No. 683,232. Patented Sept. 24, 1901.

J. STUBBERS.

CARBURETER.

(Application filed Apr. 20, 1900.)

(No Model.) 4 Sheets—Sheet I.

Fig. 1

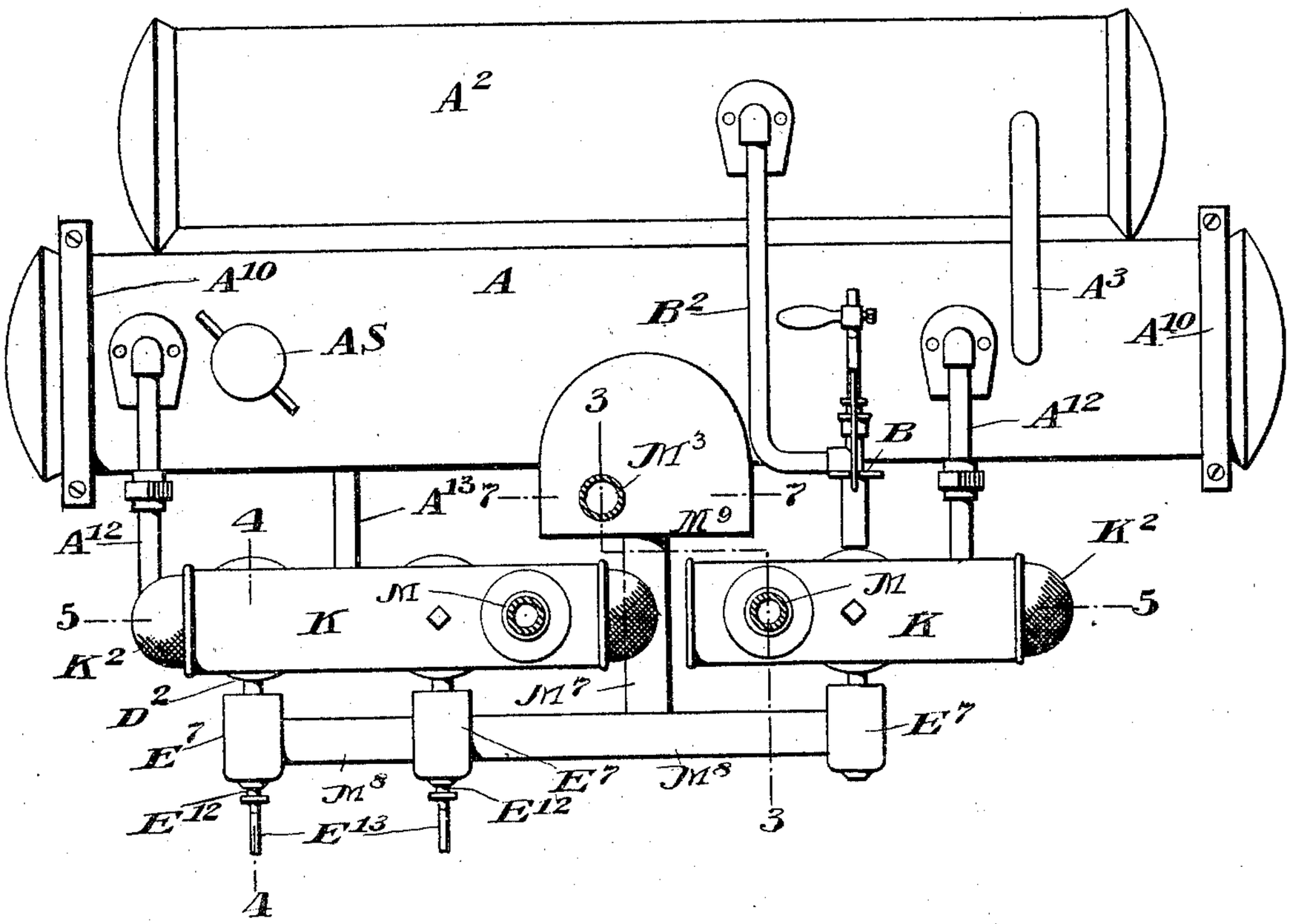


Fig. 6

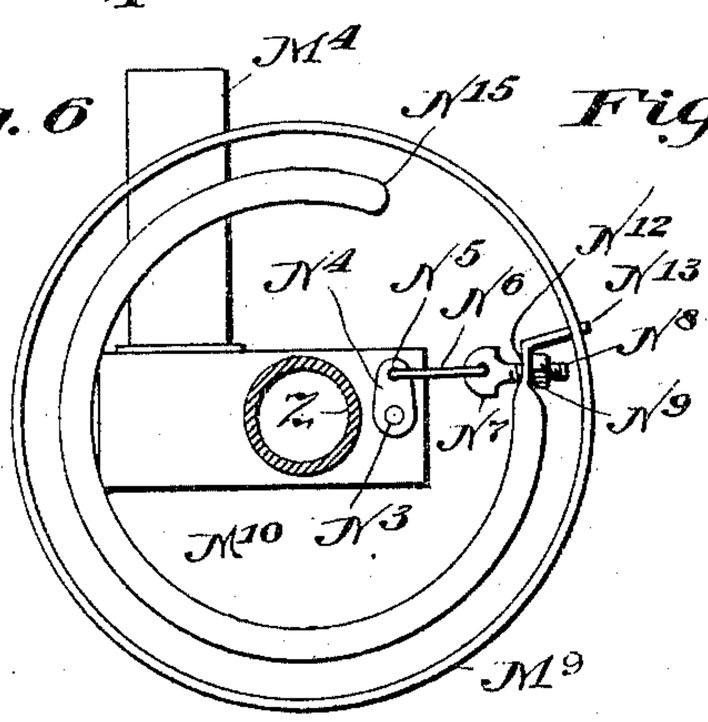
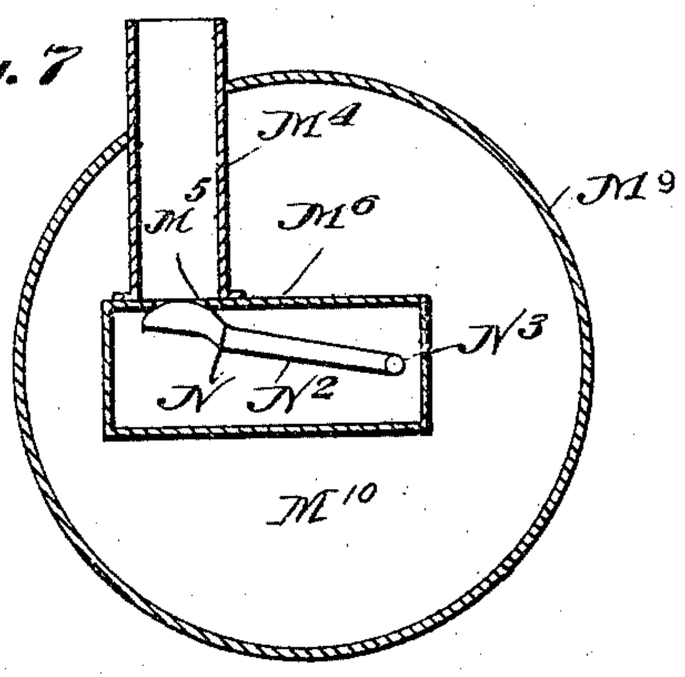


Fig. 7



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(No Model.) 4 Sheets—Sheet 2.

