

(No Model.)

G. C. JOHNSON.
GAS GENERATOR AND VAPORIZER.

No. 554,699.

Patented Feb. 18, 1896.

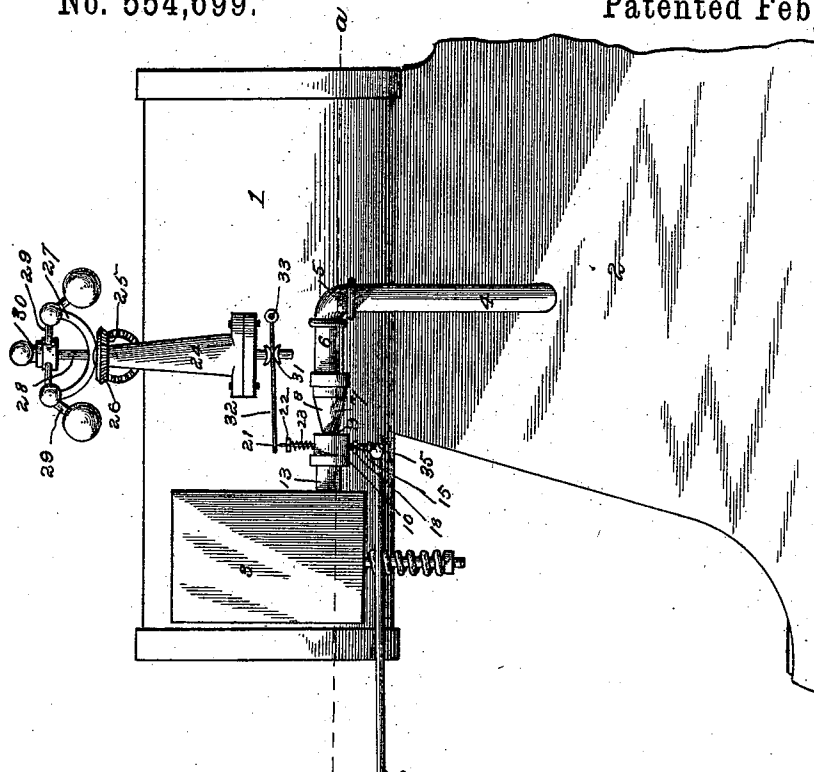


Fig. 7.

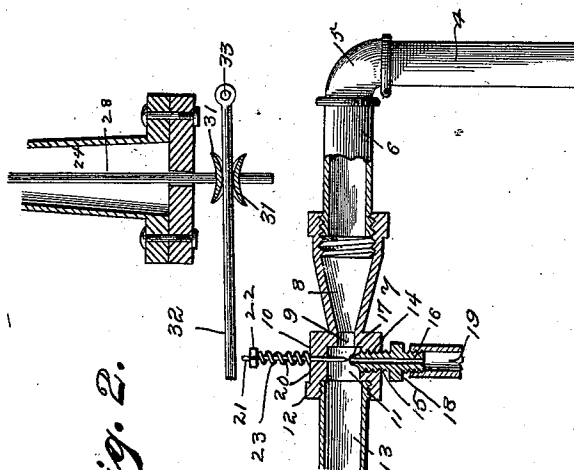
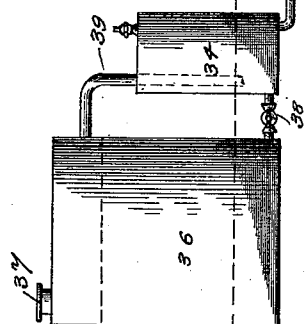


Fig. 2.

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GEORGE CHARLES JOHNSON, OF LOS ANGELES, CALIFORNIA.

GAS-GENERATOR OR VAPORIZER.

SPECIFICATION forming part of Letters Patent No. 554,699, dated February 18, 1896.

Application filed January 30, 1895. Serial No. 536,701. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CHARLES JOHNSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Gas-Generator or Vaporizer, of which the following is a specification.

This invention relates to an improved vaporizer for use in connection with explosive-engines, and it has for its object to produce a vaporizer or gas-generator which will be simple in construction, and which will remain inactive except when the conditions of the operation require its action, whereupon it will respond promptly to the governor and generate and deliver the requisite amount of gas.

The invention further consists in certain improved features of construction in the valve for regulating the operations of the vaporizer or generator, whereby it is employed in connection with the governor of an engine, and is actuated by the same as the necessity therefor arises. All of these points and features will be fully explained hereinafter and finally embodied in the claims.

In the drawings, Figure 1 represents a side elevation of the cylinder of an explosive-engine and a portion of its frame, the same being shown with my several improvements applied thereto. Fig. 2 is an enlarged section taken through the generator or vaporizer and extending to the valve for controlling the same and the connection thereof with the generator.

