

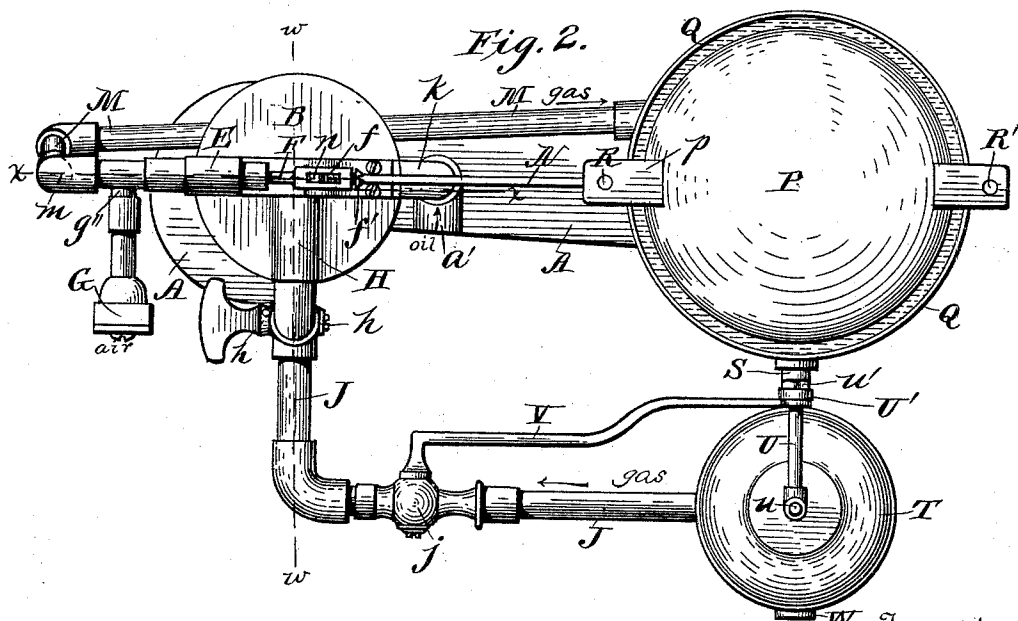
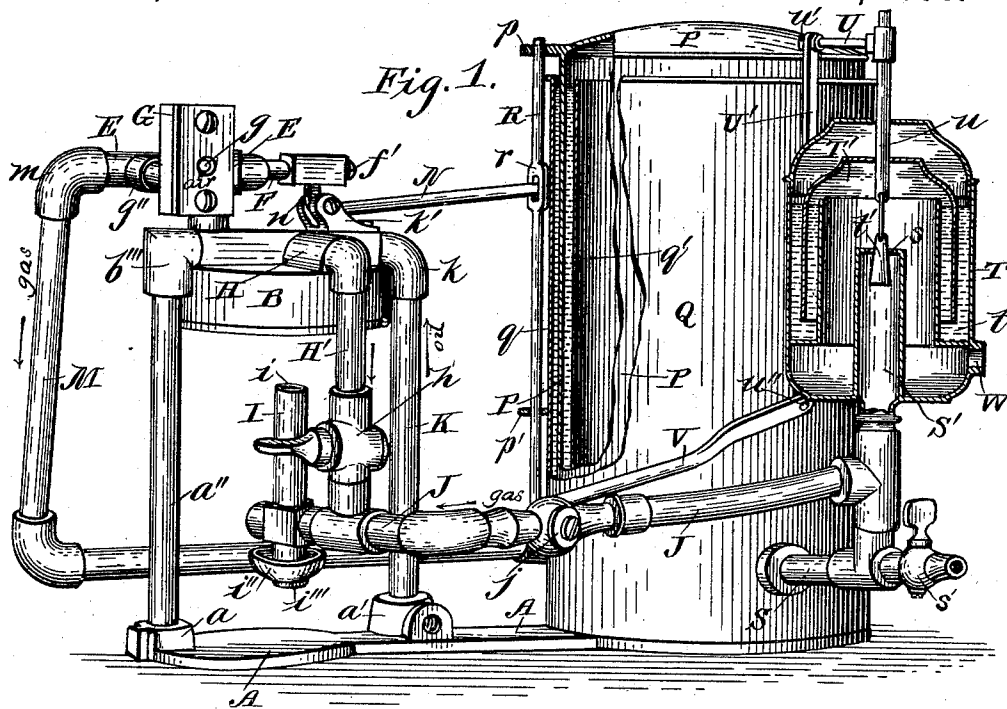
(No Model.)

