C. E. CLARK.

GAS GENERATING SYSTEM.

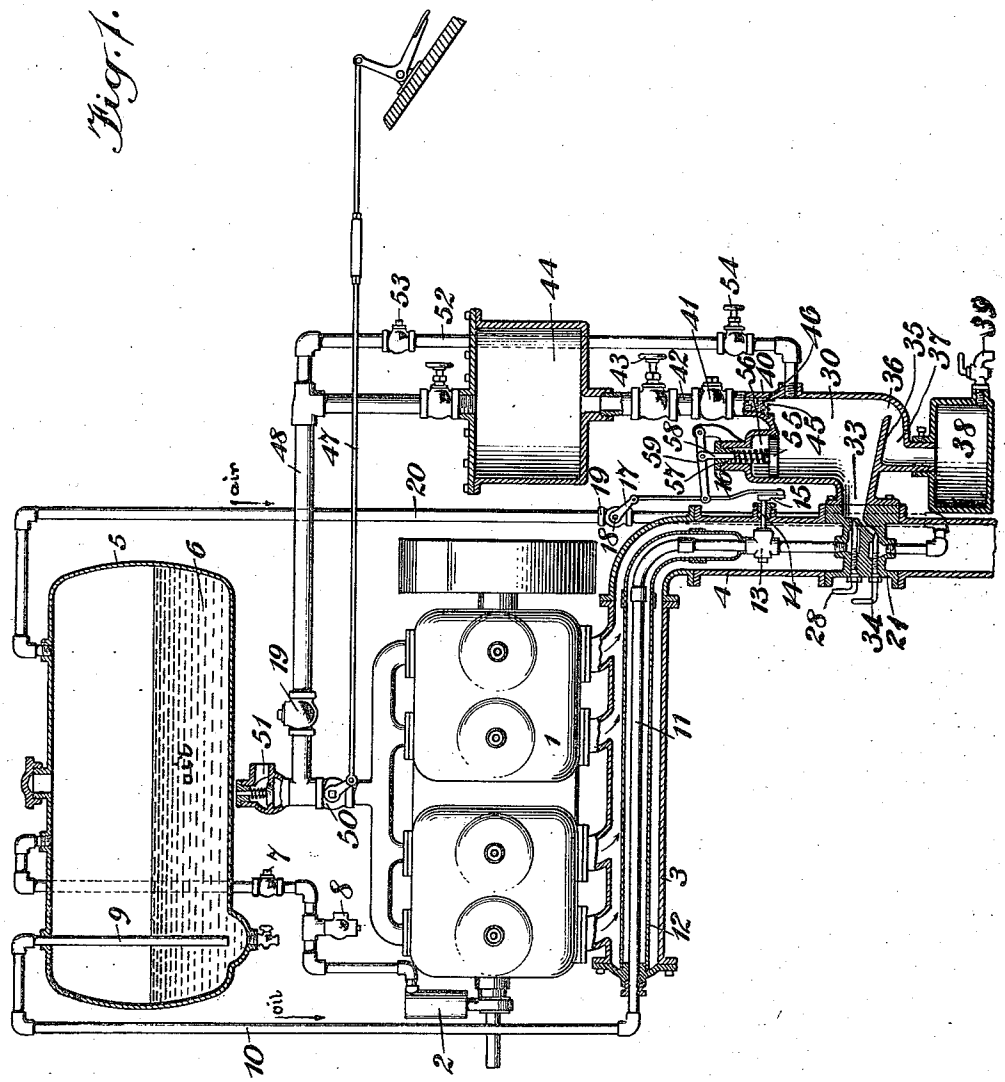
APPLICATION FILED MAR. 17, 1914.

1,147,608.

Patented July 20, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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Fig. 3.