The reference-numeral 1 indicates the cylinder of an explosive-engine, and 2 a portion of its frame. This cylinder and frame, and indeed the entire engine, may have any suitable construction, since my improvements are applicable to all engines which are operated by the expansive force of explosive fluids or gases, and generally known as "explosive-engines."

3 indicates the usual valve-chamber which is in communication with the cylinder 1 and contains the valve which holds the generated gas within the cylinder. Communicating with the interior of the frame 2, and reaching the atmosphere from said interior, is the air-supply tube 4, which extends upwardly to a point

above the lower side of the cylinder 1, and which is there provided with an elbow 5, which is in turn connected to the section of horizontal tubing 6. The tube 6 extends rearwardly from the tube 4.

Designated by the numeral 7 is the generator or vaporizer, and this comprises a tapering or cone-shaped part 8, which is directly adjacent to the tube 6, and which is contracted to a throat 9 at its rear extremity. Directly adjacent to the part 8 is the cylindrical and enlarged portion 10, which forms an enlarged chamber 11. This chamber 11 is the mixing-chamber of the generator and terminates at the left in an enlarged and screw-threaded portion 12. Fitted within the threaded portion 12 is the short section of tubing 13, which extends horizontally and rearwardly in alignment with the tube 6 and communicates with the valve-chamber 3.

Formed in the lower side of the mixing-chamber 11 is the vertically-extending and internally-threaded passage 14, within which the correspondingly-threaded tube 15 is fitted. The tube 15 is formed with a contracted passage 16 therein, and its upper end has a nipple 17, which forms the nozzle of the tube. Formed integral with the tube 15, and intermediate of its ends, is the angular wrench-seat 18. The lower end of the tube 15 is in communication with the supply-tube 19, which conveys to the tube 15 and to the generator or vaporizer in general the fluid from which the gas is to be derived.

Formed in the wall of the mixing-chamber 11 at the upper side thereof and longitudinally aligned with the passage 16 of the tube 15 is the passage 20, in which the needle-valve stem 21 is arranged to slide, and is provided at its lower end with a conical point to fit in the upper end of the passage 16 and close the same. The valve-stem 21 is provided at its upper end with an adjustable nut 22, which serves to confine the expansive spring 23 on the valve-stem. The spring 23 embraces that portion of the valve-stem 21 which projects out of the cylindrical and enlarged portion 10 of the generator or vaporizer and operates to keep the valve-stem raised out of engagement with the nipple 17 of the tube 15, whereby the passage 16 is kept normally open.

24 indicates the governor-column, which is rigidly secured to one side of the cylinder 1 adjacent to the generator 7.

25 indicates the gear which is connected with the moving parts of the engine and which meshes with the gear 26 of the governor-crown 27, and whereby said crown is given that rotary movement which is essential to the operation of the governor, the same being of the centrifugal class.

28 indicates the governor stem or shaft, which is movable vertically in the column 24, and which has the usual arms 29 pivotally connected to its head 30 and to the crown 27. By these means as the crown 27 revolves, the arms 29, being weighted, as in the usual construction, will rise at their outer ends under the influence of the centrifugal force, thus causing the stem 28 to descend proportionately.

The lower end of the stem 28 is provided with two shoes 31, which have arc-shaped contiguous faces curved in opposite directions and grooved so that the lever 32 may be seated therein and may have positive connection with the stem 28, so as to be raised or lowered in accordance with the movements of said stem. The lever 32 has its fulcrum at the point 33 on the cylinder 1, and its free end is arranged directly over the valve-stem 21, so that upon the downward movement of the lever the valve-stem will be engaged thereby and pushed into the upper end of the passage 16, so as to close the same. Thus it will be observed that the stem 28 of the governor may move vertically, and that owing to the peculiar construction of the shoes 31 its movements will be transmitted to the lever 32, which will result in a depression of the valve-stem 21 when the lever moves downward and in a relaxation of the pressure on said stem when the lever moves upward, so as in said latter movement to permit the spring 23 to raise the valve-stem 21. The purpose of the shoes 31 is to connect the stem 28 to the lever 32 in a way which will be attended by little friction and which will result in preventing all lost motion, to the end that the slightest movement of the stem 28 will be accurately transmitted to the lever 32.

The supply-tube 19 passes slightly downwardly from the tube 15, and thence bends and proceeds horizontally to the supplemental tank or reservoir 34.

35 indicates a cock, which is located in the pipe 19 at the bend aforesaid, and which is provided to shut off the gasoline, but not to regulate the supply. The supplemental tank 34 is associated with the main tank 36, which has many times the capacity of the tank 34, and which is provided with an inlet-orifice 37, by which it may be filled.

