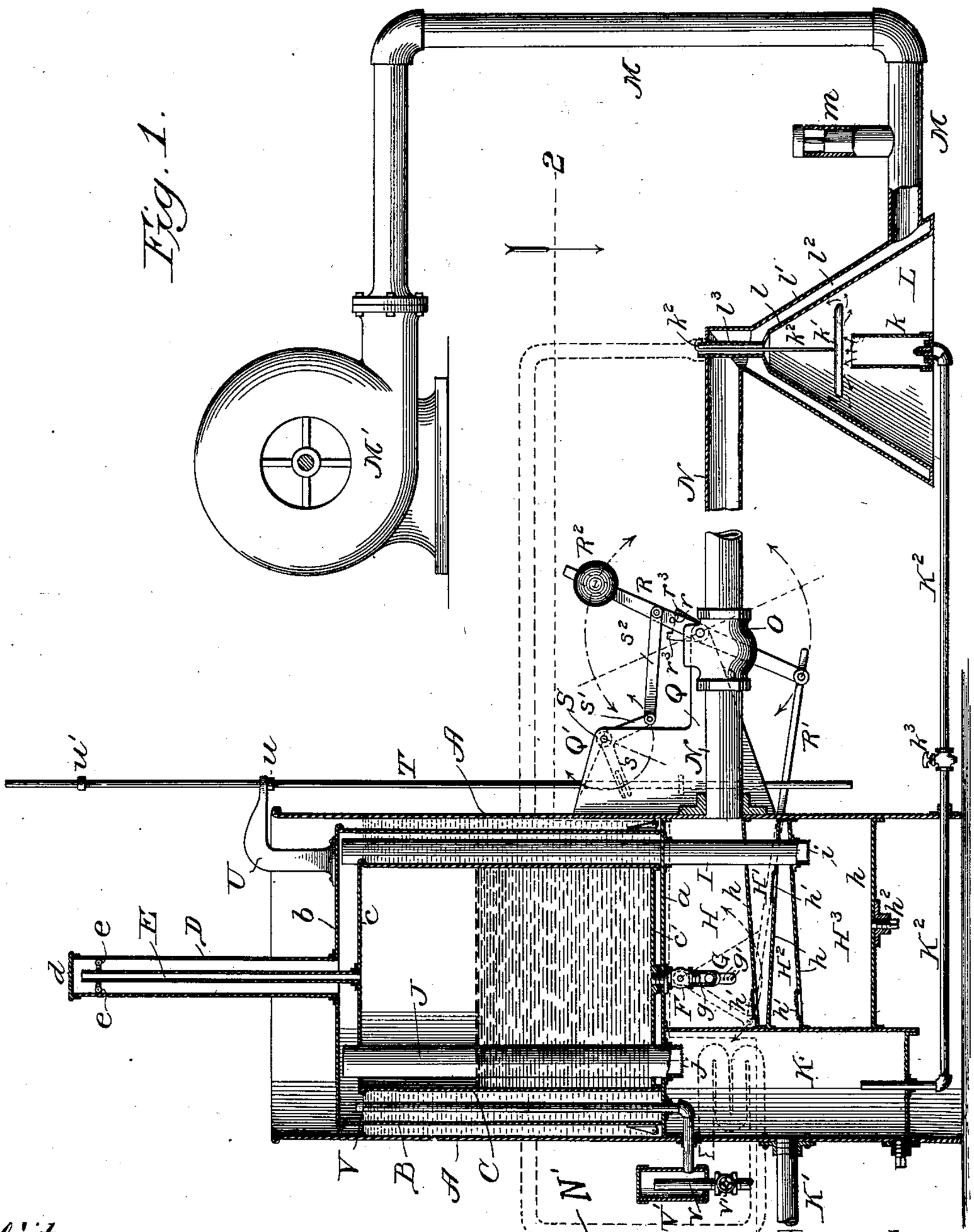
CARBURETER.

