No. 698,063. Patented Apr. 22, 1902.

F. W. C. SCHNIEWIND.

PLANT FOR MANUFACTURING GAS.

(Application filed Aug. 29, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

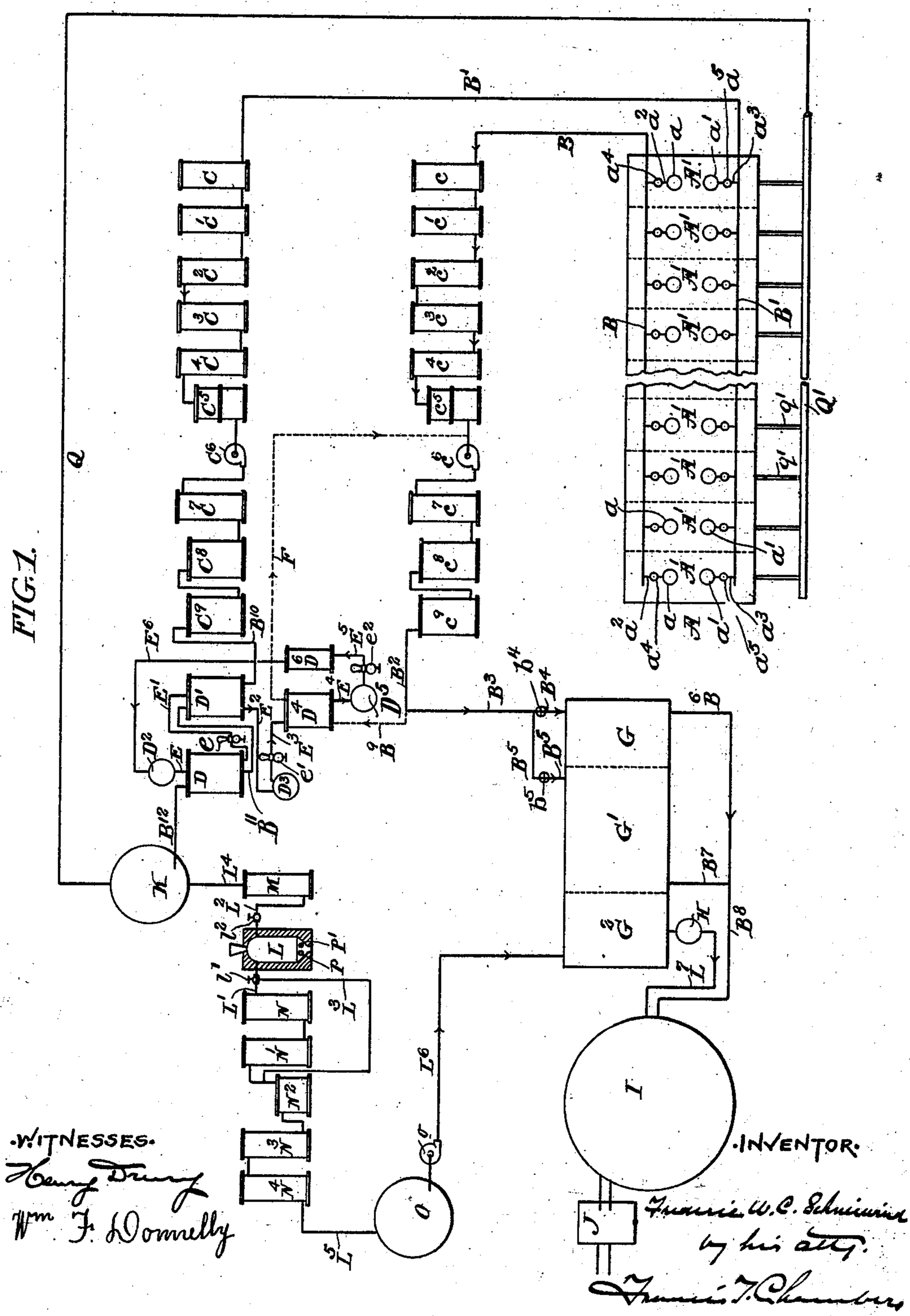

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FIG. 2.