38 indicates a pipe located at the lower portions of the tanks 36 and 34 and serving to establish communication between the two, whereby the gasoline may be passed from the

tank 36 to the tank 34. This tube is provided with a cock or valve, by which it may be opened and closed.

I provide means by which the flow of gasoline from the tank 36 to the tank 34 may be regulated and restricted and the gasoline in the tank 34 prevented from rising to a height greater than the nipple 17 of the pipe 15, and this consists of a tube 39, which is bent at right angles, enters the tank through the top, extends downwardly thereinto, and terminates in the plane of the upper end of the tube 15. Thus it will be seen that when the pipe 38 is open the gasoline from the tank 36 will flow into the tank 34 until it rises to the level of and closes the lower end of the tube 39. This effectually cuts off all exit of air from the tank 34 and makes it impossible for more gasoline to enter said tank, because of the air therein. It will be observed that as soon as the gasoline is drawn out of tank 34 more may enter, and therefore the tank is kept filled to the requisite extent. The dotted line *aa* indicates the level to which the gasoline should rise in the tank 34, and also the level to which it should rise in the pipe 15.

The tanks 34 and 36 will, of course, be supported upon any suitable means, and it is necessary that their comparative elevation be maintained uniformly, all of which will be understood. I have not shown any means for supporting the tanks 34 and 36; but this will be understood, and does not, therefore, require any detailed description.

In the operation of my invention, assuming that the engine has arrived at such a stage in this operation as to need an additional supply of gas or vapor, the stem 28 of the governor will rise and the lever 32 be moved out of engagement with the valve-stem 21. This will open the passage 16 of the tube 15, whereupon the operation of the piston within the cylinder of the engine will, as is common in all engines of this class, create a partial vacuum in the pipe 4 and cause the air to be drawn rapidly through said pipe and into the cylinder 1. This rapid passage of the air through pipe 4, which is concentrated by the cone 8, will result in the drawing of a small quantity of gasoline out of the pipe 15, and the vaporization thereof by the rapid current of air, thus forming an explosive mixture which is carried into the cylinder, where it is ignited and exploded. This rush of air through the pipe 4 is performed at each forward stroke of the piston, and results in a continual vaporization of the gasoline and a corresponding increase of speed of the engine, and this increased speed in the operation of the engine will be followed by a downward movement of the stem 28 of the governor and a corresponding movement of the valve-stem 21. This will close the passage 16 of the tube 15 and prevent further withdrawal of the gasoline from the same. Such a condition of affairs continues until the speed of the engine is de-

creased so as to render a new supply necessary, whereupon the operation above described will be repeated.

Having described the invention, I claim—

5 1. A vaporizer comprising in its construction a conical portion 8, having communication at its enlarged end with the atmosphere and having its contracted end terminating in
10 a throat 9, a cylindrical and enlarged portion forming a mixing-chamber 11, said mixing-chamber being in communication with means for producing a partial vacuum, a needle-valve stem extending into the mixing-chamber
15 10, and a gasoline-introducing tube 15 tapping the mixing-chamber and having its opening aligned with the valve-stem so that it may be closed thereby, the said gasoline-introducing tube being in communication
20 with a source of gasoline supply, substantially as described.

2. The combination with an explosive-engine, of a centrifugal governor having a vertically-reciprocating stem, a lever pivotally
25 connected to the stem and operated in unison therewith, a mixing-chamber in communication with the atmosphere and with the cylinder of the engine, a gasoline-introducing tube fitted in the lower side of the mixing-chamber and communicating with the interior
30 thereof, a valve-stem fitted in the upper side of the mixing-chamber and movable vertically therein and aligned with the passage in the gasoline-introducing tube so as to be capable

of closing the same, and an expansive spring 35 embracing the valve-stem and operating to keep the same out of engagement with the gasoline-introducing tube, the said lever being capable of pressing down upon the valve-stem and of moving the same into engagement with the tube to close the same, substantially as specified. 40

3. The combination with an explosive-engine, of a governor mounted thereon, a vertically-reciprocating stem in the governor, 45 said stem having at its lower end two relatively-inverted shoes formed with arc-shaped and grooved contiguous faces, a lever fulcrumed at one extremity and arranged at an intermediate point between the curved faces 50 of said shoes and within the grooves thereof, a mixing-chamber in communication with the atmosphere and with the cylinder of the engine, and having a gasoline-inlet orifice at its lower side, and a needle-valve stem movable 55 vertically in the upper side of the mixing-chamber and capable of closing the said gasoline-inlet orifice, the said valve-stem being operated by the lever, substantially as described. 60

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE CHARLES JOHNSON.

Witnesses:

HENRY LANGE,
ROBERT L. BROWN.