(Application filed Jan. 26, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

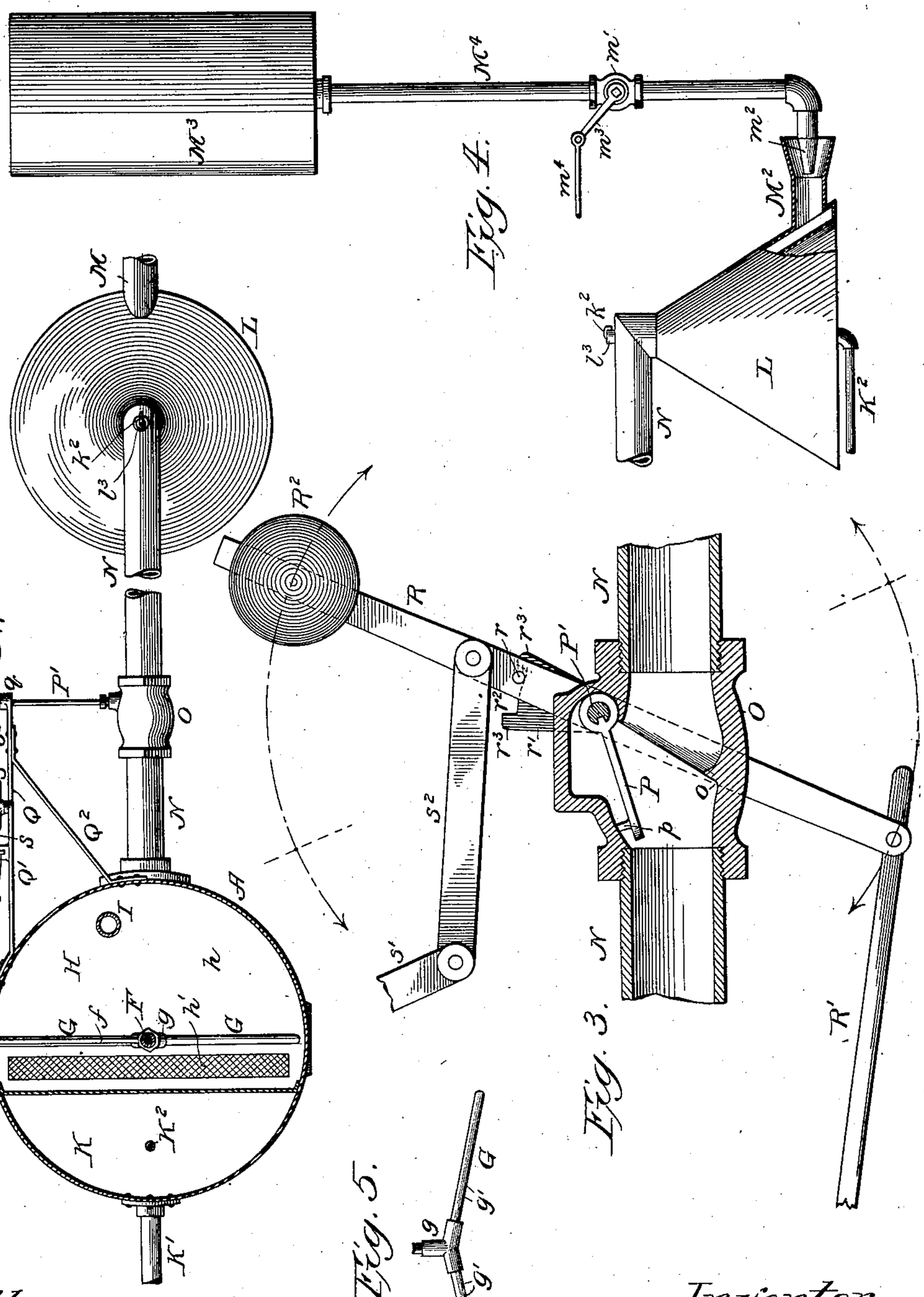

Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.

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CARBURETER.

(Application filed Jan. 26, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

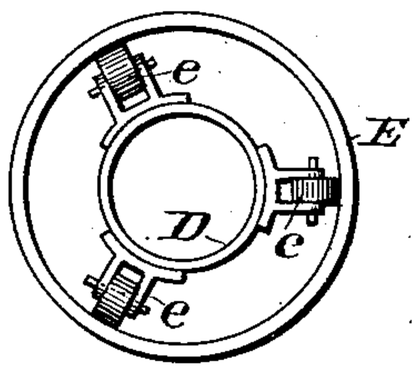


Fig. 6.

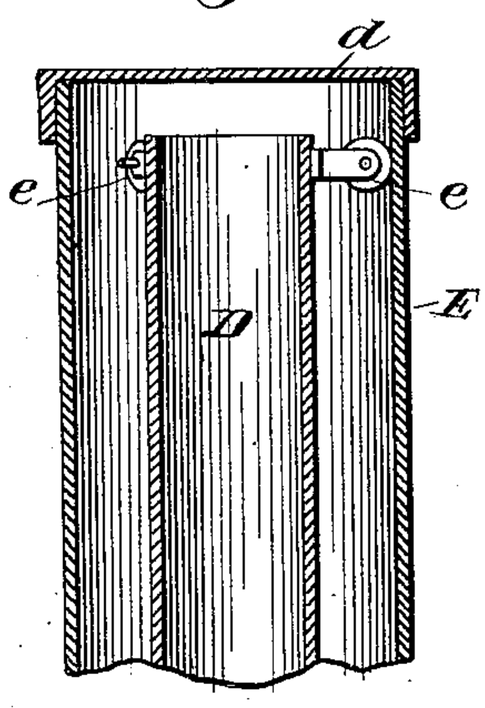
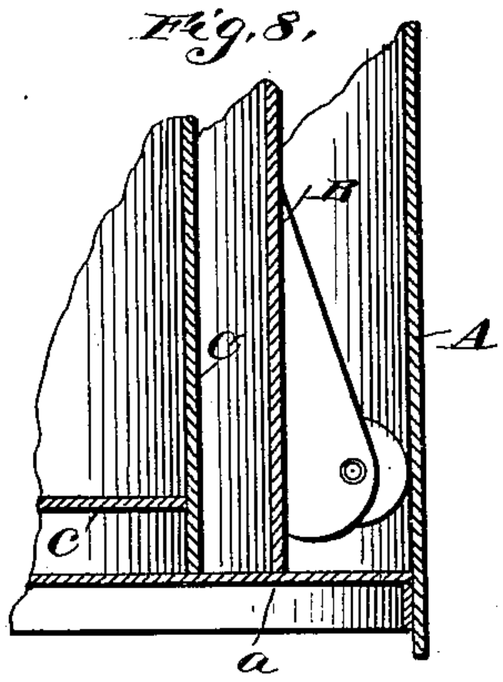


Fig. 8.