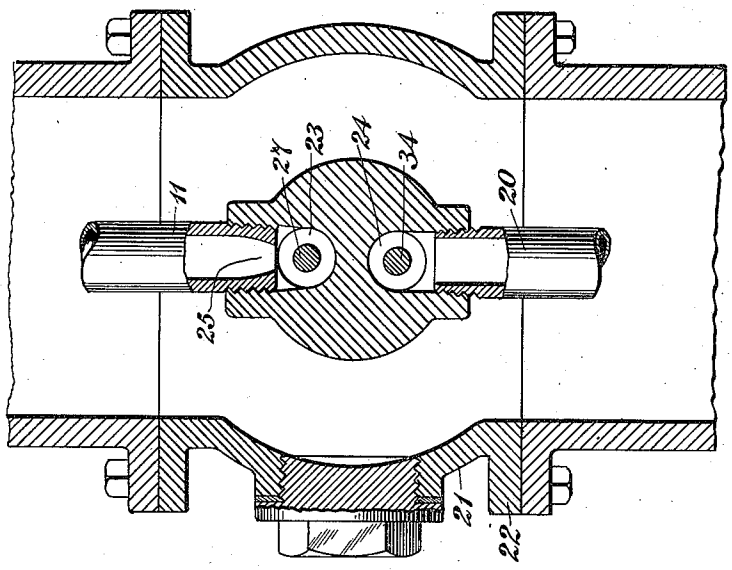
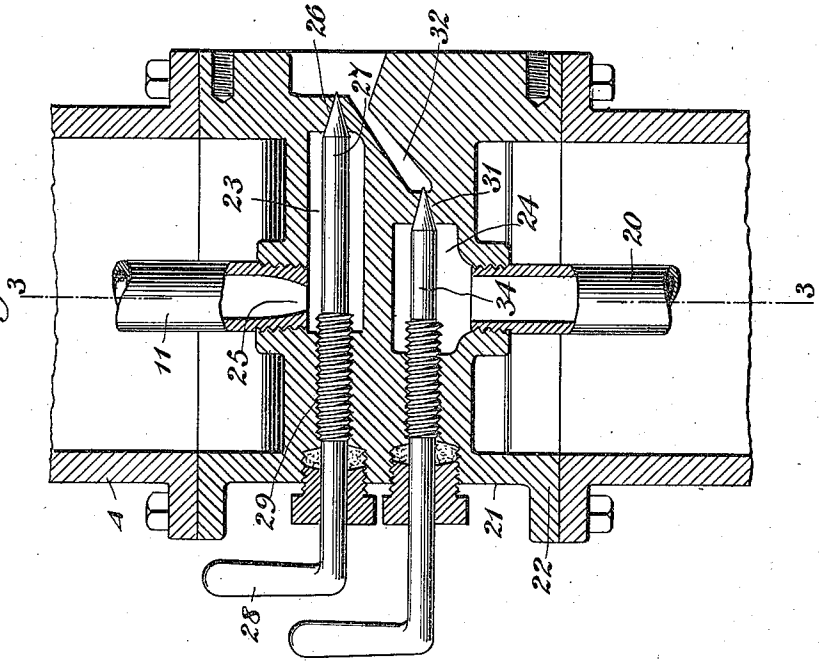


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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GAS-GENERATING SYSTEM.

1,147,608. Specification of Letters Patent. Patented July 20, 1915.

Application filed March 17, 1914. Serial No. 825,261.

To all whom it may concern:

Be it known that I, CHESTER E. CLARK, a citizen of the United States, and a resident of the city of New York, Tompkinsville, borough of Richmond, county of Richmond, and State of New York, have invented a new and Improved Gas-Generating System, of which the following is a full, clear, and exact description.

This invention relates to improvements in gas generating systems, and has for an object to provide an improved structure which may use crude oil or any desired oil, and produce a gas easily transported and ready for use at all times.

Another object of the invention is the provision of an improved structure wherein the same works under pressure maintained at a certain tension, whereby a certain mixture of gas is produced continually, according to the way the device is set to operate.

