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A. J. BASSETT

OIL GAS APPARATUS

Filed Nov. 12, 1925

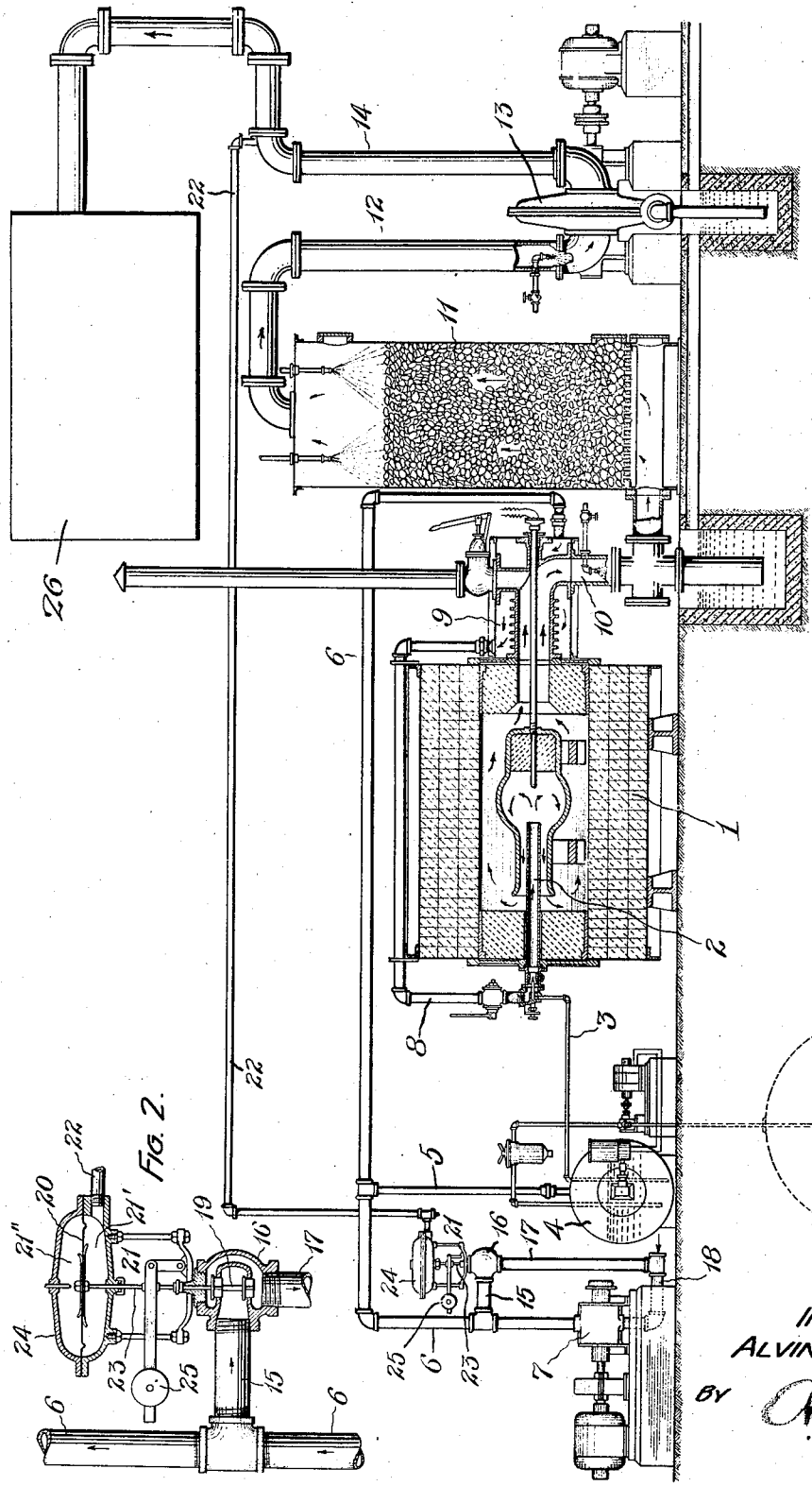


FIG. 1.

FIG. 2.

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UNITED STATES PATENT OFFICE.

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OIL-GAS APPARATUS.

Application filed November 12, 1925. Serial No. 68,542.

My invention relates to oil gas apparatus, and particularly to an apparatus for carrying out a method of controlling the volume of oil gas production described and claimed in an application for U. S. Letters Patent filed by me even date herewith, Serial No. 68,544, methods of controlling the volume of gas production.