Fig. 13

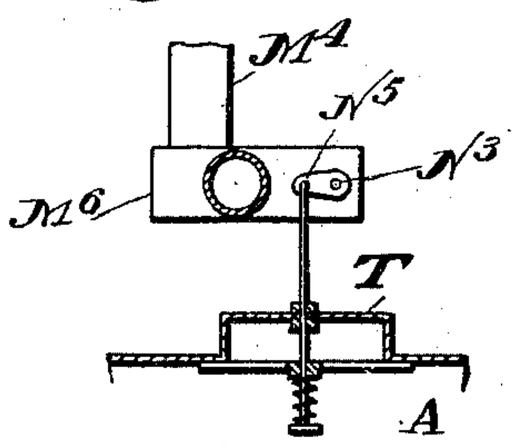


Fig. 14

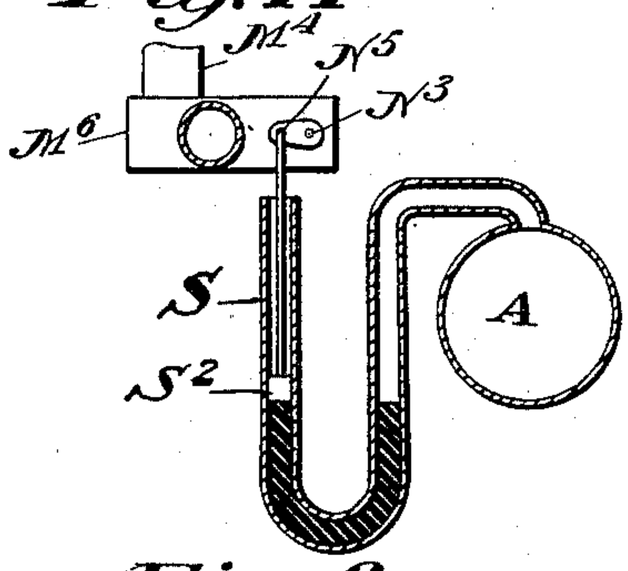


Fig. 2

Fig. 8

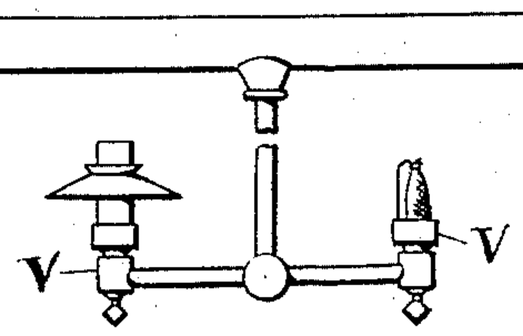
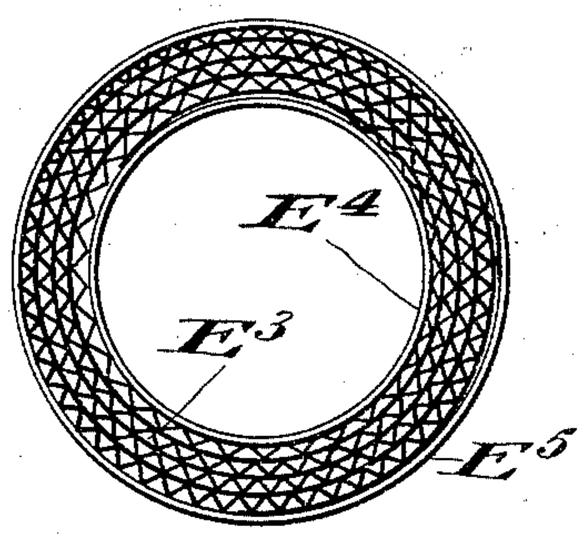
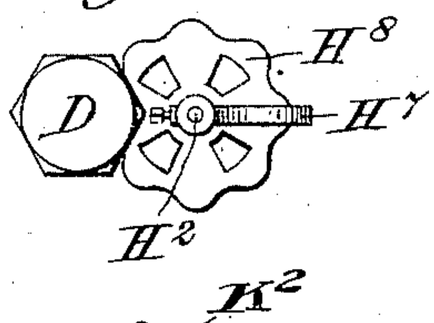


Fig. 15.





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(No Model.) 4 Sheets—Sheet 3.