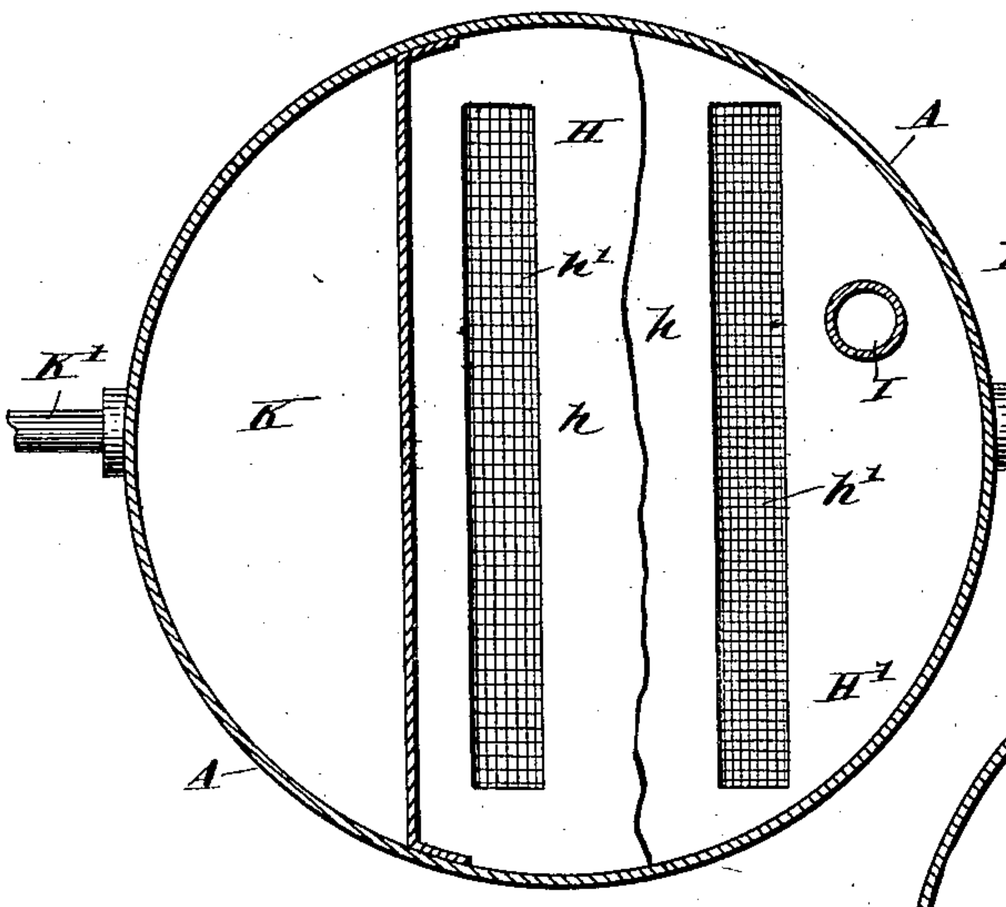


Fig. 9.

