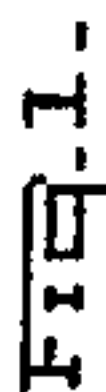


974,945.

3 SHEETS--SHEET 1.



J. B. Appleman,
Margaret Hughes.

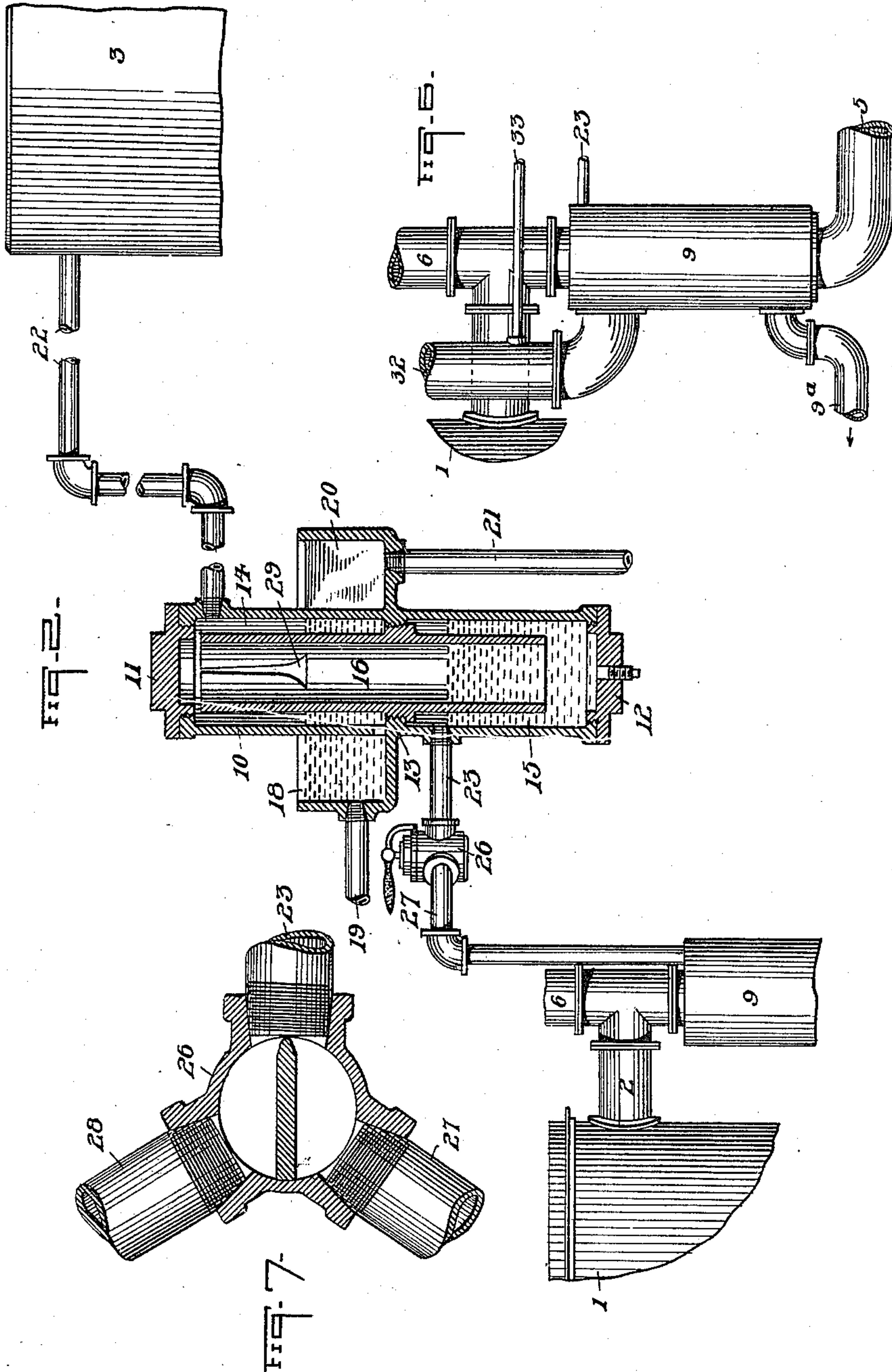
ATTORNEY

W. O. AMSLER.
 APPARATUS FOR MAKING PRODUCER GAS.
 APPLICATION FILED APR. 17, 1906.

974,945.