Fig. 4

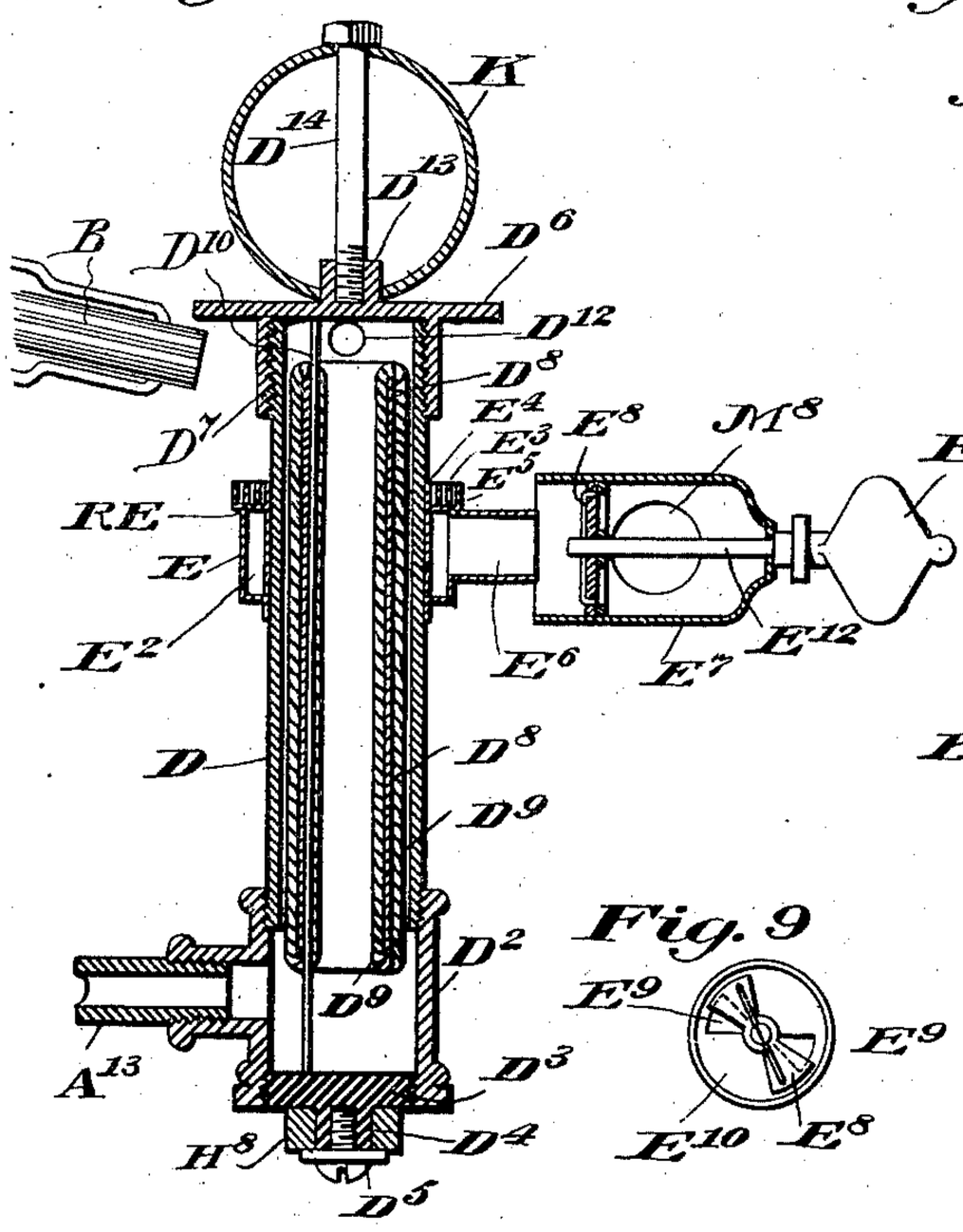


Fig. 3

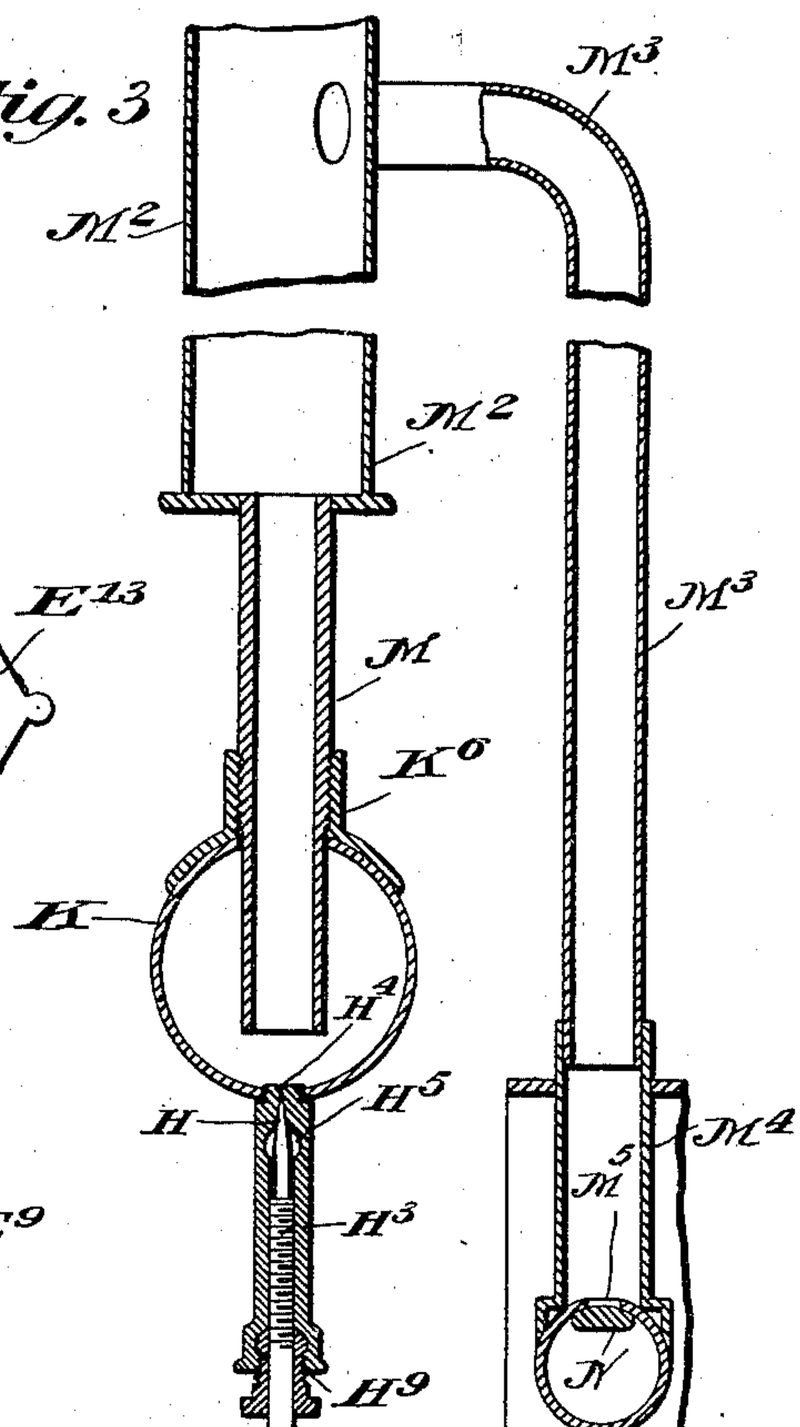
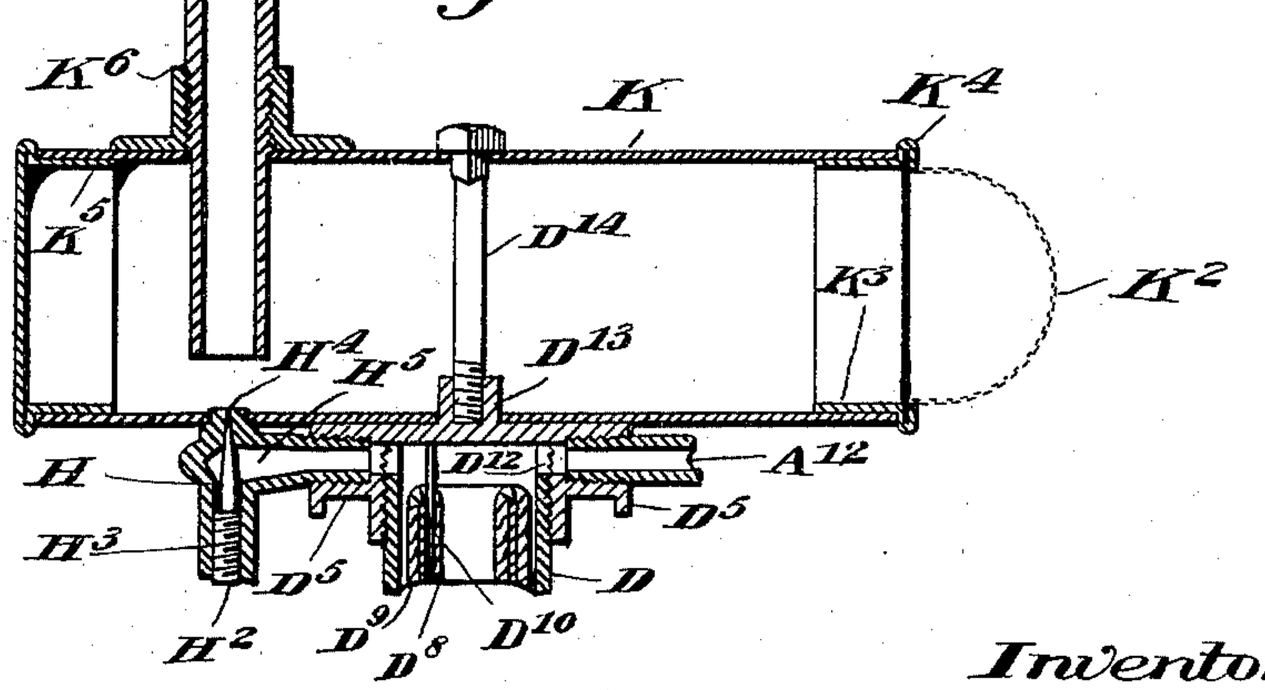


Fig. 9

Fig. 5



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(No Model.) 4 Sheets—Sheet 4.