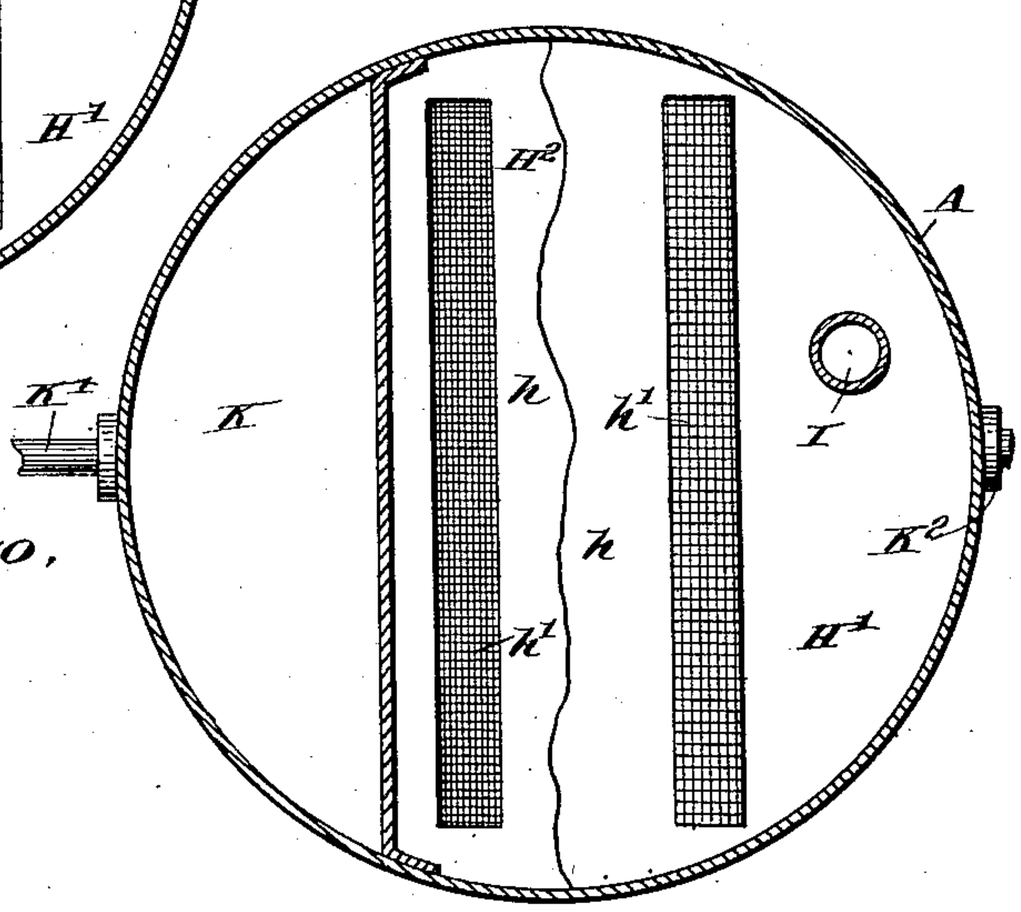


Fig. 10.

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UNITED STATES PATENT OFFICE.

JACOB MORTIMER GOLDSMITH, OF CHICAGO, ILLINOIS.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 672,854, dated April 23, 1901.

Application filed January 26, 1900. Serial No. 2,857. (No model.)

To all whom it may concern:

Be it known that I, JACOB MORTIMER GOLDSMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to the production of a practically-fixed gas from combining air with carbon vapors in such relation and under such conditions as to create a gas having excessive heating qualities and high illuminating effect when charged with oxygen and which can be used for manufacturing and domestic purposes generally.

The invention relates more particularly to generators having a limited capacity for each operation and intended for use in buildings and residences where only a small gas-supply is required to be constantly maintained; but the principle of the invention is also adapted for and intended to be used in the construction of generators for producing gas in large quantities.

The objects of the invention are to construct a gas-generating apparatus operating under a fixed equal pressure and automatically governing and regulating the supply to the demand; to have the hydrocarbon element surrounded and protected by water; to so construct and combine the several parts that the machine as a whole will be compact and contained in a very small space; to effectually and reliably gasify or vaporize the hydrocarbon and charge the air therewith by thoroughly atomizing and commingling the carbonaceous vapors with the air under conditions which will insure a thorough impregnation and commingling of the air proportionately with the vapors, so as to produce a gaseous non-condensable body possessing great heating qualities and high illuminating power under proper combustion conditions; to regulate and control the discharge of the oil or carbonaceous liquid and the supply of the air to take up the necessary amount of oil or carbonaceous liquid in a vapor form and have the control in both cases correlative, so that when the flow of one ceases the flow of the other also ceases and when the flow of one commences the flow of the other also commences; to deliver the air-supply under the requisite condition of pressure and heat, so as to insure the taking up or absorbing of the atomized oil or vapor to the full capacity of the air and no more, and to improve generally the construction and operation of the machine as a whole.

The invention consists in the several features of construction and combination of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a sectional elevation of the generator and the appliances connected therewith, showing, however, the pressure-blower and supply-pipe in elevation; Fig. 2, a sectional plan view on line 2 of Fig. 1 looking in the direction of the arrow; Fig. 3, a detail, partly in section, of the air-supply-controlling valve; Fig. 4, a detail, partly in section, showing a compressed-air reservoir or flask in conjunction with the air-heating appliance; Fig. 5, a detail of the oil-delivery tube; Fig. 6, a sectional elevation of the pressure-tube and the filling-tube, showing the guide-rollers for the gasometer-bell; Fig. 7, an end elevation of the tubes and guide-rollers of Fig. 6; Fig. 8, a detail in section showing one of the guide-rollers between the gasometer-bell and the outer casing; Fig. 9, a cross-section through the spraying-chamber with the floor of the chamber broken away, showing the atomizers of the first and the second spraying atomizing-chambers; and Fig. 10, a cross-section through the second atomizing-chamber with the bottom or floor broken away, showing the atomizers of the second and third atomizing-chambers.

In carrying out my invention I construct an outer cylinder or receptacle A of sheet-iron or other suitable material and of the requisite dimensions for the capacity of the apparatus. A partition or bottom *a* is secured in the cylinder A, and above this partition or bottom within the cylinder is located a gasometer-bell B, having an open bottom and a closed top *b*. This gasometer-bell surrounds an oil reservoir or receptacle C, which reservoir or receptacle has a closed top *c* and a closed bottom *c'*. The cylinder or receptacle A above the bottom or partition *a* is to receive and contain water, and the gasometer-bell enters into and divides the water, so as to leave a surrounding body of water around the gas-

ometer-bell on the outside and a body of water within the gasometer-bell surrounding the oil tank or receptacle, by which arrangement the oil is surrounded and protected by the water, and a water seal is provided and maintained which prevents any escape of gas while the apparatus is in operation.

A tube D opens into the top of the gasometer-bell and extends up therefrom and is closed tightly at its upper end or top by a suitable cap *d*. This tube D incloses a filling-tube E, which opens into the oil-receptacle C, through the top or cover *c* thereof, and, as shown, the upper end of the filling-tube is provided with antifriction guide-rollers *e*, which run near or against the interior face of the tube D, so that the tube E forms a guide-rod by which the tube D and gasometer-bell are guided and maintained in a direct line of movement in connection with the antifriction-rollers. The tube D, by reason of its open connection with the gasometer-bell, permits the gas to pass up thereinto and enter the oil tank or receptacle under the gasometer-pressure for such pressure to exert itself on the oil and create a force to assist in the discharge of the oil from the receptacle, producing, in effect, a pressure-feed for the discharge properly of the oil.