2 Sheets—Sheet 1.

J. S. WOOD.  
GAS MACHINE.

No. 499,076.

Patented June 6, 1893.



Witnesses

Reverence.

M. R. M. Grayser.

W Inventor  
Joseph S. Wood  
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Attorney

(No Model.)

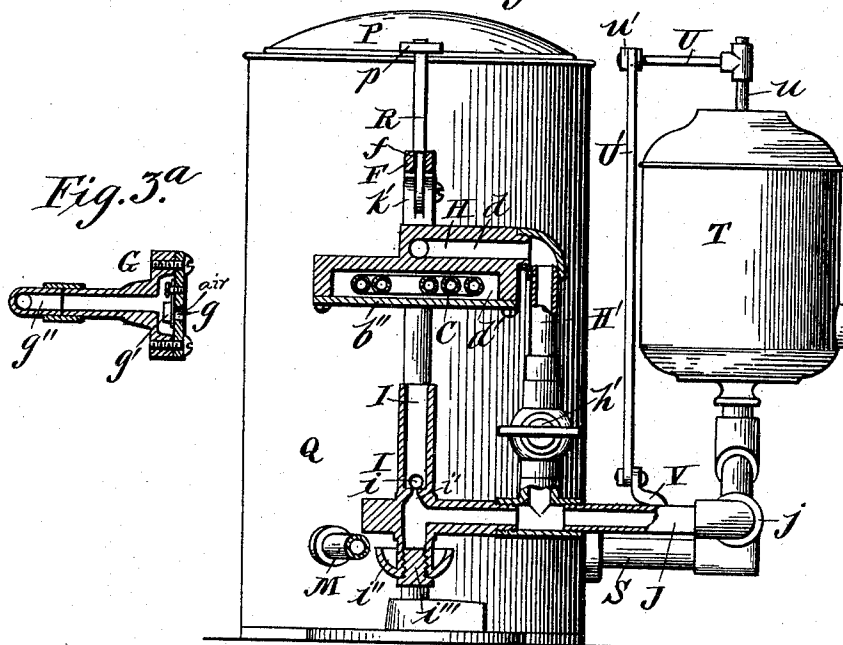
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J. S. WOOD.  
GAS MACHINE.

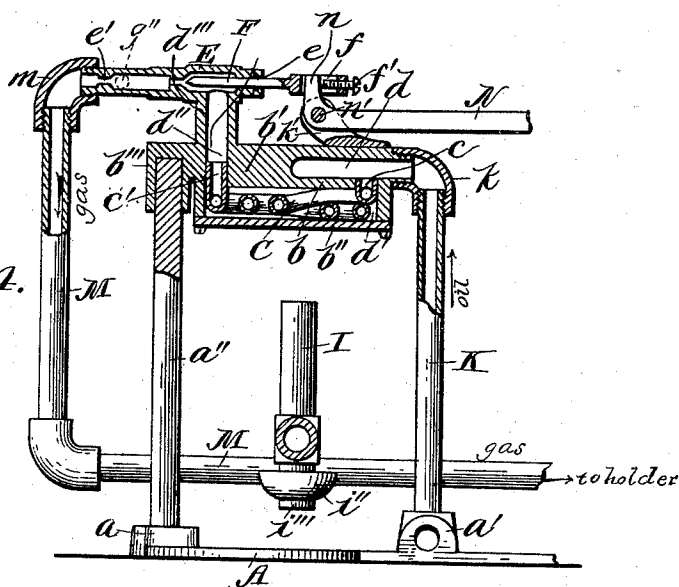
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*Fig. 3.*



*Fig. 4.*



Witnesses

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# UNITED STATES PATENT OFFICE.