Fig. 10

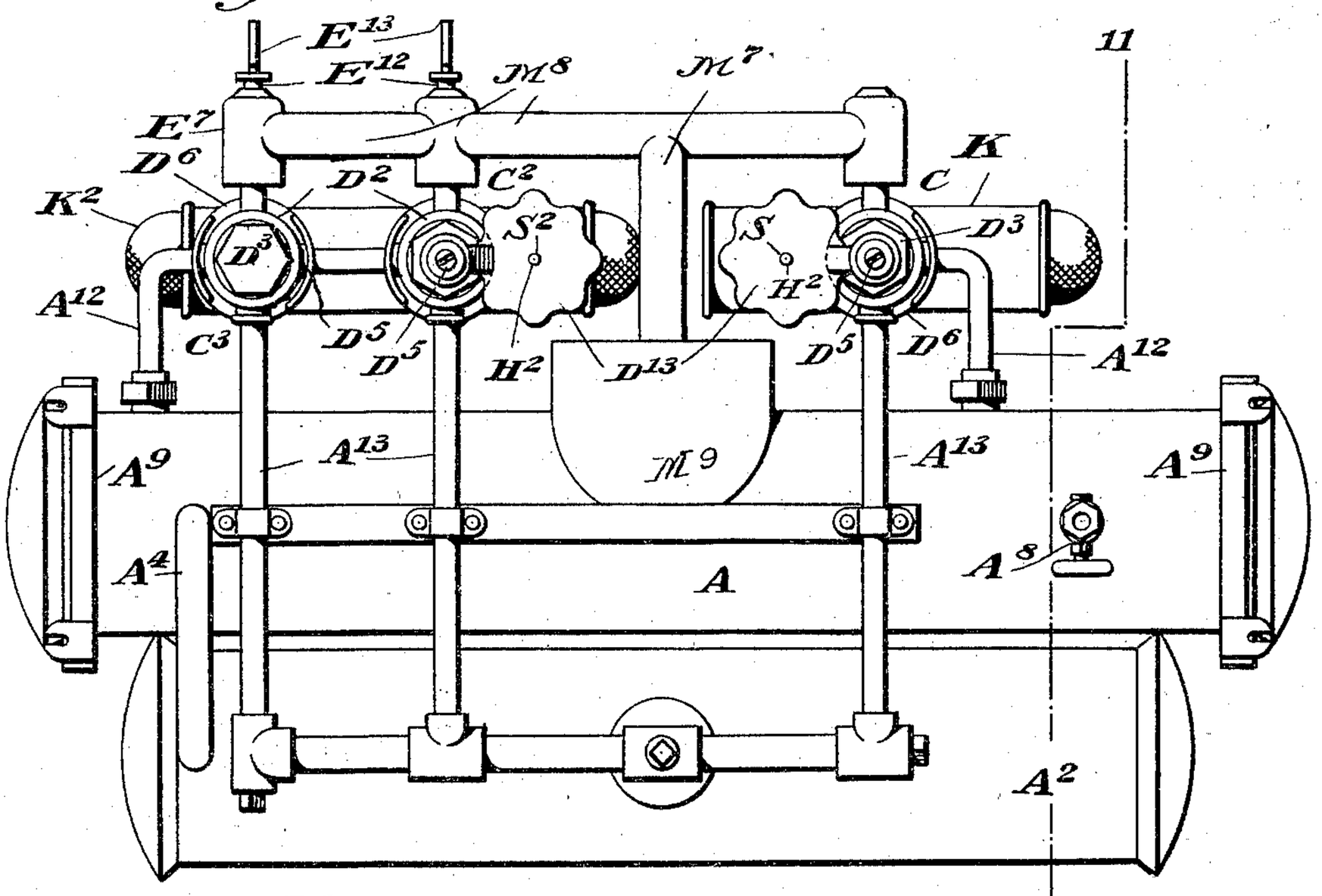


Fig. 11

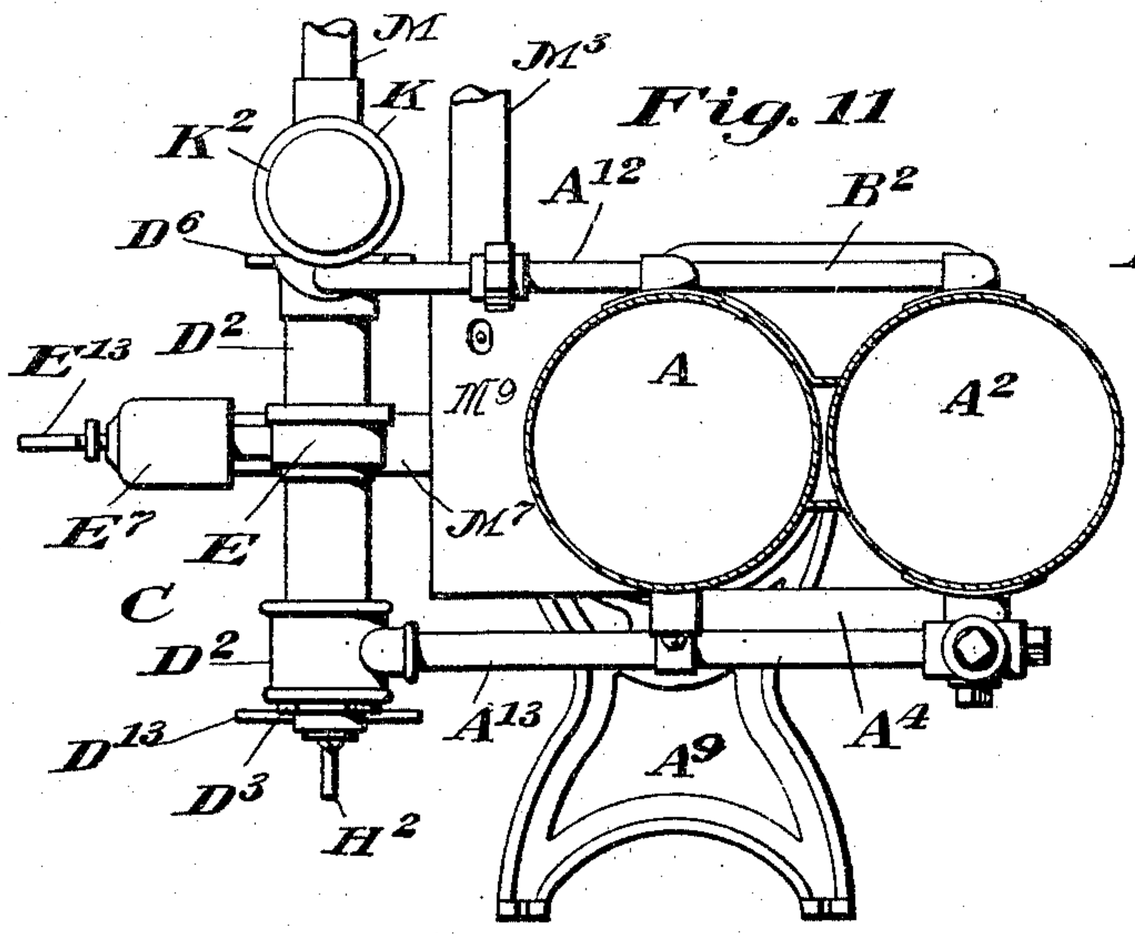
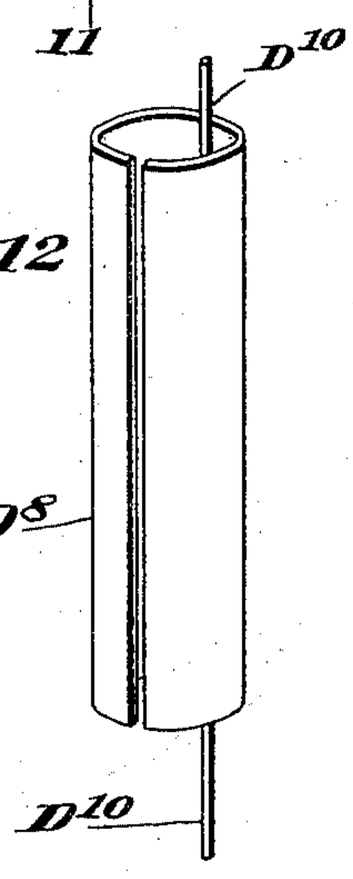


Fig. 12



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UNITED STATES PATENT OFFICE.

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CARBURETER.

SPECIFICATION forming part of Letters Patent No. 683,232, dated September 24, 1901.

Application filed April 20, 1900. Serial No. 13,631. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH STUBBERS, a citizen of the United States, and a resident of the city of Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Gas-Generators for Illuminating Purposes, of which the following is a specification.

My invention relates principally to improvements on gas-machines where gas is generated by heat, and air mixed with the gas by means of entraining air into a mixing-tube by the force of the gas. As it is desirable to mix a large quantity of air with the gas when this gas is used for heating a Welsbach or similar mantle to a point of incandescence, it is desirable to have considerable pressure on the gas, as the amount of air mixed with the gas depends largely on the force with which it is delivered from the needle-opening. It is also desirable to have a uniform pressure, for if the pressure varied the quantity of gas at one time would when the pressure was weak not fill the mantle, or in case there was sufficient gas turned on to fill the mantle then there would be an excess of gas when the pressure increased. When the mantle is not filled with a blue flame, the mantle will not give much light. When an excess of gas is used, more than to fill the mantle, the flame will burn on the outside of the side of the mantle, and thereby dim the light to some extent, and, furthermore, such excess of flame is ruinous to the mantles, chimneys, and shades and a waste of fuel. As will be seen by the specification and drawings, I have overcome these difficulties. I can regulate and set the machine so as to obtain any desired pressure. The machine may be started with two pounds pressure, and if the same is set for fifteen pounds it will automatically increase until it reaches fifteen pounds; but it will not exceed fifteen pounds by an ounce, nor will it get below fifteen pounds more than one-half a pound until all the gasolene in the tank is exhausted. The proper amount of pressure may be pumped into the tank and then the pressure would not increase.

Another advantageous result of one of the features of my invention is that I prevent the leakage of gasolene from the needle-openings and am able to use a tank of any desired shape, which simplifies the construction.