Patented Nov. 8, 1910.

3 SHEETS—SHEET 2.



WITNESSES:

J. P. Appelman,
Maryann O. Hughes.

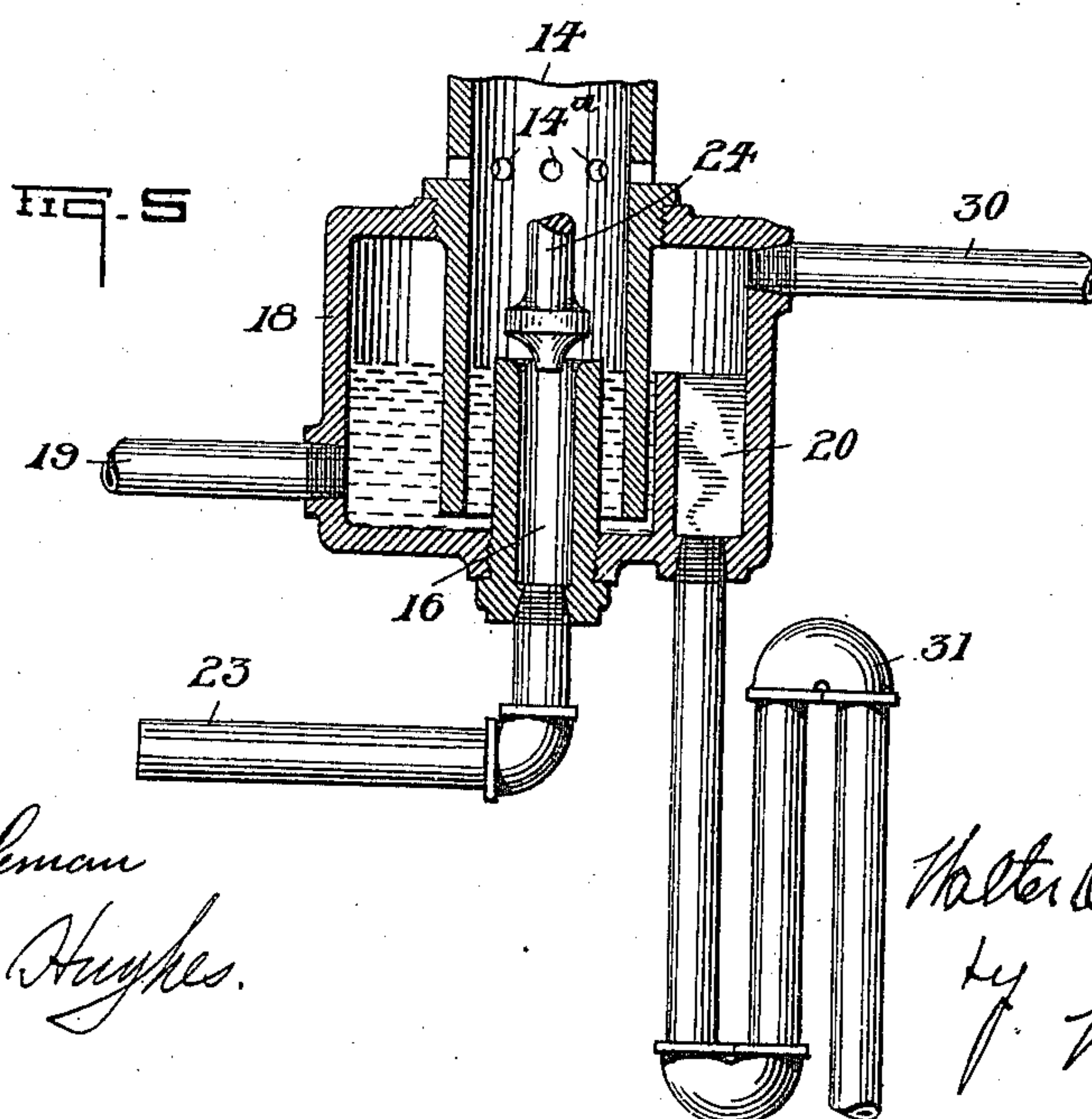
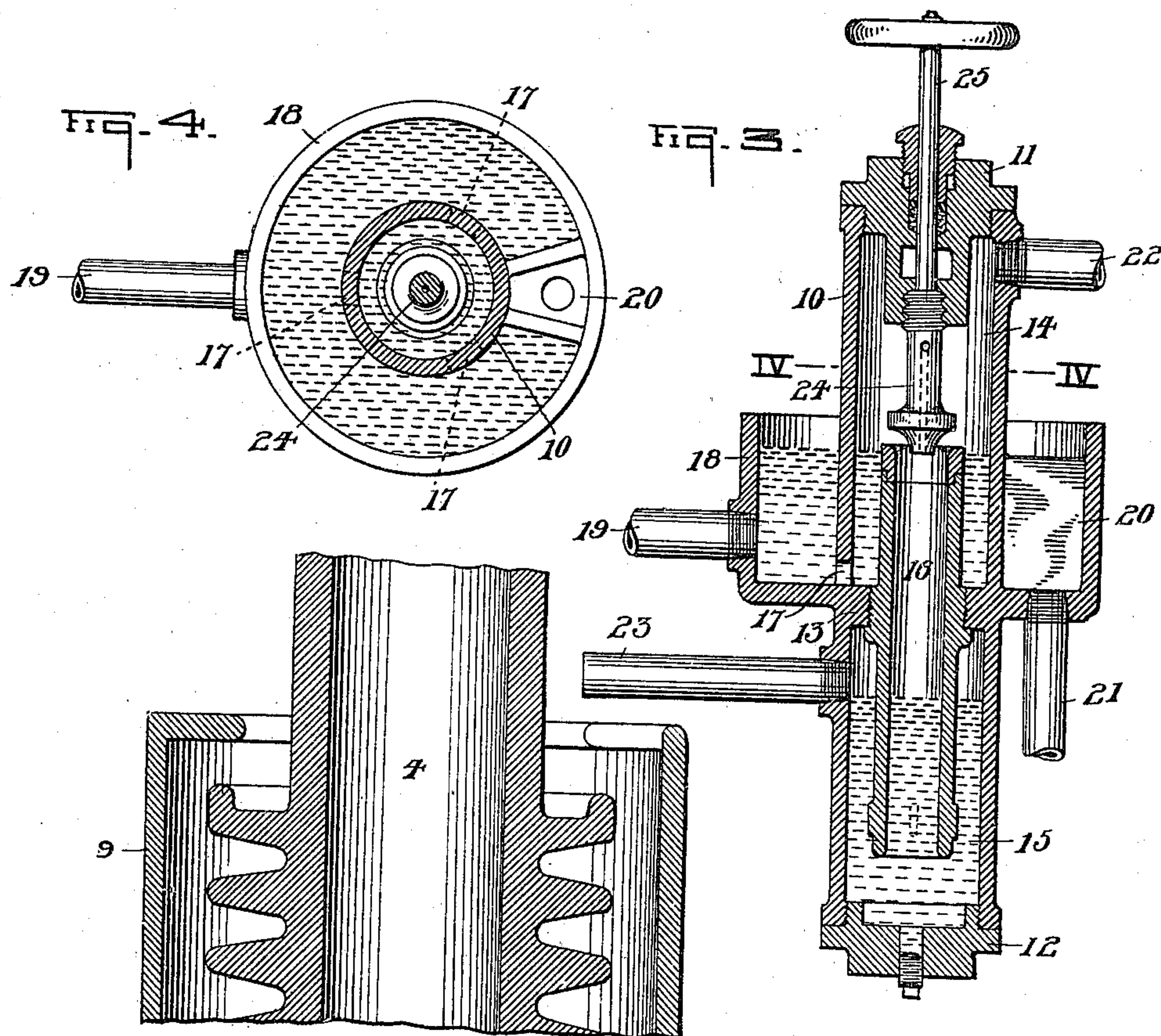
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3 SHEETS—SHEET 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WALTER O. AMSLER, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR MAKING PRODUCER-GAS.