JOSEPH S. WOOD, OF BROOKLYN, NEW YORK.

## GAS-MACHINE.

SPECIFICATION forming part of Letters Patent No. 499,076, dated June 6, 1893.

Application filed May 4, 1892. Serial No. 431,775. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH S. WOOD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an automatic gas generating machine of that class in which a liquid hydrocarbon is vaporized by heat and the resulting vapor discharged, under pressure, in a jet, whereby the proper proportion of atmospheric air is drawn in and mixed therewith to form an illuminating-gas of the desired candle power; and more particularly the invention relates to certain improvements in the construction and arrangement of the vaporizing retort and coil,—improvements in the heating burner and its connections with the retort and the regulator which connects with the gas holder,—improvements in a regulating device connecting with the holder, the heating burner, and the house service pipes, whereby the flow of gas to the heating burner may be more quickly and accurately controlled, and the generation of gas, therefore, better controlled for correctly supplying either one burner or any desired number of burners,—also to certain improvements in the needle-valve and its connections, which control the flow of gas from the generating retort to the holder.

The object of the invention is to simplify the construction and increase the effectiveness of automatic gas machines, and a more particular object is to improve the construction of the vaporizing retort.

Another object of my invention is to provide for quickly and accurately controlling the flow of gas to the heating burner under the retort, so that the heat of the retort may be instantly controlled, and therefore the generation of gas controlled in exact proportion to the number of burners on the house service pipe which are lighted, and so that only the proper quantity of gas will be supplied to the burners, whether there be ten or only one in use.

My regulating device is more sensitive and

moves quicker than the drum of the gas-holder, and by means of it and the connections between it and the heating burner, the holder, and the house service-pipe, I am enabled to supply gas to the house burners at a more uniform pressure and produce a perfectly steady flame at the burner. Blowing of gas at the burners and a flickering flame are thus avoided and a much more satisfactory light is produced.

The matter constituting my invention will be defined in the claims.

I will now describe my improved gas machine in detail by reference to the accompanying drawings, in which—

Figure 1 represents a sectional perspective view of the machine. Fig. 2 represents a top plan view with parts in section. Fig. 3 represents a transverse section on line *w, w*, Fig. 2. Fig. 3<sup>a</sup> represents a sectional detail of the air valve. Fig. 4 represents a longitudinal section on line *x, x*, Fig. 2.

My machine is mounted upon a base plate, A, provided with lugs or bosses, *a, a'* for connecting the post *a''* and the oil pipe K, which serve to support the vaporizing retort B. The retort B, connects by lug or elbow *b'''*, with post, *a''*, and by elbow *k*, with the oil supply pipe K. Retort B is divided by partition, *b*, into an upper chamber, *d*, and a lower chamber *d'*, and the upper chamber is provided with a transverse partition *b'*, forming an outlet chamber *d''*. The lower chamber *d'*, is closed by a bottom plate *b''* for protecting the coil C, from excessive heat from the burner. The inlet chamber *d*, of the retort is connected by a passage *c*, with the superheating coil C, which is arranged in the form of a flat coil in the chamber, *d'*, and connects by passage *c'*, with the outlet chamber *d''*, which in turn connects by a short pipe *d'''*, with the ejector or mixing chamber E. The bottom plate, *b''*, is connected to the retort by screws or other devices, so that it can be readily removed for giving access to the coil, and when in place protects the coil from becoming overheated and injured by the burner flame.

The ejector and mixing-chamber, E, is provided at its end with a stuffing box *e*, through which passes the needle-valve, F, which fits at its inner end in the conically tapering orifice in the throat of the ejector. Chamber E

is also provided with an outlet throat  $e'$ , and with an air supply port,  $g''$ . Air is supplied to chamber E, through an inlet box G, having a front plate, provided with a port,  $g$ , and containing a flap valve,  $g'$ , arranged to close port,  $g$ . By means of this arrangement leakage of gas or vapor through the air box is prevented. Chamber E, is connected by elbow  $m$ , to gas pipe M, which connects with the tank Q of the gas-holder.