The object of my invention is to effect such control in a simple and efficacious manner and to produce a quantity of produced gas varying in accordance with the demand for such gas made upon the apparatus or consuming device to which the gas is to be supplied, as for example a heating furnace or an internal combustion engine.

This object in the specific apparatus illustrated I accomplish by providing unloading means for the delivery side of the air pump, providing a valve for such unloading means, and a pressure-operated regulator for actuating said valve and connecting the regulator with the gas delivery pipe of the gas apparatus, the connection being such that an increase of pressure in the delivery pipe will open or increase the opening in said valve, unload some or more of the air delivered by the pump, decrease the amount of air and oil supplied to the gas converter and thus decrease the volume of gas produced.

The said invention consists of means hereinafter fully described and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain means for carrying out my invention, the disclosed means, however, constituting but one of the various mechanical forms in which the principle of my invention may be employed.

In said annexed drawing:

Figure 1 represents a side elevation, partly in vertical axial section, of a gas-making apparatus embodying my invention.

Fig. 2 represents, upon an enlarged scale, an axial section of the regulator forming part of the apparatus.

In the illustrated device a converter or gasifier 1 of the type shown and described in my pending application Serial No. 717,071, filed May 31st, 1924, is provided and supplied from the mixing tube 2 with a mixture of oil and air. The oil is supplied from a pipe 3 connected with the oil tank 4 which is supplied with air under pressure from branch pipe 5 connected with the main air pipe 6 which is supplied from the outlet of the air pump 7, which supplies a constant pressure.

This oil is discharged into the mixing tube simultaneously with air from the air pipe 8. This latter pipe is connected with a chamber 9 which is heated by the produced gas emanating from the converter which chamber receives its air supply from the main air pipe 6.

The produced gas passes from the converter or gasifier 1 through a main outlet pipe 10 into a scrubber 11, through a pipe 12 into a tar extractor 13 and thence into the main gas delivery pipe 14 which leads to a furnace, a gas engine, or other gas utilizing apparatus 26, which is to be supplied with such gas.

The construction thus fas described is similar to that of my above-mentioned application, Serial No. 717,071.

As is well known, the demand upon the supply of produced gas varies. In the case of an internal combustion engine, it varies with the load upon the engine, and in the case of a furnace it varies as the furnace valves are opened or closed to supply more or less gas thereto during its operation.

In order to increase or decrease the supply in accordance with the demand, I provide the above-described apparatus with the following accessories.

The main air pipe 6 is connected near the pump 7 by means of a pipe 15 with the side of the valve chamber in the casing of a valve 16, the bottom of such chamber being connected with a pipe 17 whose lower end is connected with the air inlet pipe 18 of the pump 7, said inlet pipe communicating with the atmosphere. The movable member 19 of the valve, Fig. 2, controls communication between the pipes 15 and 17, and it will be seen that when valve 16 is open, air will be unloaded or diverted from pipe 6 through pipes 15 and 17 and go back to the pump, said two pipes together forming an unloading means. This results in the discharge finally into chamber 9 from pipe 6, and hence into the converter from the mixing pipe 2, of a given amount of air, such amount depending upon the size of opening in the valve 16 and hence the amount of air which is unloaded or diverted. When said valve 16 is closed, a maximum, and when wide open a minimum of air will be supplied to said converter.

The pump 7 is a constant displacement pump, and if the valve 16 is completely closed so that the suction in pipe 17 is zero, then the

air pressure of the pump is at a maximum or, otherwise stated, it is working at its predetermined pressure. However, as the valve 16 is more or less opened, according to the building up of the pressure in delivery pipe 14, then the pressure of the pump 7 is scaled down from maximum to zero as a minimum, whereby the load on the pump and the cost of operating same is accordingly reduced. Thus the working air pressure, or the air pressure effectively used, is throttled all the time inversely proportional to the demands on the gas-making apparatus. In other words, the load on the pump 7 is in proportion to the oil-gas delivery from the pipe 14. Instant control of the gas-making operation is thus afforded.

The stem 23 of the valve projects through the casing 24 of a regulator 21 and is attached to a diaphragm 20 which divides said casing into two compartments, an upper compartment 21'' and a lower compartment 21'. The latter is connected with one end of a pipe 22 whose other end is connected with the gas delivery pipe 14. A suitable weight 25 is also connected with the valve stem and tends to close the valve 16, as will be readily seen.