974,945.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed April 17, 1906. Serial No. 312,121.

To all whom it may concern:

Be it known that I, WALTER O. AMSLER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Making Producer-Gas, of which the following is a specification.

The primary object of my invention is to provide a new and improved apparatus for obtaining a constant quality of gas during the manufacturing of producer-gas in a gas-producer.

In the manufacture of producer-gas the quality of gas delivered from the producer depends almost entirely upon the proportion of water or moisture that is introduced with the air. The air gives carbon monoxid and carbon dioxid to the gas while the water or moisture causes a considerable formation of hydrogen and some carbon monoxid, hence it follows that unless the proportion of water to air introduced to the producer is at all times the same, the quality of the producer-gas will vary. For some purposes, as for example, where the gas is employed for power in gas-engines, variation in the quality of producer-gas is highly undesirable.

My invention is designed to secure a constant quality of gas regardless of the variation in the quantity of gas delivered from the producer. This I accomplish by causing to be introduced into the producer with the variable quantity of air, a quantity of water or moisture directly proportional to the quantity of air introduced.

In the accompanying drawings, which illustrate applications of my invention, Figure 1 is a side elevational view of a suction gas-producer plant, embodying my invention; Fig. 2 is a part elevational view and a part sectional view showing the governor or controlling device enlarged and showing its connection with the producer and scrubber; Fig. 3, a sectional view of a modified form of governor and the vaporizer; Fig. 4, a cross-sectional view taken on line 4-4 of Fig. 3; Fig. 5, a central vertical sectional view of a modified form of governor; Fig. 6, an elevational view showing an application of my invention in connection with a producer in which air under pressure is utilized; and Fig. 7, a sectional detail view of valve employed in the form of Fig. 2.

Referring to the drawings, 1 designates a gas-producer having a producer-gas exit 2 located near the top of the producer and in communication with a scrubber 3 by means of a passage 4, and a pipe 5, which latter enters the scrubber near the bottom thereof, as clearly shown by Fig. 1.

6 represents an exhaust pipe also in communication with the producer-gas exit 2. Pipe 6 is provided with a valve-mechanism 7.

Connected with and in open communication with the upper portion of the scrubber is a suction-pipe 8. Pipe 8 may lead directly to a gas-engine, not shown, or other suction creating means, or, if desirable, to a gas-purifier interposed between the engine and the scrubber.

The means and the arrangement of parts as above described are well known to those skilled in the art and I deem it unnecessary to more particularly describe the same. In addition to these means it is customary to employ a vaporizer for the purposes of generating a sufficient quantity of steam for the producer. In the drawings I have shown a vaporizer 9, surrounding the producer-gas passage 4, and connected with the producer by a pipe 9^a.

A characteristic and important feature of the present invention, is the apparatus for governing the quantity of water or moisture, in the form of steam or other vapor, admitted to the producer with the air during the manufacture of producer-gas.

In the operation of gas-producers, and particularly where they are employed in connection with a gas-engine, in which the producer-gas is passed directly from the producer to the engine and the gas utilized therein, the quantity of gas manufactured is varied according to the utilization of the gas in the engine. Or, inasmuch as the quantity of gas made is directly proportional to the air that is introduced, and as this amount of air is directly proportioned to the difference of pressure between the air inlet and gas outlet of the producer or the producer system, then by introducing a quantity of water or moisture proportioned to this difference of pressure the proportion of air to water will be the same for all quantities of gas made. To accomplish these ends I have shown several forms of apparatus or automatic governors in conjunction with the gas-producer and other parts. In the forms of

Figs. 2 and 3, the governing-mechanism comprises a casing 10, having its upper end closed by a flanged and screw-threaded bonnet 11, and its lower end also closed by a cap 12. The interior of the casing is divided by an annular apertured partition wall 13 into an upper compartment 14 and a lower compartment 15. Located in the compartments 14 and 15 and passing through and supported by the annular partition wall 13 is a hollow plug 16. Plug 16 constitutes a passage for water from compartment 14 to compartment 15. Surrounding compartment 14 and in open communication therewith by means of passages 17 is a water reservoir or chamber 18 adapted to contain a constant quantity of water supplied thereto by a supply pipe 19. 20 designates an overflow water chamber provided with an overflow outlet 21. Water reservoir or chamber 18 is open at its top to the atmosphere. In both forms of governing-mechanism, I employ a suction pipe connection 22 in communication with the upper compartment 14, and a measured-water outlet pipe 23 in communication with compartment 15. In the form of Fig. 3, in addition to the parts mentioned is a valve 24 having its seat on the upper end of the hollow-plug and having its valve-stem 25 extended through the bonnet 11. The function of valve 24 is to control the flow of water from the compartment 14 into the hollow-plug 16. In the form of Fig. 2 I place a valve 26 outside of the casing connected up with the measured-water pipe 23 and in this construction 27 designates the passage leading to the vaporizer and 28 a waste-passage. In the form of Fig. 2 I provide the hollow-plug with a weir 29. Weir 29 should be preferably designed so that the amount of water flowing over it is directly proportional to the head of the column of water in compartment 14. These forms of governing-mechanisms are particularly designed for use in connection with a suction gas-producer in which the suction is produced by a gas-engine or some other form of exhauster. These two forms of governing apparatus connected up with the producer, etc., as shown, make use of the difference of pressure in the producer-gas system to vary the head of a column of water in the compartment 14, which variation produces a variable flow of water from compartment 14 into the hollow-plug 16, compartment 15, and thence to the vaporizer 9 by way of measured water-pipe 23. If desirable the variable quantity of water entering the water-pipe 23 may be passed directly to the producer instead of first being converted into steam.