A discharge-valve is located in a casing or shell F, screw-threaded into the bottom of the oil tank or receptacle, so as to have communication therewith for the discharge of the oil into the spraying-chamber, and for ordinary and general usage this automatically-controlled valve of the shell or casing F will be all that is required. A three-branch coupling *g* is attached to the valve shell or casing F and has communication therewith. This coupling *g* carries perforated discharge spray-pipes G, which pipes are set at an angle or inclination, as shown, to insure a uniform flow and discharge from the pipes their full length, which result is had by reason of the unvarying pressure maintained on the oil.

The perforated pipes discharge into what may be termed a "spraying-chamber" H, having an inclined bottom *h*, with a perforated discharge plate or opening covered by a mesh or gauze, forming an atomizer *h'*, and this opening discharges into a second chamber H', which in turn discharges into a third chamber H^2, which in turn discharges into a fourth chamber H^3. Each chamber has an inclined bottom *h* and a perforated discharge plate or opening covered by a mesh or gauze forming an atomizer *h'*, and the discharge plates or openings are located at alternate ends or sides of the chambers. The atomizers *h'* increase in fineness or mesh as they descend, as shown in Figs. 9 and 10, thereby producing an increased breaking up or atomizing of the oil and air, so as to thoroughly commingle the two and produce a practically-fixed gas for heating and illuminating purposes. Any oil not vaporized can be drawn off at the plug h^2 of the last atomizing-chamber.

An induction or supply pipe or tube I for the gasometer-bell, having a wire mesh or gauze *i* at its lower end, is entered into the chamber H^3, and this pipe extends up for its top or upper end to be above the water-line of the receiver A and above the top of the oil-receptacle C, so that the heated air and oil-vapors from the chamber H^3, which have there become practically a fixed gas, will pass up through the pipe and enter the gasometer-bell above the water-line and operate to raise such bell under a uniform and unvarying pressure. An eduction or discharge pipe J from the gasometer-bell passes in the arrangement shown down through the oil reservoir or receptacle, with its upper end above the top of such receptacle and above the water-line, and its lower end is provided with a mesh or gauze *j* and is entered into an accumulating or fixing chamber K for the gas to flow from the gasometer into such chamber, to be taken therefrom by a delivery-pipe K' and carried to the burners or other place of consumption. The eduction or discharge pipe J instead of passing through the oil tank or receptacle could pass down in the space between the gasometer-bell and the oil-receptacle.

A pipe K^2 enters the accumulating-chamber K and is provided with a shut-off cock or valve k^3 outside of the cylinder or receiver A. This pipe has at its outer end an ordinary Bunsen or other suitable burner *k*, above which, in a funnel-shaped heater L, is a heat storing and transmitting plate *k'*, suspended by a rod k^2, so as to properly coact with the burner. The heater L is formed of an inner shell or cone *l* and an outer shell or cone *l'*, between which is a space l^2, closed at the bottom or larger end of the shell or cone. A tube l^3 extends up from the inner shell or cone through which the suspending-rod k^2 passes and over the end of which such rod is hooked or otherwise secured to properly suspend the plate or disk *k'* and to permit the radiation or passage of the air that supports combustion at the burner.

A pipe M is entered into the space l^2, and this pipe is connected with a pressure-blower M' in the arrangement shown in Fig. 1, which blower can be of any suitable and well-known construction that will produce a steady blast or current with the requisite pressure to force the air through the pipe to enter the space of the heater. The pipe M is provided with a relief-valve *m*, intermediate of the blower and the heating-chamber, which valve is automatic in its operation in controlling the air-blast from the blower. The closing of the valve for the blast of hot air in the conducting-pipe between the heater and the spraying and mixing chamber, with the blower in operation, causes the pressure of the air, which is unable with the supply-valve closed to pass

through the heater, to act on the relief-valve *m* and open such valve for the pressure to escape from the pipe M into space and preventing the pressure from the blower to pass through the heater and enter the spraying and mixing chamber, thus effectually stopping the generating of gas until through the consumption of the gas the gasometer descends to its limit, thereby causing the relief-valve to close and the air to be again passed first to the air-heating chamber and thence to the gasometer. A pipe N is connected with the apex or smaller end of the outer shell or cone of the heater, and this pipe enters a coupling O and is continued from such coupling, so as to enter and have communication with the spraying or initial mixing-chamber H for supplying air under pressure to such chamber.

The coupling O has in its chamber a valve P, which in its closed position abuts against or rests upon a shoulder *o* and in its open position has an engagement with the wall of the shell by a lug or stop *p*. This valve is carried by a stem P′, mounted in the coupling and supported in the arrangement shown near its outer end by an arm or bracket Q, having a head or bearing *q* for the stem, and the arm or bracket is strengthened by a diagonal brace Q^2, extending out from the outer cylinder or receiver. The projecting end of the shaft P′ has mounted thereon an arm or lever R, connected with one end of which is a rod R′, which rod in turn is connected to an arm or crank *f*′ on the end of the stem *f* of the valve in the casing or shell F, so that the movement of the lever R operates both the valve of the shell or casing F and the valve P approximately at the same time.