A still further object of the invention is to provide a generating system which will generate gas that may be stored and transmitted any desired distance without deterioration, said gas being generated from heavy oils, as for instance crude oil.

In carrying out the object of the invention the same may be associated with various devices, as for instance an ordinary explosive engine. When associated with an explosive engine the manifold or exhaust tube is utilized so that the heat from the exhaust will heat the oil to the desired temperature so that the same may properly mix with the air supplied thereto at a proper point. The supply tank is provided with any desired quantity of oil, and is then connected to a suitable pump which maintains a predetermined pressure of air in the tank. This causes the oil to be fed from the tank and also provides an air supply which is utilized in making the gas. The oil from the tank is forced through a suitable pipe inclosed in a housing, said pipe and housing being arranged in the manifold of the engine. A mixing device or generator is connected with the oil pipe extending through the manifold and with an air pipe extending from the supply tank. These two pipes discharge heated oil and air, respectively. The air is caused to flow or be discharged across the spray or discharge of oil, whereby a perfect mixture is produced, the discharge being made in a suitable mixing chamber provided with a refuse compartment, and with a discharge outlet. From the mixing chamber the air passes through a suitable filler into a storage chamber, and from thence to the explosive engine or other point of utilization. It is to be noted that the generating device causes a proper mixture of the air and oil to produce a proper explosive gas when the device is to be used on an explosive engine, such gas being adapted to be exploded without the extra mixing of additional air by a carbureter or other similar device. When the gas is to be used for heating purposes or for any other purpose the generating device is readjusted so as to produce a proper mixture for the oil used in order to provide a proper gas for heating or for any other particular purpose desired.

In the accompanying drawings—Figure 1 is a top plan view of an explosive engine, an embodiment of the invention being shown connected thereto, certain parts being in section; Fig. 2 is an enlarged detail sectional view through a generating device; Fig. 3 is a section through Fig. 2 approximately on line 3—3.

Referring to the accompanying drawings by numeral, 1 indicates an explosive engine of any desired kind provided with an air pump 2, also of any desired kind. The engine 1 is provided with the usual manifold 3 through which the exhaust is discharged. Manifold 3 is provided with an extension 4 for accommodating certain parts of the invention said extension 4 being connected with a suitable muffler, if desired. Arranged at a convenient point is a supply tank 5 in which oil 6, preferably crude oil, is placed. Pump 2 is connected through suitable pipes to tank 5 so as to supply the same with compressed air, a check valve 7 being interposed in said pipe so as to prevent any reverse movement of the air. A relief valve 8 is also provided which may be set so that pump 2 can only maintain a certain pressure in tank 5. An oil discharge pipe 9 is connected with tank 5 and extends to near the bottom thereof. This pipe has connected therewith pipe 10 which has a section 11

extending through the manifold 3 and extensions 4. In order that the exhaust will not heat pipe 11 in spots or cause a sudden heating of the oil by the intermittent discharge of the exhaust, a housing 12 surrounds section 11 to near the discharge point, as clearly shown in Fig. 1. The section 11 of pipe 10 is provided with a valve 13, which valve has an operating shaft 14. Connected to shaft 14 is a crank 15 having a link 16 connected therewith, which link is also connected with crank 17 of shaft 18 used in operating valve 19. Valve 19 is arranged in the air supply pipe 20 which supplies air from tank 5 to the atomizing device 21. The atomizing device 21 is constructed as more clearly shown in Figs. 2 and 3, which structure includes a suitable casing 22 provided with chambers 23 and 24. Chamber 23 is in free communication with a section 11 of pipe 10, which section is tapered at 25 so as to give a spray effect to the discharge into chamber 23. Chamber 23 is provided with an opening 26 adapted to accommodate the needle valve 27, which needle valve may have a handle 28 for operating the same, or may be provided with a squared portion or other suitable means for receiving a tool, whereby the needle valve may be adjusted. The needle valve 27 is provided with threads 29 so that upon a rotation of the valve the same will be opened or closed. The opening 26 discharges directly into the mixing chamber 30, while the opening 31 from the air chamber 24 discharges into the mixing chamber through an inclined passageway 32, whereby the air is discharged into the spray of oil at a tangent and thereby mixes more quickly and in a better manner. It will be noted that there is a short passageway 33 through which the air and oil spray must pass before entering the mixing chamber 30. This also assists in causing a more perfect mixing of the air and gas. The air opening 31 coacts with the needle valve 34 which is constructed similar to needle valve 27 and therefore will need no additional description.