As the pressure in oil-gas delivery pipe 14 increases, the diaphragm will be raised and the valve 16 opened, or if already open, its opening will be increased. As the pressure falls, the weight 25 will cause the diaphragm to drop and the valve to close or its opening decreased.

The size of the weight 25 is made such that while the apparatus is working, that is while gas is being manufactured and consumed, the valve 16 is always open to some extent, excepting when the full capacity is demanded, in which event the valve is completely closed, as of course is also the case when the apparatus is not working at all.

In operation, therefore, when the demand for gas increases, the pressure in pipe 14 decreases the opening in the valve 16 is diminished and the amount of air delivered to the converter increases, the air pressure in pipe 6 increasing coincidentally.

Such increase of air pressure is communicated to the oil in tank 4 and a corresponding increase of the oil supply and a corresponding increase in the production of gas is effected.

When the demand for gas diminishes the opening in valve 16 is increased, the amount of air and oil diminished and the amount of gas produced is decreased, as will now be apparent.

It will therefore be observed that the amount of gas produced varies at a rate inversely proportional to the pressure in the main gas outlet pipe 14.

What I claim is:

1. In an oil-gas apparatus, the combination of a converter for converting oil into gas and having an oil-gas delivery pipe extending therefrom, means for mixing oil and air and delivering the mixture into said converter, an oil supply, a conduit connecting said oil supply and the mixing means, an air pump, a main air conduit connecting said pump and the mixing means, a branch air conduit connecting said main air conduit and said oil supply, a pressure-unloading air conduit tapping said main air conduit intermediately said pump and said branch air conduit, and means for regulating said unloading conduit to cause the escape of air in proportion to the pressure of gas in said oil-gas delivery pipe.

2. In an oil-gas apparatus, the combination of a converter for converting oil into gas and having an oil-gas delivery pipe extending therefrom, means for mixing oil and air and delivering the mixture into said converter, an oil supply, a conduit connecting said oil supply and the mixing means, an air pump, a main air conduit connecting said pump and the mixing means, a branch air conduit connecting said main air conduit and said oil supply, a pressure-unloading air conduit tapping said main air conduit intermediately said pump and said branch conduit, a valve in said pressure-unloading conduit, a movable diaphragm connected to said valve, and a conduit communicating with said delivery pipe and adapted to transmit the pressure therein to said diaphragm, said valve being actuated to open proportionately to the movement of said diaphragm.

3. In an oil-gas apparatus, the combination of a converter for converting oil into gas and having an oil-gas delivery pipe extending therefrom, means for mixing oil and air and delivering the mixture into said converter, an oil supply, an air supply, means for exerting pressure on the air and causing the oil and air to move to said mixing means, together with conduits for conveying the oil and air, and a conduit passing the air pressure to the oil supply, means forming a return air passage to said pressure-exerting means from said air-conveying conduit, a throttle for said return air passage, and means actuating said throttle to open to cause air to return to said pressure-exerting means, said actuating means being connected to said oil-gas delivery pipe and controlled by the gas pressure therein.

4. In an oil-gas apparatus, the combination of a converter for converting oil into gas and having an oil-gas delivery pipe extending therefrom, means for mixing oil and air and delivering the mixture into said converter, an oil supply, an air supply, means for exerting pressure on the air and causing the oil and air to move to said mixing means, together with conduits for conveying the oil and air, and a conduit passing the air pres-

sure to the oil supply, means forming a return air passage to said pressure-exerting means from said air-conveying conduit, a valve for said return air passage, means controlling the movements of said valve, and a conduit arranged to communicate the gas pressure in said delivery pipe to said controlling means.

5. In an oil-gas apparatus, the combination of a converter for converting oil into gas and having an oil-gas delivery pipe extending therefrom, means for mixing oil and air and delivering the mixture into said converter, an oil supply, a conduit connecting said oil supply and mixing means, an air pump, a main air conduit connecting said pump and the mixing means, a branch air conduit connecting said main air conduit and said oil supply, a pressure-unloading air conduit tapping said main air conduit and forming a return air suction conduit to the pump, and means for regulating said unloading conduit to cause a change in the amount of air escaping in proportion to the pressure of gas in said oil-gas delivery pipe.

Signed by me, this 31st day of October, 1925.

ALVIN J. BASSETT.