The needle-valve F, is provided with a head slotted at  $f$ , and also with an adjustable screw,  $f'$ , said slot serving for the passage of the bent end  $n$ , of the pivoted lever N. To the top of the retort there is secured a bracket  $k'$ , slotted at its upper end in which there is pivotally connected the lever N by means of a pivotal pin,  $n'$ , and the bent end,  $n$  of lever N projects from the pivotal connection up into the slot  $f$  of needle-valve F, for opening or closing said valve by the fall or rise of the holder when the outer end of lever N is engaged with the rod R, which connects with the holder drum.

The retort is provided with a transverse passage H, connecting with its inlet chamber,  $d$ , and to such passage is connected a pipe H', having a valve  $h'$ , and connecting with the Bunsen burner I, below the jet orifice  $i'$ , said passage and pipe serving to conduct oil or vapor directly from the retort to the burner when starting the machine into operation.

The Bunsen burner, I, is preferably arranged centrally below the retort and is provided with a jet orifice,  $i'$ , and an air port,  $i$ , arranged in the usual manner, and at the bottom with an oil or alcohol cup,  $i''$ , and a closing plug,  $i'''$ . A gas supply pipe, J, having a valve,  $j$ , connects with pipe H', and with the burner I, supplying gas thereto from the regulating device T, T'. The oil supply pipe K, connects, in practice, with an elevated oil tank or with an air pressure oil tank, not here shown, and passes through the boss,  $a'$ , and thence to the elbow  $k$ , which connects with the inlet chamber  $d$  of the retort. The pipe K, is preferably packed with asbestos to regulate the flow of oil to the retort.

The holder is composed of a tank Q, having double walls,  $q, q'$ , forming an annular space between them containing the water seal, and into which is inserted the inverted drum P. To the drum P, is secured a guide rod, R, by means of a bracket,  $p$ , and such guide rod passes loosely through the eye of the second bracket  $p'$ , secured to the outer wall of tank Q. Rod R, is provided with an enlarged slotted portion  $r$ , for receiving the end of lever N. A second guide rod R', is provided on the opposite side of the holder to steady the up and down movement of drum P.

The gas holder is connected by a pipe S, with the interior of pipe S' of my regulator. This regulator is composed of an outer cylinder or shell T, provided with an annular water seal cup,  $t$ , into which is inserted the

inverted movable drum T'. The interior pipe S', forming part of the regulator, is provided at the top with a valve opening  $s$ , in which there is suspended the conical valve  $t'$ , which is connected by a cord or chain to the vertical rod  $u$ , which is secured to the top of drum T', and passes up through an opening in the top of the shell T, where it is connected to a horizontal rod U. The outer end of rod U is screw-threaded and has connected to it by means of a nut  $u'$ , the vertical rod U' which connects at its lower end by a pivotal-pin  $u''$ , with lever V, which is connected at its opposite end to valve  $j$  in gas pipe J, which controls the flow of gas from the regulator to the heating burner I.

The service pipe W, connects with the interior of the regulator and supplies the burners in the building.

A drip cock,  $s'$ , preferably connects with the lower end of pipe S', for drawing off water of condensation.