The air pipe 20 discharges air into chamber 24, which chamber is preferably comparatively small, and which chamber is also preferably provided with an air pressure substantially equal to the air pressure in tank 5. The pressure of the oil in chamber 23 is also substantially equal to the pressure in tank 5 so that the oil spray and the air spray is of substantially equal pressure. It is of course to be observed that the oil passes through the manifold before it passes into the chamber 23, whereby the same is in a more or less gaseous or vaporized state. It is also to be observed that this oil supply is heated to the desired extent for quickly mixing with the air, the air being more or less heated by passing through the lower part of pipe 20 and through the housing or casing 22 of the atomizer 21.

The mixing chamber 30 is provided with a bottom 35 which is broken away or opened at 36, whereby the ungasified parts or refuse from the oil may pass downwardly through the passageway 37 into the refuse chamber or receptacle 38. A suitable valve 39 is provided for drawing off the refuse whenever desired. The gas from chamber 30 passes upwardly through the discharge member 40 and from thence through check valve 41 and then pipe 42. A hand operated valve 43 is provided in pipe 42 so as to manually shut off the gas from chamber 30 whenever desired. The check valve 41 is designed to prevent the reverse flow of gas from storage tank 44. It will be observed that a wire mesh member 45 is arranged in the discharge opening 40 and a filtering medium 46 is arranged adjacent the wire mesh. The filtering medium 46 may be asbestos or asbestos wool, as desired. From the storage tank 44 the gas is led through pipe 47 to pipe 48, and from thence through check valve 49 to the throttle valve 50 of engine 1. A relief valve 51 is provided adjacent the throttle valve 50 so that if the throttle valve was suddenly shut off the gas may escape without doing injury to various parts. Connected with pipe 40 is a by-pass or return pipe 52 provided with a check valve 53 and a hand operated valve 54, pipe 52 connecting pipe 48 and mixing chamber 30. This pipe is to relieve the mixing chamber 30 of excessive pressure. In order to accomplish this relieving action when the pressure in chamber 44 reaches a predetermined extent no more of the explosive mixture will pass therein, but will pass into pipe 52 and through valve 54 which is normally open. From valve 54 the explosive matter will pass through the check valve 53, and from thence to pipe 48. From pipe 48 the explosive matter passes through check valve 19 either to the engine or to the relief valve 51. It will be noted that the explosive matter in chamber 44 not discharged, will not be raised beyond a certain pressure. In order that the supply of air and oil may be automatically shut off a piston 55 is provided and is arranged with one face in free communication with chamber 30, and is adapted to operate in a cylinder 56. Normally spring 57 holds the piston 55 in the position shown in Fig. 1, but when pressure in the chamber 30 exceeds a certain limit the piston will be moved against the action of spring 57 and consequently will raise the piston rod 58 and swing the lever 59 so that link 16 will be moved longitudinally, whereupon valves 13 and 19 will be closed. It will of course be

evident that the closing of these valves may be done quickly or slowly, or that these valves may be only partially closed so as to supply a small quantity of fuel. When the engine 1 is stopped the pressure in chamber 30 and chamber 44 will increase until the same reaches the maximum, after which the piston 55 will be moved for shutting off completely the air and the oil.