On the extreme end of the stem P′, adjacent to the arm or lever R, is a collar or sleeve R^3, having a plate or arm *r*′, with a recess r^2 terminating at each end in a stop r^3, and in this recess r^2 a projecting pin *r* on the arm or lever R enters, so that with the movement of the arm or lever the projecting pin will contact the stops and oscillate the valve-stem and raise and lower the valve P. The recess permits a limited movement of the arm or lever before the engagement, which limited movement allows the arm or lever to pass the center in either direction for the weight or ball R^2 on the lever to act and produce a quick throw of the arm or lever, and consequently a quick opening or closing of the valve, accordingly as the lever is moved.

A bell-crank lever S is mounted on a stud or pivot projecting out from an extension Q′ on the bracket or arm Q. One end or arm *s*′ of this lever is connected by a rod or link s^2 with the arm or lever R and the other arm *s* of the lever S is slotted and engages a pin *t* on a sliding rod T, which rod at its lower end is held and guided in an ear or projection *t*′ on the bracket or arm Q. The rod T has thereon adjustable contact collars or rings *u* and *u*′, with which an arm U, carried by the gasometer-ball, engages as the bell rises and falls. The upward movement of the bell causes the arm to contact the collar *u*′ and raise the rod T, which in turn moves the bell-crank lever for the arm *s*′ through the link s^2 to move the arm or lever R in the direction to throw down or close the valve P and at the same time close the valve controlling the discharge of the oil, by which movement both valves are simultaneously closed, or approximately so. This operation will occur with the limit of ascent of the gasometer-bell, at which time the full capacity of the apparatus has been reached.

The consumption of the gas permits the gasometer-bell to descend, and when the limit of descent has been nearly reached the arm U contacts the collar or ring *u* and forces down the rod T, reversing the movement of the bell-crank lever and through the arm *s*′ and link s^2 moving the arm or lever R in the opposite direction to the first movement, raising or opening the valve P and at the same time opening the discharge-valve from the oil tank or reservoir, so that a renewed operation of producing gas will begin. These operations of opening and closing the two valves will occur with each operation of the generator, so that the action of the valves is automatically changed with and by the condition of the gas in the generator.

A pipe V, having its upper end above the water-line in the gasometer-bell and above the top of the oil-tank, is located in the space between the bell and the tank. This pipe passes through the partition *a* and out through the wall of the main casing and its end enters a trap and water seal V′, from which a discharge-pipe *v*, having a valve *v*′, leads to a suitable place of discharge. All illuminating-gases are liable to slight condensation, and to prevent any ill effects therefrom I provide the drip-pipe V, which takes any overflow of water or condensation there may be before it reaches a point where it could pass into the gas-pipes. The trap or water seal prevents any escape of the gas from the drip or overflow pipe even when left permanently open.

The air-supply heater L instead of being furnished by a pressure-blower can be supplied from a compressed-air reservoir or tank M^3 through a pipe M^4, which pipe can have a valve shell or casing *m*′, the valve of which can be moved through an arm m^3 and a rod m^4 from the lever R, with which the rod can be connected. This arrangement requires, as shown, a properly-constructed air injector or discharge nozzle m^2, which enters a supply-pipe M^2, having a funnel-shaped mouth, leaving a space around the mouth and between it and the injector or discharge nozzle for the movement of the compressed air to create a suction or injection of an increased volume of air from the surrounding atmosphere into the pipe M^2 to commingle with the compressed air and be heated and expanded by the heater L in its passage to the supply-pipe N.

The heating of the air before directing it to

the chamber H insures perfectly dry air for absorbing the oil. By this arrangement the proper treatment of the air with the oil will be obtained. The spraying of the oil at first and subsequently atomizing the mixture of oil and air into finer relations as the operation proceeds through the several atomizing-chambers insures a proportional absorption of oil-vapor to the full capacity of the air, producing a rich fuel-gas for heating and illuminating requirements.

It will be seen that the oil is fully protected by the surrounding body of water and that the discharge of the oil is controlled coincidently with the supply of air, and it will be further seen that the discharge is assisted by the pressure of the produced gas within the oil-receptacle and that such discharge is maintained uniform and regular by said pressure and the spraying is uniform and equal the full length of the discharge-pipe by reason of the inclination of such pipe and the unvarying pressure until all the oil is consumed.

In order to insure the complete fixing of the produced gas, the accumulating and final fixing-chamber may be superheated by extending a pipe N′ (shown by dotted lines in Fig. 1) from the flue or pipe l^3 of the air-heating chamber. This pipe N′ can be entered into the interior of the chamber K with one or more coils or bends, so as to give considerable heating-surface, and then be passed through the wall of the chamber, so that none of the products of combustion will be deposited in the chamber. This arrangement better insures the complete transformation of the produced gas into a fixed gas for final consumption and makes the chamber K a final fixing and accumulating chamber.

The apparatus enables the use of air under pressure either from a proper power-blower or in a compressed state to be used in producing a fixed gas when combined in proper proportionate quantities with the vapor of the hydrocarbons, and the proper amount of absorption of the vapors by the air is insured by spraying and atomizing the oil to give proportionate quantities of both air and vapor. It also enables either high-grade hydrocarbons or hydrocarbons of a low specific gravity to be used for the production of a practical fixed gas. This feature of using low-specific-gravity oils has not heretofore been successfully accomplished owing to the fact that the air will not at its normal temperature eliminate its moisture and absorb sufficient vapors to produce a fixed gas. This is overcome by the proper heating of the air before absorbing the gas.