The several features of my invention will be apparent from the following description and claims, and the various advantages resulting from their use conjointly or otherwise will be more fully apparent from the following description and claims.

In the accompanying drawings, making part of this application, and in which similar letters of reference indicate corresponding parts, Figure 1, Sheet 1, is a plan view of mechanism illustrating my invention, the gas-delivery pipes above the main body of the apparatus being removed. Fig. 2, Sheet 2, is a front elevation of the same, the gas-delivery pipes being present. Fig. 3, Sheet 3, is a vertical partial section drawn to an enlarged scale and taken in the plane indicated by line 3 3 of Fig. 1. Fig. 4, Sheet 3, is an enlarged partial vertical section taken through one of the retorts in the plane indicated by the line 4 4 of Fig. 1. Fig. 5, Sheet 3, is an enlarged partial section taken vertically through the upper part of the right-hand retort in the plane indicated by the line 5 5 of Fig. 1. Fig. 6, Sheet 1, is an enlarged detail view showing the mechanism for controlling the supply of gas to the subburner from the pressure in the fuel tank or reservoir. Fig. 7, Sheet 1, is a view similar to Fig. 6, but showing the valve-casing in section to illustrate the arrangement of the valve therein. Fig. 8, Sheet 2, is an enlarged detail view showing the construction of the subburner. Fig. 9, Sheet 3, is an enlarged detailed view showing the construction of the valve controlling the subburner. Fig. 10, Sheet 4, is an under side or inverted plan view of the entire device. Fig. 11, same sheet, is a section taken vertically through the device in the plane indicated by the line 11 11 in Fig. 10. Fig. 12, same sheet, is a view showing the cylindrical wicking-support for the generator detached. Fig. 13, Sheet 2, is a fragmentary sectional view showing a modified form of the means for controlling the generation from the variation in pressure in the reservoir. Fig. 14, Sheet 2, is a view showing still another form of this controlling means. Fig. 15, Sheet 2, is a top

view of the dial accompanying the index-pointer of the valve of the generator.

The reservoir is preferably made cylindrical and of small diameter, so that it may stand considerable pressure. For the sake of convenience and compactness and to secure economy of room I prefer when more than two gallons capacity is required to employ two reservoirs and to so unite these that they shall act as one reservoir.

In the drawings, A indicates a reservoir, and A^2 a second reservoir. Each reservoir is to contain gasolene or coal-oil. I so connect these cylinders that the gaseous pressure in each above the gasolene shall be the same and that the height of gasolene in each shall be alike. The air tube or pipe A^3 connects the top of the air or gaseous space in one reservoir A with the top of the air or gaseous space in the other reservoir A^2. I provide a tube A^4, which communicates with the bottom of reservoir A and the bottom of reservoir A^2. Thus the liquid in each reservoir will stand at a common level. In the reservoir A is a pipe A^5, which extends from the bottom of the reservoir nearly to the top of the same. Thus the top of the pipe A^5 is always in the air-space of the reservoir. The bottom of the pipe makes a close joint with the bottom of the reservoir, so that no liquid can leak out of the reservoir or into the pipe. The bottom of this pipe communicates with a pipe A^6, in turn communicating with a suitable air-pump A^7. A suitable valve A^8 (clearly shown in Figs. 2 and 10) allows air to be forced into the reservoir through the pipe A^5. The valve can be closed to prevent any air from returning through this pipe. The reservoirs are duly supported. In the present illustrative instance there are for this purpose at each end of reservoir A uprights A^9, having a concave band between them. Upon this band the end of the reservoir is secured. A strap A^{10} over the reservoir and secured to the uprights serves to hold the reservoir to the uprights and the band. The second reservoir may be supported, as shown, by the connections A^3 and A^4 to the reservoir A.

B indicates the initial burner, which receives its carbureted air from the reservoir. In the present instance it receives this carbureted air from the reservoir A^2; but it may receive such carbureted air from the reservoir A. The tube or pipe B^2 conveys such carburated air or aerated fuel to the initial burner.

There will be one generator connected to the gasolene-tank, and there may be more, according to the number of burners to be supplied with fuel. In the present illustrative instance C indicates a generator, C^2 a second generator, and C^3 a third generator. It is to be understood that that generator which is in close proximity to the initial burner is the one which is always to be present. In the illustration the generator C is the one close to the initial burner. The generators C, C^2, and C^3 are each preferably constructed as follows: There is a cylinder D, which at its lower end carries the cylindrical sleeve D^2, screwed thereto. To this sleeve D^2, at its lower end, is secured, preferably by a screw, a plug D^3, and the latter carries the downward projection D^4. On this projection is located the needle brace and dial H^8, as seen in Fig. 15. The screw-piece D^5, screwed into the projection D^4, by means of its enlarged head, holds the needle brace and dial securely in place on the projection D^4. Onto the upper end of this cylinder D is secured a discal top D^6, whose annular flange D^7 is screwed to the top of cylinder D. The generator C^3 is constructed substantially the same as generator C^2, omitting the needle-valve and its special accompaniments. The generators C^2 and C^3 are connected at the top by pipe A^{12}, as clearly shown in Figs. 2 and 10. When thus connected, generator C^3 does not need a special needle-valve H, which it otherwise would have. The generator C^2 has the needle-valve H, and this needle-valve will operate for both generators. Some of the gas generated in generator C^3 will pass through pipe A^{12} and out of the exit-orifice H^4. This generator C^3 is for the purpose of generating more gas, part of which goes into the gasolene-tank by conduit A^{12} to generate more pressure or to keep up the pressure and part of it to be utilized for other purposes.

Within the cylinder D of the generator is located a cylinder D^8, and this cylinder is covered within and without with an envelop D^9 for capillary attraction. Such envelop is made of cotton wicking or other absorbent material. The wicking D^9 is so arranged in the cylinder D and said cylinder is so arranged that the lower end of said wicking stands substantially level with the bottom or below the level of the bottom of the tank or reservoir and the upper end of said wicking below the orifice D^{12}. The cylinder D^8 is slitted for convenience of winding the wicking thereon, and it carries the wicking D^9. The cylinder D^8 and the wicking D^9 thereon are held in place in the cylinder D and prevented from vertical movement preferably by a rod D^{10}, secured to the cylinder D^8, resting at its lower end on the plug D^3 and at its upper end against the cap D^6. The bottom of the wicking is elevated, as shown, above the mouth of the tube or pipe A^{13} to prevent accumulations of sediment, and thereby stopping up this pipe A^{13}. The top of the wicking is held at or below the bottom of the orifice D^{12} to prevent accumulation of sediment in the latter orifice. It will be understood that the upper part of the space within the generator is duly connected by a pipe A^{12} with the gas-space of the reservoir, this pipe A^{12} being connected to orifice D^{12} of the generator. In the present instance the pipe A^{12} also connects generators C^2 and C^3. The preferred mode of making such connection is indicated in Fig. 5. The pipe A^{12} may make an

elbow, as shown, in connecting the reservoir and the generator. The bottom of the reservoir is duly connected to the bottom portion of the generator by means of a pipe A^{13}. Thus air with or without vapor is free to pass through pipe A^{12} from the reservoir to the generator, or vice versa, and liquid (gasolene or coal-oil) is free to pass from the reservoir to the generator. Consequently the liquid in the generator and reservoir will stand at the same level.

H indicates a needle-valve point, and H^2 the screw-shank of the valve.

H^3 indicates the cylindrical portion, having a screw-thread for engaging the screw-thread of the valve and extended to constitute the valve-seat and embrace a portion of the valve-shank.