The form of governing-mechanism shown by Fig. 5 is particularly adapted to be used with a producer in which the air admitted to the producer is introduced thereto under

pressure. It is also adapted for use in connection with the exhaust from a gas-engine. The form under consideration differs somewhat from the other two forms above described. In this form the reservoir or chamber 18 is closed instead of being open to the atmosphere, and the compartment 14 is open to the atmosphere by means of air-holes 14^a. 30 designates a pipe in communication with chamber 18, and this pipe may be either connected up with the exhaust from a gas-engine or with the pressure supply from the producer. 20 indicates the overflow-chamber, which chamber communicates with a trap 31. The lower compartment 15 is omitted in this construction and the variable flow of water from compartment 14, caused by the differences in pressure, flows to measured-water pipe 23 by way of hollow-plug 16. This form of governing or controlling-mechanism operates, when employed in the manner stated, to furnish a proportional quantity of water to the producer or to a vaporizer according to the proportion of air introduced or, if used in connection with a gas-engine, in accordance with the variation of load on the engine.

Fig. 6 shows the controlling-device connected up with a producer to which air under pressure is supplied to the producer. In this view, 32 designates a pipe through which the air under pressure is passed to the vaporizer 9, and 33 indicates a pipe connection leading to the closed chamber 18 of the governing-mechanism.

What I claim is,

1. In a gas producer system, the combination, with the producer, of means for introducing into the producer a quantity of water directly proportional to the quantity of air, comprising a controlling-mechanism having a receptacle containing a column of water, said receptacle disposed outside of the path of the generated gas, and a pipe in communication with the receptacle and with means in the system whereby the column of water is directly acted upon by the differences in pressure in the system to cause a variable flow of water from the receptacle into the producer.

2. In a gas producer system, a producer, a producer-gas outlet adapted to be connected with means for sucking air and water into the producer, a controlling-mechanism comprising a receptacle containing a column of water, said receptacle disposed outside of the path of the generated gas, and a pipe in communication with the receptacle and with means whereby the column of water is directly acted upon by the differences of pressure in the system to cause a variable flow of water from the receptacle into the producer.

3. In a gas producer system, the combination, with the producer, of means for intro-

ducing into the producer an equal proportion of air and steam comprising a controlling-mechanism having a receptacle containing a column of water, said receptacle disposed outside of the path of the generated gas, a pipe in communication with the receptacle and with means in the system whereby the column of water is directly acted upon to cause a variable flow of water from the receptacle, a vaporizer, means connecting the vaporizer and the controlling-mechanism, and means connecting the vaporizer and the producer.

4. In a gas producer system, the combination with a producer, of means for supplying steam to the producer in proportion to the quantity of air introduced comprising a receptacle divided into two water compartments, a passage connecting the compartments, a pipe in communication with one compartment and with the producer exit, a vaporizer in communication with the producer, and a pipe in communication with one water compartment and with the vaporizer.

5. In a gas producer system, the combination with a producer, of means for supplying steam to the producer in proportion to the quantity of air introduced comprising

a receptacle divided into water compartments, a passage formed with a weir connecting the compartments, a pipe in communication with one compartment and with the producer exit, a vaporizer in communication with the producer, and a pipe in communication with one water compartment and with the vaporizer.

6. In a gas producer system, the combination with a producer, of means for supplying steam to the producer in proportion to the quantity of air introduced comprising a receptacle divided into an upper water compartment and a lower water compartment, a water reservoir outside of the upper compartment and in communication therewith, a passage connecting the compartments, a pipe in communication with one compartment and with the producer exit, a vaporizer in communication with the producer, and a pipe in communication with one water compartment and with the vaporizer.

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

WALTER O. AMSLER.

Witnesses:

W. G. DOOLITTLE,
MARGARET HUGHES.