The fixed gas produced can be used for illuminating purposes, and the generators can be made of small or large capacity, so as to be used in residences and apartment-buildings as well as in factories. The stability of the gas apparatus is also of a nature that renders it well adapted for mechanical purposes and for heating buildings and residences and for use generally in the arts.

The apparatus while primarily intended for use in producing a fixed gas from hydrocarbons can be employed in the production of a fixed gas from natural or coal gas, so as to give such gas more body, for which purpose the air-supply is not required, but the natural or coal gas can be introduced into the superheater and transmitted through the discharge-pipe therefrom into the spraying-chamber to act on the hydrocarbon vapors for such vapors to be proportionately absorbed by the gas and transmitted into the gasometer-bell and thence to the fixing and accumulating chamber, where the gas will be supplied with the requisite amount of hydrocarbon vapors. It will thus be seen that the apparatus can be used distinctly and separately as a combined pressure-regulator for producing gas from atomized vaporized hydrocarbon oil and air and can also be used as a carbureter for natural or coal gas, by which the gas can be heated, expanded, and enriched by the passage of the gas through the heating-chamber and thence into the spraying-chamber and through the various vaporizing atomizing chambers into the gasometer bell, and in such passage be thoroughly and completely carbureted by contact with the atomized hydrocarbons, converting the non-illuminating natural gas to a strong illuminating-gas, to do which all that is necessary is to dispense with the use of the air-pressure and enter the natural or coal gas under pressure directly into the heating-chamber.

The operation of the apparatus in governing the supply of hydrocarbons and air or of natural or other gas is entirely automatic and is always under a fixed equal pressure, so that the discharge of the hydrocarbon element is in fixed relation to the supply of air or gas, and after the initial starting the apparatus operates without any special care or attention.

I claim—

1. In a gas-generator, the combination of an outer cylinder or receptacle for containing a body of water, a gasometer-bell movable within the outer cylinder or receptacle, an oil-reservoir within the gasometer-bell surrounded by the body of water of the outer cylinder or receptacle, a tube leading from the gasometer-bell, and a supply-pipe for the oil-reservoir inclosed by the gasometer-bell tube and provided with guide-rollers for maintaining the tube and gasometer-bell in a direct line of travel, substantially as described.

2. In a gas-generator, the combination of an outer cylinder or receptacle for containing a body of water, a gasometer-bell movable in the outer cylinder or receptacle, an oil-reservoir within the gasometer-bell, a spray-tube below the bottom of the oil-reservoir and having valve-controlled communication with the oil-reservoir, a spraying-chamber underneath the oil-reservoir within the outer cylinder

and into which the spray-tube delivers oil, and an air-supply pipe leading into the spraying-chamber, substantially as described.

3. In a gas-generator, the combination of an outer cylinder for containing a body of water, a gasometer-bell movable within the outer cylinder or receptacle, an oil-reservoir within the gasometer-bell, oppositely-inclined spray-tubes having valve-controlled communication with the oil-reservoir, a spraying-chamber in which the inclined spray-tubes deliver the oil, and an air-supply pipe leading into the spraying-chamber, substantially as described.

4. In a gas-generator, the combination of an oil-reservoir within the gasometer-bell, a valve-controlled discharge-tube leading from the oil-reservoir at the bottom, spray-tubes located on opposite sides of the discharge-tube, each tube having a downward inclination from the horizontal, a spraying-chamber beneath the oil-reservoir and in which the spray-tubes are located and deliver oil, and an air-supply pipe leading into the spraying-chamber and projecting air thereinto for commingling with the oil-spray, substantially as described.

5. In a gas-generator, the combination of an oil-reservoir within the gasometer-bell, a valve-controlled discharge-tube leading from the oil-reservoir at the bottom, a horizontal spray-tube having communication with the oil-reservoir discharge-tube, a spraying-chamber beneath the oil-reservoir in which the horizontal spray-tube is located and delivers oil, an atomizing-chamber directly below the spraying-chamber having communication therewith, and an air-supply pipe leading into the spraying-chamber and projecting air thereinto for commingling with the oil-spray to have the commingled product pass into the atomizing-chamber, substantially as described.

6. In a gas-generator, the combination of an oil-reservoir, a spray-tube having a valve-controlled communication with the oil-reservoir, a spraying-chamber in which the spray-tube is located and delivers oil, and a series of atomizing-chambers having a mesh of proportionately-increasing fineness, and an air-supply tube leading into the spraying-chamber, substantially as described.

7. In a gas-generator, the combination of an outer cylinder or receptacle for containing a body of water, a gasometer-bell movable within the outer cylinder or receptacle, an oil-reservoir within the gasometer-bell, a spray-tube having a valve-controlled communication with the oil-reservoir, a spraying-chamber in which the spray-tube is located and delivers oil, an air-supply pipe leading into the spraying-chamber, a series of atomizing-chambers communicating with each other and with the spraying-chamber and each having a discharge-opening with an atomizer of proportionately-increasing fineness, a gas-induction pipe leading from the final atomizing-chamber into the gasometer-bell, and a gas-eduction pipe leading from the gasometer-bell into an accumulating and fixing chamber, substantially as described.