H^4 indicates the valve-seat and the exit-orifice thereof beyond the valve, but controlled by the latter. The space H^5 beneath the seat H^4 is duly connected, substantially as shown, by a pipe H^6 with the upper portion of the space within the generator. The valve is operated by a suitable handle H^7. The valve-rod H^2 is duly braced by a projection H^8, and which not only serves for a brace, but also for a dial, thereby enabling the handle of the valve to be turned to the extent necessary to regulate the size of the opening H^4 of the needle-valve. In the present illustrative instance this brace H^8 is carried by the plug D^3 of the generator and is secured there by the head of the screw-piece D^5. The customary stuffing-box H^9 is present to prevent the gas from leaking past the needle-valve shank H^2. The needle-valve exit-orifice H^4 opens into the lower part of a receiver K. For advantageous arrangement I have located the receiver upon the generator, and the latter is made to support the former. For instance, the receiver rests upon the top D^6 of the cylinder D of the generator. This top D^6 has a stud D^{13} projecting vertically upward, and as arranged this stud projects through the bottom of the receiver K. A bolt D^{14} passes down through the receiver and is screwed into the stud D^{13}, and thus secures the receiver firmly to the generator. The receiver is adapted to receive or intake air from without, and to this end one or both ends may be open and for protection from dust and the like be covered with a screen of gauze or wire-netting K^2. For convenient removal and replacement this screen K^2 is connected to a sleeve K^3, arranged to slide upon or preferably, as shown, within the ends of the receiver, a flange K^4 on the sleeve limiting the movement of the sleeve into the receiver. Where only one end of the receiver carries a screen K^2, the other is closed, but is preferably provided with a thimble K^5, arranged to slide onto or preferably into the end of the receiver. An advantage of such a device as a thimble consists in the fact that it is removable and when desired can be quickly removed and allow ready access to the needle-point for cleaning the same. It is not necessary to have a screen on each end of the receiver. All that is necessary is that there is sufficient screen to allow a free access of air, which for a small number of burners can be accomplished with one screen. In the drawings, Fig. 5, the receiver is shown at one end provided with a screen and at the other with a thimble. The same receiver similarly provided is shown at the right-hand side of Fig. 1. In the latter figure the left-hand receiver is shown provided at each end with a screen, as it is intended to mix sufficient air with the vapor from two generators. In case only one generator is used or the machine has only one generator the latter will be the one shown at the right hand in Fig. 1—viz., the one located in proximity to the initial burner B.

It is to be understood that the number of generators and receivers is to be increased according to the number of burners in the building which is to be supplied with light.

Each generator is duly supplied with a subflame-burner, which may be of any preferred construction. As herein shown, the construction of said burner is as follows: Around the cylinder D is located a subflame-burner cup E. The chamber E^2 of this burner-cup has at top suitable braces R E, and upon these braces is located a coil of corrugated metal E^3, held between an inner annular wall E^4 and an outer wall E^5 and serving as ports for the outlet of gas for subflame-burner. A tube E^6 connects the burner-cup chamber E^2 with a valve-chamber E^7, containing a suitable valve E^8. The preferred kind of valve is of the register form, (see Fig. 9,) and the wings of this valve are caused to close or uncover the openings E^9 of the diaphragm E^{10} by means of a rod E^{12}, connected to the valve, and journaled in this diaphragm E^{10} and passing through and beyond the outer end of the valve-chamber and there (beyond the chamber) operated by a handle E^{13}. This valve controls the flow of commingled air and vapor from the gas-delivery pipe M^2 through the pipe M^8, which enters the valve-chamber E^7, as shown in Figs. 1, 2, 4, and 10. It is to be understood that no valve is needed for that subflame-burner which is in conjunction with the initial burner, as that burner should always be in operation.

Directly above the needle-valve is a commingling tube or pipe M, the lower portion of which extends down into the receiver K. This tube M is secured in a suitable manner, preferably, as shown, by being screwed into a standard K^6, fixed on the top of the receiving-chamber K. Higher up this tube M enlarges in a tube or pipe M^2, of greater diameter. It is this latter pipe which carries the carbureted air to the service-pipes of the building. The service-pipes in turn convey the carbureted air to the burners, and they are provided with mantles or other incandescent material when the burners are to be used for illuminating purposes. The receiving-

chamber K may be varied in form and when of certain shapes the tube M need not extend down below its roof. This would ordinarily be the case where the shape of the receiver is broad and flat. Means other than receiver K may be used for preventing the products of combustion from the subflame entering into the tube M. Such a device may be upon the well-known plan used in many gasolene-stoves, where the gas-exit from the generator is several inches away from the horizontal line of the generator. The products of combustion going upward will when the device is so constructed not enter the commingling-tube. The tube M can be constructed in any desired way—that is, the tube M may be varied in conformation and it may only reach to the top of the receiver. It should be in line with the axis of the orifice H^4, and be either perforated at the side close to this orifice or it should set the proper distance away from it, so as to allow sufficient air to be entrained.

M^3 represents a return-pipe joined at its upper end to pipe M^2, as shown, and extending down by a tubular extension or pipe M^4 to an automatic valve N. This valve operates against an opening M^5, communicating at one side with the pipe or passage M^4 and on the other side with the chamber M^6, in turn communicating with the pipe or passage M^7, in turn communicating with the pipe M^8, which latter communicates with each of the subburners heretofore described. The valve N regulates the flow of gas, &c., through the opening M^5. The valve N has an arm N^2, fixed to a pivot N^3, journaled as shown, and this pivot passes through the wall of chamber M^6 to the outside thereof and is there provided with an arm N^4, whose free end has an opening N^5, which receives and holds the end of a rod N^6, connecting the free end of the lever with a stud or screw-bolt N^7, whose screw-threaded portion N^8 after passing through the closed end of the hollow spring N^{10} at N^{12} is adjustably secured in place by the nut N^9, screwed on portion N^8. The spring N^{10} consists of a flat hollow rod curved. Such rod is preferably made as follows: A tube made of sheet metal is flattened, so that it is about four times broader than it is thick. This tube is then curved, so that it makes a portion of a circle, substantially as shown. One end N^{15} of this tube is fixed to a stationary support, preferably, as shown, to a wall M^{10}, which is the rear wall of the valve-casing M^9 and which may as in the present illustrative instance, constitute a part of the wall of the reservoir A. This end of the tube connects the interior of the tube with the interior of the reservoir. The other end part of this tube terminates in a rod N^{13}, angulated as shown, and its extreme end part extends through an opening through the valve-casing M^{10} and is free to slide longitudinally forth and back in this opening as the tube expands or contracts. Those service-pipes M and M^2 which are connected with the receiver K which is at the left in Figs. 1 and 2 or with any receiver K other than the one which is to feed the pipe M^4 do not need a pipe M^4 and are to operate without the addition of such a branch pipe M^4. These facts will become more fully apparent upon a perusal of the description of the general mode of operation. This operation is as follows:

In the present instance it will be understood that when the word "reservoir" is mentioned it is understood to include all of the compartments—such as A, A^2, and the like—going to make up a conjoint reservoir. Furthermore, the term "gasolene" will be held for the purposes of specification to include coal-oil and the like.

The reservoir is filled with gasolene and to the height preferably to within one-half an inch from the top. Air is now pumped into the tank by the air-pump, and the air therein is thereby compressed as desired. The valve of the initial heat-burner B is now opened. Air in the reservoir in moving will pass over the gasolene therein and will absorb vapor. Part of the air will pass through the pipe A^3 to the rear vessel A^2. The requisite air charged with gasolene-vapor will pass through pipe B^2 to the initial burner B. There the escaping carbureted air is ignited and heats the generator C. The pumping of air into the reservoir is continued until the generator C is sufficiently heated to generate gas from liquid contained in the wicking D^9. The needle-valve H^2 is opened, and the generated vapor coming from the orifice H^4 is delivered into the commingling-tube M and by means of its rapid and forceful escape from the valve H in an upward direction entrains the air with it. The air and gas will thus commingle and pass up the delivery-pipe M^2 and pass out of the illuminating-burners in the building or structure to be lighted. Such burners V V (shown in Fig. 2 of the drawings) should be opened before opening the valve D^7. Some of the carbureted air will also pass down through the pipe M^3 and past the valve N and into the valve-chamber M^8, thence through pipe M^7 into pipe M^8, thence through chamber E^7 and into the subflame-burner cup E and out of the perforations R E, and there it will ignite from the lighted initial heat-burner. The initial burner B is now turned off, and thus the combustion at its orifice is put out. More air is pumped into the reservoir until the pressure will expand the hollow spring N^{10} and cause the latter to partially close valve N, which is indicated by the subflame at the burner E E^3 getting lower. Now the condition of the apparatus is, there is a flame burning on the first generator C. If it is desired to use only a limited number of lights, the valves E^8 E^8 of the generators C^2 and C^3 are kept closed. In such event the service-pipe M is the only one in use. In the event of its being desired to use lights on the other service-pipes then