The machine having been constructed and arranged as above described and shown in the drawings, the operation thereof for generating gas is as follows: The oil tank being supplied with oil, air pressure is applied thereto, which forces oil up through pipe K to the retort. The Bunsen burner is first heated up for starting the apparatus by burning a small quantity of alcohol in the cup,  $i''$ ; then when the burner is sufficiently heated, oil is supplied thereto by slightly opening valve  $h'$ , in pipe H, leading from the retort. The oil vapor now generated in the heated burner flows through the jet opening  $i'$ , and draws air in through the port  $i$ , and the gas is ignited. The flame quickly heats the retort and its superheating coil C, whereby oil, which is supplied to the retort, is rapidly vaporized and the vapor forced into the ejector and mixing-chamber E, where it escapes through the orifice of the needle-valve, thereby drawing air through the air box G, and thence through ports  $g''$ , into the mixing chamber. The mixture of vapor and air escapes through the outlet throat  $e'$ , into pipe M, by which it is conducted to the holder from which gas is supplied to the burners on the surface pipe and also to the heating burner I. As soon as the generation of gas is commenced in the retort, the lever N, is connected at its outer end to the slotted portion  $r$ , of rod R attached to the holder, and then lever V is attached at nut  $u'$  or pivotal pin  $u''$  to rod U or U', which connect to the movable drum T', of the regulating device. As gas flows into the holder, the drum P will rise, thereby raising the outer end of lever N and actuating the needle-valve. The valve  $h'$ , in pipe H' is now closed, shutting off the oil supply to the burner. The machine now runs automatically,—gas being generated to supply the burners on the house service pipe and the heating burner, I, beneath the retort. As soon as the house burners are lighted, the drum T', of the regulator will fall, thereby opening valve  $j$ , on pipe J, and sup-

plying gas to the heating burner for increasing the heat of the retort. Gas now being consumed at the house burners, it flows from the holder through the regulator, causing the drum P to fall, thereby carrying downward lever N, and opening the needle-valve F, so that a larger volume of gas will flow from the retort to the holder. If the house burners are now turned out, the regulator will rise at once, and at a little later period the drum P of the holder will slowly rise, but the regulator always rises and falls first, then at a later period drum P rises and falls. By means of the instantaneous rise and fall of the regulator, the flow of gas to the heating burner I, is instantly controlled, so that the heat is instantly increased or diminished under the retort, thereby instantly controlling the generation of gas in the retort. The regulator being much more sensitive than the drum of the holder, the generation of gas is much better controlled than heretofore and the flow of gas to the burners is made uniform and a steady flame produced. If the burners of the house service pipe are turned out, the regulator will rise at once, shutting off the flow of gas to heating burner I, and drum P of the holder will also rise at a little later period, thereby shutting off the flow of gas from the retort through the mixing chamber and pipe M to the holder.

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

1. The combination with a generating retort, having an oil supply pipe and a gas outlet pipe, leading to a holder, of a heating burner arranged below said retort, a pipe provided with a valve connecting the retort with said burner, a gas holder, a regulator, a pipe connecting said regulator and burner provided with a valve and mechanism connecting said valve and regulator, whereby the burner may be fed with oil or gas as desired.

2. The generating retort provided with a

horizontal partition *b*, having ports, *c*, *c'*, dividing it into upper and lower chambers, said upper chamber being divided by a transverse partition into an oil inlet chamber and a gas outlet chamber, a superheating coil connecting with each of the chambers at ports *c*, *c'*, and arranged below partition *b*, in lower chamber a removable bottom plate below the coil for protecting it from excessive heat, an oil supply pipe, a gas outlet pipe, and a heating burner arranged below the retort, all combined and operating, substantially as described.

3. The gas generating retort having a transverse partition dividing it into an oil inlet chamber, and a gas outlet chamber, a superheating coil arranged below said chambers and connecting with them, a removable bottom plate below said coil and an outlet passage for conducting oil to the burner, in combination with the heating burner having a jet orifice and a valved pipe connecting the oil chamber of the retort with said burner below its jet orifice, substantially as described.

4. The combination of the generating retort, a heating burner arranged below it and an ejector and mixing chamber connecting with the gas outlet pipe of the retort, a gas holder, a pipe connecting the mixing-chamber with said holder, a regulating device having a movable drum and connecting with the holder and house service pipe, a gas pipe, *J*, having a valve *j*, connecting said regulator with the heating burner under the retort, lever *V*, connected with said valve *j*, and with the drum of the regulator, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH S. WOOD.

Witnesses:

JOHN H. REFORD,

JEROME J. HINES.