8. In a gas-generator, the combination of an accumulating and fixing chamber receiving a supply of generated gas from a movable gasometer-bell, a pipe leading from the chamber and provided at its outer end with a burner, an air-heating chamber surrounding the burner receiving a supply of air under pressure, and an air-supply pipe leading from the air-heating chamber to the spraying or mixing chamber of the generator, substantially as described.

9. In a gas-generator, the combination of an oil-reservoir, a valve-controlled discharge from the oil-reservoir, a spraying or mixing chamber for the discharge, an air-heating chamber receiving and heating a supply of air under pressure, an air-supply pipe leading from the air-heating chamber to the spraying or mixing chamber and supplying hot air under pressure, a valve in the air-supply pipe, and means automatically operated by the rise and fall of the gasometer-bell to close and open both the oil-controlling valve and the air-supply-controlling valve, substantially as described.

10. In a gas-generator, the combination of an air-heating chamber, an open-mouthed pipe communicating with the air-heating chamber, a discharge-nozzle for injecting air under pressure into the open-mouthed pipe and producing a suction, and multiplying the supply of outside air in the heating-chamber, and an air-supply pipe leading from the air-heating chamber and supplying hot air under pressure to the mixing-chamber of the gas-generator, substantially as described.

11. In a gas-generator, the combination of an oil-reservoir within the gasometer-bell, a spraying-chamber for oil beneath the oil-reservoir and into which the oil descends from the reservoir, a pipe supplying air under pressure to the spraying-chamber, and a series of atomizing-chambers below the spraying-chamber one under another and each having a meshed communication with its adjoining chamber for downwardly-passing oil, air and hydrocarbon vapors from chamber to chamber under the breaking up and atomizing effects of the meshes, substantially as described.

12. In a gas-generator, the combination of a main casing containing a body of water, a gasometer-bell rising and falling within the main casing, an oil-reservoir within the gasometer-bell surrounded by water and having a closed bottom and top, a vertical tube having a closed upper end and extending up from the top of the gasometer-bell, and a tube open at both ends and extending up into the gasometer-bell tube from the top of the oil-reservoir, for the admission of generated fixed gas from the gasometer-bell into the oil-res-

ervoir and have the pressure of the gas act and provide a uniform pressure-feed for the oil, substantially as described.

13. In a gas-generator, the combination of a spraying-chamber, atomizing-chambers connected one with the other and receiving and transmitting oil and air or gas from chamber to chamber in the production of a fixed gas, a heating-chamber, a blast-pipe supplying air or gas under pressure to the heating-chamber, and a pipe leading from the heating-chamber to the spraying-chamber for superheating air or gas before entering the spraying-chamber and forcing the air or gas in a heated condition and under pressure into the spraying-chamber, substantially as described.

14. In a gas-generator, the combination of an oil and air receiving chamber, means for spraying the oil as it enters the receiving-chamber, a series of chambers communicating with each other and with the receiving-chamber, means for atomizing the gas and air in the travel from chamber to chamber, a heating-chamber, the blast-pipe supplying air or gas under pressure to the heating-chamber, and a pipe leading from the heating-chamber to the oil and air receiving chamber, for supplying superheated air or gas under pressure to combine with the hydrocarbon vapors of the oil developed by spraying and atomizing, substantially as described.

15. In a gas-generator, the combination of an outer casing containing a body of water, a rising-and-falling gasometer-bell in the outer casing and entered into the water, an oil-reservoir within the gasometer-bell, a pipe extending upward from the top of the oil-reservoir and open at both ends, and a pipe extending up from the top of the gasometer-bell and surrounding the oil-reservoir pipe and having its outer end closed, for admitting gas under pressure into the oil-reservoir and have the pressure of the generated gas operate to feed the oil, substantially as described.

16. In a gas-generator, the combination of an outer casing containing a body of water, a rising-and-falling gasometer-bell in the outer casing and entered into the water, and an oil-reservoir within the gasometer-bell having open communication with the bell above the oil for admitting pressure from the gasometer-bell into the oil-reservoir above the oil and have the pressure act to feed the oil, substantially as described.

17. In a gas-generator, the combination of a rising-and-falling gasometer-bell, an oil-reservoir within the gasometer-bell, a spraying and mixing chamber, an air-supply pipe leading to the spraying and mixing chamber, a valve in such pipe, a weighted lever carried by the stem of the valve, a rod having stops thereon and carried by the gasometer-bell to rise and fall with the bell, and a link connection between the weighted lever and the rod for the movements of the gasometer bell to open and close the valve in the air-supply pipe, substantially as described.

18. In a gas-generator, the combination of a rising-and-falling gasometer-bell, an oil-reservoir within the gasometer-bell, an oil-supply pipe connected with the oil-reservoir, a valve controlling the oil-supply pipe, a spraying and mixing chamber into which the oil-supply pipe delivers oil, an air-supply pipe leading to the spraying and mixing chamber, a valve in the air-supply pipe, a weighted lever on the stem of the air-supply valve, a rod having stops and carried by the gasometer-bell to rise and fall therewith, a connection between the rod and the weighted lever, and a connection between the weighted lever and the valve of the oil-supply pipe for controlling both the oil and the air supply from the movements of the gasometer-bell, substantially as described.

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Witnesses:
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