the valve E^8 of generator C^2 should be turned on to heat the generator C. When the latter is sufficiently heated to generate gas, then the needle-valve H adjacent to this generator should be opened. In case generator C^2 does not generate sufficient carbureted vapor then valve E^8 of generator C^3 should be turned on. All gas generated in excess of the amount used or discharged by the needle-valves H H passes through the pipes A^{12} into the reservoir. This gas being hot will heat the reservoir, thereby expanding the contents of the reservoir. Such heating will create more pressure. The pressure will act on spring N^{10}, and thereby cut down the supply of gas to the subflame by way of the valve N, the latter cutting down the subflame, and thereby preventing too much pressure. As the gasolene is used out of this reservoir it is necessary to maintain a constant (the same) pressure of carbureted air therein, that the apparatus may properly operate. As will be seen, it is necessary to this end that the contents of the reservoir be expanded in proportion to the amount of liquid used out of the tank; otherwise the pressure would decrease and some one must very often go to the air-pump and use it. One of the principal objects of certain features of my invention is to maintain an almost uniform pressure automatically. As will be observed, such automatic generation and maintenance of desired pressure is accomplished automatically as pressure is reduced in the reservoir by reason of the consumption of gasolene. As the gasolene is consumed and the pressure in the reservoir is reduced the spring N^{10} contracts and the end at N^{12} approaches the end at N^{15} and opens the valve N, thereby enlarging the subflame or subflames. The spring is so delicately adjusted and so responsive that a difference of one pound of pressure in the reservoir will open the valve out full. Consequently the degree of pressure will not vary one pound as long as sufficient gas is generated to supply the burners and heat the reservoir and expand its contents in proportion to the amount of gasolene consumed.

The function of the wicking D^9 as disposed relative to the generator it accompanies is of the first importance. It is to be observed that the relation of the generator to the tank is, in general, the construction shown in the Letters Patent of the United States No. 603,452, dated May 3, 1898, issued to George B. Murrell; but by my improvement in the furnishing and the construction and the disposition of the wicking and the form of the generator I am enabled to make the reservoir of a greater depth than could be done with the device of Letters Patent No. 603,452. The wicking which I place in the generator takes up the gasolene and carries it to the top portion of the generator, no matter at what height therein the liquid may stand. Because of this advantageous capacity for extra depth the machine can be much more conveniently constructed. The shallow reservoir (old style) if made in the shape of a square pan is too weak to withstand pressure and if made of small tubes requires too much space and is too cumbersome. It is to be observed that my improved construction admits of my placing the generator above the tank and allowing the wick to hang (extend) down to the bottom of the tank. The wicking will continue to draw up the gasolene. The generator in such a location would have an open bottom and would be secured to the top of the tank.

In order to use the riser-pipe, which has no return-pipe M^3, it is necessary to have either one or more burners in use on the line which has the return-pipe. The reason is that when the subflame is cut down by means of the hollow spring and valve the gas must have an outlet somewhere. If there were no burners in use—if they were all closed—then the gas would have to come out of the air-inlet when cut off by the regulating-valve, which would cause the subflame to smoke.

In some cases a modified construction of regulator for the automatic control of the subflame may be desirable, and such may be provided without material departure from the principles and spirit of my invention. For example, in Fig. 13 I have shown a regulator wherein the valve N is controlled from an elastic diaphragm T, one side of which is subject to the pressure from the tank or reservoir and is by the rise of such pressure pressed outward, so as to operate the valve to regulate the supply of air and gas to the subflames.

In Fig. 14 another form of regulator is shown, comprising a tube S, containing mercury and bent in U form. One arm of the tube is in communication with the interior of the tank or reservoir, and the other arm of said tube has a float S^2, connected to valve N. By this means the rise of pressure in the tank or reservoir acts on the mercury in tube S, raising the float S^2 and moving valve N to cut down the supply of air and vapor to the subburner.

For convenience and simplicity I cause the tank to be heated by the surplus gas generated by the generator. This may, however, be done in other ways. The limitation and operation to be observed are that the flame which heats the tank is to be controlled and regulated by a governor, and thereby control the pressure.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In a gas-machine, the combination of a generator having absorbent material and being so arranged that the absorbent material is in communication with the gasolene supplied from the tank, a tank air-tight so that an air-pressure can be created therein; a conduit suitably arranged from the top of the generator to the top of the tank, gas-exits located in said generator, and means for maintaining the level of the gasolene in the

generator at a point below the gas-exits, substantially as and for the purposes specified.

2. In a gas-machine, the combination of a gasolene-tank connected to the generator, suitable means for conveying the gasolene from tank into generator, suitable means for heating the generator, a generator having a gas-exit and suitable means for utilizing this gas to heat the contents of the gasolene-tank for generating pressure therein, suitable means whereby the pressure in the tank will regulate the heating means of this tank, substantially as and for the purposes specified.

3. In a gas-machine, the combination of a tank connected to a generator, gas-exit in said generator located at a higher level than the gasolene in the tank, absorbent material in said generator to convey the gasolene supplied from the tank to a given height in the generator, a conduit or passage-way from the upper part of the generator, into an air or gaseous space of the tank, commingling-tube in line with the gas or vapor exits, the gas-delivery pipe having one or more burners, subflame-burner, a pipe leading from the gas-delivery pipe to the subflame-burner, a valve which is closed or partially closed by pressure in the tank when a certain pressure has been reached, and opened when the pressure has been diminished and through which the gas must pass to get to the subflame-burner, substantially as and for the purposes specified.

4. In a gas-machine, the combination of a tank connected to a generator, a gas-exit in said generator, located at a higher level than the gasolene in tank, suitable means for conveying gasolene from the tank into the generator, a conduit or passage-way from the upper part of the generator into the air or gaseous space of the tank, commingling-tube in line with the gas or vapor exit, a gas-delivery pipe having one or more burners, a subflame-burner, a pipe leading from the gas-delivery pipe to the subflame-burner, a valve, which is closed or partially closed by pressure in the tank when a certain pressure has been reached and opened when the pressure has been diminished through which gas must pass to get to the subflame-burner, substantially as and for the purposes specified.

5. In a gas-machine, the combination of a gasolene-tank, a generator and suitable means for heating same, one or more gas-exits in said generator, supply-pipe for one or more burners, branch pipe leading from the supply-pipe to the subflame-burner, subflame-burner suitably arranged to heat the contents of the gasolene-tank, a valve controlled by the pressure in said tank to increase the supply of gas to the subflame-burner when the pressure is low and to decrease the supply of gas to the subflame-burner when the desired pressure has been reached, substantially as and for the purposes specified.

6. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator, a tank or reservoir for containing the liquid hydrocarbon, means for supplying liquid hydrocarbon from the tank or reservoir to the lower part of the generator, a pipe affording communication between the upper part of the generator and the upper part of the tank or reservoir, means for creating pressure in the generator and tank, a subburner for heating the upper part of the generator, and a device in the generator for maintaining the liquid hydrocarbon at a given level in the generator, substantially as and for the purposes specified.

7. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator having means for discharging hydrocarbon vapor from it, devices for collecting such discharged vapor and for mixing the same with air, a tank or reservoir for containing the liquid hydrocarbon, means for supplying liquid hydrocarbon from the tank or reservoir to the lower part of the generator, a subburner for heating the upper part of the generator, a device in the generator for elevating the liquid hydrocarbon up to the point in the generator which is heated by said subburner, and a pipe affording communication between the upper part of the generator and the upper part of the tank or reservoir, substantially as and for the purposes specified.

8. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator having means for discharging hydrocarbon vapor from it, devices for collecting such discharged vapor and for mixing the same with air, a tank or reservoir for containing the liquid hydrocarbon, means for supplying liquid hydrocarbon from the tank or reservoir to the generator, said supplying means and tank or reservoir being arranged and adapted to afford a varying level of the liquid hydrocarbon within the generator, a subburner for heating the generator, a device in the generator for elevating the liquid hydrocarbon to the front in the generator which is heated by said subburner, and means for discharging vapor from the generator to the tank or reservoir, substantially as and for the purposes specified.

9. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator, provided with means for discharging vapor from it, a tank or reservoir for supplying liquid hydrocarbon to the generator, means for maintaining equivalent pressures in the generator and in the tank, a subburner for heating the generator, and means controlled by the pressure in the tank or reservoir, for supplying hydrocarbon to said subburner, substantially as and for the purposes specified.

10. In an apparatus for supplying gas from liquid hydrocarbon, the combination of a generator provided with means for discharging vapor from it, a tank or reservoir for supplying liquid hydrocarbon to the generator, means for maintaining equivalent pressures in the generator and the tank or reservoir, a

subburner for heating the generator, means for supplying hydrocarbon to said subburner, and a device actuated from the variation in pressure within the tank or reservoir, and arranged to control the said means supplying hydrocarbon to the subburner, substantially as and for the purposes specified.

11. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator provided with means for discharging vapor from it, a tank or reservoir for supplying liquid hydrocarbon to the generator, means for maintaining equivalent pressures in the generator and in the tank or reservoir, a subburner for heating the generator, a pipe for supplying hydrocarbon to said subburner, a valve controlling the flow of hydrocarbon through the pipe, and a device actuated from the variations in pressure within the tank or reservoir and arranged to actuate the said valve, substantially as and for the purposes specified.

12. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator having means for discharging hydrocarbon vapor from it, devices for collecting such discharged vapor and for mixing the same with air, a tank or reservoir for containing the liquid hydrocarbon, means for supplying liquid hydrocarbon from the tank or reservoir to the generator, means for maintaining equivalent pressures in the generator and in the tank or reservoir, a subburner for heating the generator, and means controlled from the variations in pressure in the tank or reservoir, for supplying hydrocarbon to the subburner, substantially as and for the purposes specified.

13. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator provided with means for discharging vapor from it, a tank or reservoir for supplying liquid hydrocarbon to the generator, means for maintaining equivalent pressures in the tank or reservoir and in the generator, means for collecting the vapor discharged from the generator and for mixing such discharged vapor with air, a service-pipe through which said mixed vapor and air is adapted for passage, a subburner for heating the generator, a pipe leading from the service-pipe to the subburner, and a device actuated from the variations in pressure in the tank or reservoir and arranged to control the flow of vapor and air through the last-named pipe to the subburner, substantially as and for the purposes specified.

14. In an apparatus for generating gas from liquid hydrocarbon, the combination of a generator having an orifice for the discharge of hydrocarbon vapor, devices for collecting such discharged vapor and for mixing the same with air, a valve controlling the discharge-orifice of the generator, a tank or reservoir for supplying liquid hydrocarbon to the generator, means for maintaining equivalent pressures in the tank or reservoir and in the generator, a service-pipe arranged to receive the discharged vapor and air from the mixing and collecting devices, a subburner for heating the generator, a pipe leading from the service-pipe to the subburner, and a device actuated from the variations in pressure in the tank or reservoir and arranged to control the flow of vapor and air through the last-named pipe to the subburner, substantially as and for the purposes specified.

15. In a gas-machine, the combination of a gasolene-tank connected to the generator, suitable means for conveying the gasolene from tank into generator, suitable means for heating the generator, a generator having a gas-exit, suitable means whereby the pressure in the tank will regulate the heating means of the generator and the tank, substantially as and for the purposes specified.

16. In a gas-machine, the combination of a gasolene-tank connected to the generator, a suitable means for conveying the gasolene from the tank into generator, suitable means for heating the generator, a generator having two gas-exits, suitable means for utilizing the gas discharged at one of the exits for heating the contents of the gasolene-tank and generating more pressure, and suitable means whereby the pressure in the tank will regulate the heating means of the generator and the tank, substantially as and for the purposes specified.

17. In an apparatus for generating gas, the combination of a generator having a gas-exit, and provided with a heating device, a reservoir connected to the generator and adapted to hold gas under pressure and mechanism actuated from the variations in pressure within the reservoir and arranged to control the heating device of the generator, and means for enabling the hot gas or vapor from the generator to heat the tank, substantially as and for the purposes specified.

18. In an apparatus for generating gas, the combination of a generator having a gas-exit and provided with a heating device, having means for supplying it with gas from the generator-exit, a reservoir connected to the generator and adapted to hold gas under pressure, and mechanism actuated from the variations in gas-pressure within the reservoir and arranged to control the heating device of the generator, and means for enabling the hot gas or vapor from the generator to heat the tank, substantially as and for the purposes specified.

19. An apparatus for generating gas comprising a generator, a reservoir, a burner-pipe, connections between said parts, and mechanism, actuated from variations in pressure within the apparatus, for controlling the operation of the generator, substantially as and for the purposes specified.

20. An apparatus for generating gas comprising a generator, a reservoir, connections between said parts whereby equal pressures are maintained therein, burner-pipe, and

mechanism, actuated from variations in pressure within the apparatus, for controlling the operation of the generator, substantially as and for the purposes specified.

21. An apparatus for generating gas comprising a generator, a heating device therefor, a reservoir, a burner-pipe, connections between said parts whereby gas is supplied from the generator to the other parts, and mechanism, actuated from variations in pressure within the apparatus, for controlling the connection of the heating device, substantially as and for the purposes specified.

22. In an apparatus for generating gas, the combination of a generator having a gas-exit, and provided with a heating device, a reservoir connected to the generator and adapted to hold gas under pressure, a valve controlling the heating device for the generator, and mechanism, actuated from the variations in gas-pressure within the reservoir and arranged to control the valve of the heating device, substantially as and for the purposes specified.

23. An apparatus for generating gas comprising two generators each having a gas-exit and means actuated from the gas discharged at the exit of one generator for regulating the operation of the other generator, substantially as and for the purposes specified.

24. In an apparatus for generating gas, the combination of a tank and generator, a service-pipe adapted to receive vapor and air from the generator, burners adapted to receive the enriched gas or vapor from the service-pipe, said burners being for general use, means for heating the contents of the tank, and means actuated from variations of the pressure in the tank for controlling the heating means, substantially as and for the purposes specified.

25. An apparatus for generating gas comprising two generators each having a gas-exit and provided with a heating device and means actuated from the gas discharged at the exit of one generator for controlling the heating device of the other generator, substantially as and for the purposes specified.

26. An apparatus for generating gas comprising a tank or reservoir, two generators each having a gas-exit, a connection between the gas-exit of one generator and the tank or reservoir, a burner-pipe having connection with the gas-exit of the other generator, and means, actuated from the gas discharged at the exit of one generator for regulating the operations of the other generator, substantially as and for the purposes specified.

27. In a gas-machine, the combination of a gasolene-tank, a generator having a gas-exit, supply-pipe for one or more burners, branch pipe leading from the supply-pipe to the subflame-burner, subflame-burner suitably arranged to heat the contents of the gasolene-tank, mechanism controlled by the pressure in said tank to increase the supply of gas to subflame-burner when the pressure is low and to decrease the supply of gas to the subflame-burner when the desired pressure has been reached, substantially as and for the purposes specified.

28. In an apparatus for generating gas, the combination of a generator having a gas-exit, a reservoir connected to the generator, and adapted to hold gas under pressure, and mechanism actuated from the variations in pressure within the reservoir and arranged to control the operation of the generator, substantially as and for the purposes specified.

29. In a gas-machine, the combination of a tank connected to a generator and so constructed that a pressure can be created therein, gas-exit in said generator located at a higher level than the gasolene in the tank, absorbent material in said generator to convey the gasoline supplied from the tank to a given part in the generator, a conduit or passage-way from the upper part of the generator into an air or gaseous space of the tank, substantially as and for the purposes specified.

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