The invention has been described in connection with an explosive engine, and the illustrations have been shown connected with an explosive engine, but it will be evident that the system of providing an equal pressure throughout and the various detailed structures could be used separately from the explosive engine for providing a gas from crude oil or any other oil containing hydrocarbon. By feeding air to the generator from tank 5 the climatic changes and conditions will not produce any effect upon the quality of the gas or the action of the explosive engine or other device to which the gas is supplied. Where an ordinary carbureter is used air is taken from the surrounding atmosphere, and by reason of this fact the carbureter must be readjusted every time the air changes. By using a supply of compressed air, as above described, the ordinary climatic changes and the condition of the surrounding air will not in any way affect proper mixing of the gases and the proper action of the gases when used. When the system is used independently of an explosive engine any desired means may be provided for supplying heat to the tubular member or manifold 3. When using the gas for an explosive engine the needle valves 27 and 34 are adjusted to produce a proper mixture of air and gas, or in other words a proper explosive mixture for the engine without the engine drawing in a supply of air from the surrounding atmosphere. When the gas is to be used for heating purposes, as for instance in a stove, the needle valves 27 and 34 are again adjusted so as to produce a proper burning gas. When the needle valves are once set for the particular mixture they are left in that position continually as the oil is fed thereto at a continuous equal pressure and the air is fed thereto at a continuous equal pressure, said air being of continually the same characteristics. By properly mixing the heated and partially vaporized oil with the air in a heated condition, filtering the same and then drawing the same from a storage chamber, a gas is provided which may be transmitted through pipes any desired distance without detriment, or may be stored for any desired length of time.

What I claim is—

1. In a gas generating system of the class described, an atomizing device, means for supplying air and oil to said atomizing device, a mixing chamber connected with said atomizing device for receiving the mixture of air and oil as the same is discharged from said atomizing device, said mixing chamber being formed with an inclined bottom having an opening in the lowest portion thereof, a receptacle in communication with said opening designed to receive the sediment from said mixing chamber after passing through said opening, and means for directing the mixture from said mixing chamber to a point of utilization, said means including a filtering member designed to hold back dirt and oily substances, and to cause a more intimate mixing of the air and oily matter.

2. In a gas generating system of the character described, an atomizing device, means for supplying air and oil to said atomizing device, a mixing chamber for receiving the air and oil in a sprayed condition, a storage chamber for receiving said air and oil after the same have been mixed, means for leading the mixture from said storage chamber to a point of utilization, and pressure actuating means in direct communication with the mixing chamber for automatically shutting off the air and oil from said atomizing device.

3. In a gas generating system, an atomizer, a mixing chamber for receiving air and fuel from said atomizer, a fuel supply tank, means for maintaining said fuel supply tank with air under pressure, means for directing fuel from said supply tank to said atomizer, means for leading air from said supply tank to said atomizer, a controlling valve arranged in each of said last mentioned means, a pressure operated piston arranged in said mixing chamber, and means for connecting said piston with both of said valves, whereby when said piston is moved in one direction said valves will be closed, and when moved in the opposite direction said valves will be opened, and means for leading the mixed air and fuel from said mixing chamber to a point of utilization.

4. In a gas generating system, an atomizer, a mixing chamber for receiving air and fuel from said atomizer, a fuel supply tank, means for maintaining said fuel supply tank with air under pressure, means for leading the fuel in said supply tank to said atomizer, means for leading air from said supply tank to said atomizer, a valve arranged in each of said last mentioned means, a crank connected to each of said valves, a link connecting said cranks, a spring pressed piston arranged in said mixing chamber, said piston being adapted to press said spring when the pressure in said mixing chamber has reached a predetermined point, means for connecting said piston with said link, whereby when said piston is moved by the pressure in said

mixing chamber said link will be moved for automatically shutting off the fuel and air from said supply tank, and means for leading the mixed air and fuel from said mixing chamber to a point of utilization.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHESTER E. CLARK.

Witnesses:
PHILIP D. ROLLHAUS,
A. H. DAVIS.