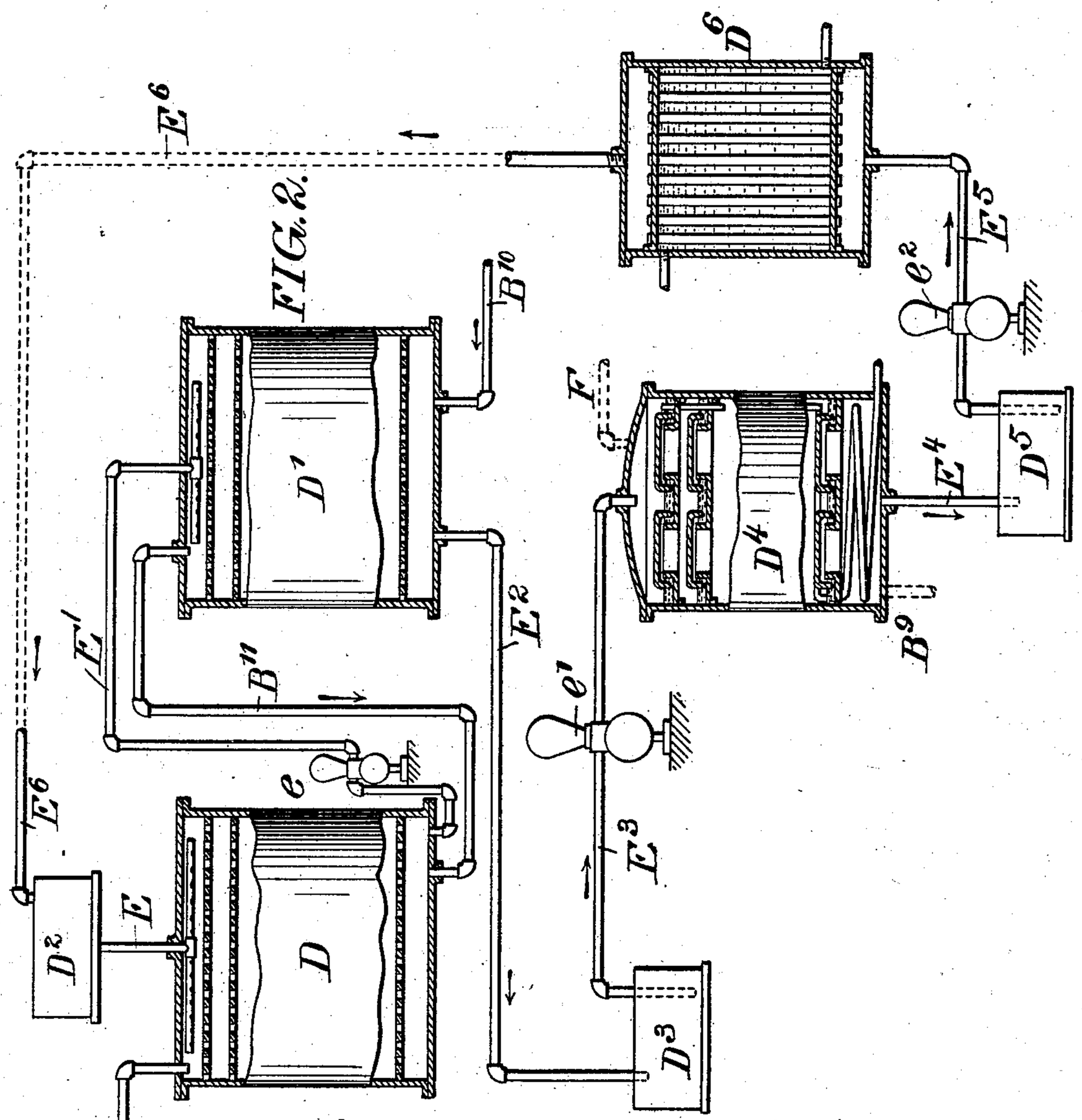
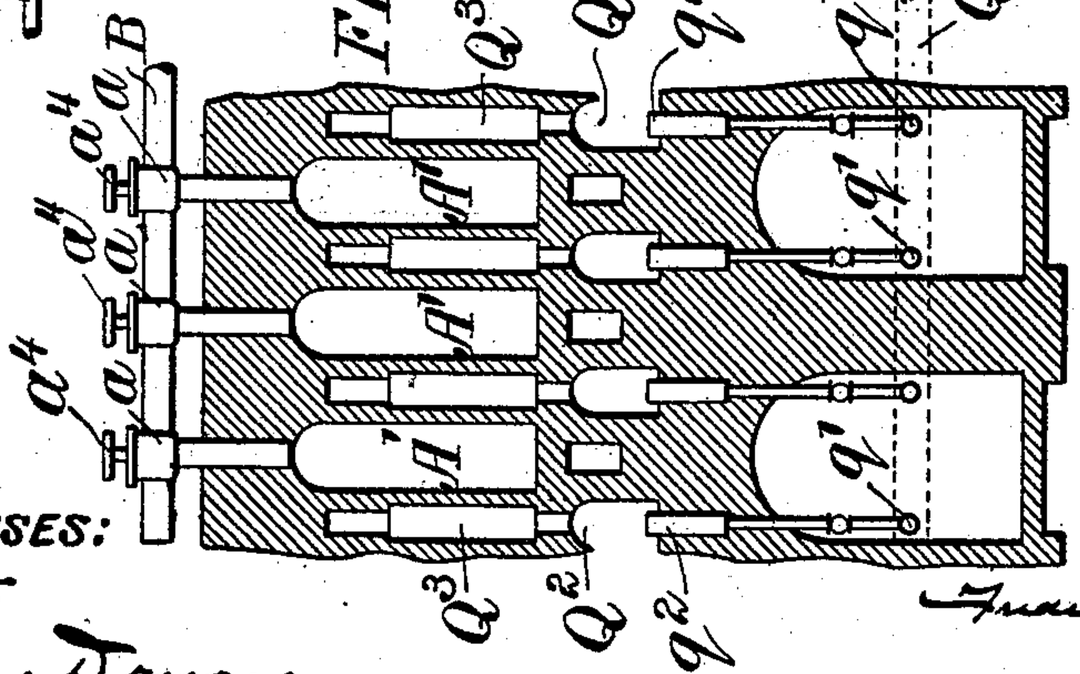


FIG. 3.



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PLANT FOR MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 698,063, dated April 22, 1902.

Application filed August 29, 1900. Serial No. 28,391. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC WILLIAM CHARLES SCHNIEWIND, a citizen of the United States of America, residing in the city, county, and State of New York, have invented a certain new and Improved Plant for Manufacturing Gas, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to apparatus for manufacturing gas, and is especially intended for use in applying a certain new method of manufacturing gas invented by me and forming the subject-matter of my other application for Letters Patent, filed August 29, 1900, Serial No. 28,390.

In my pending application, filed on the 8th of January, 1900, Serial No. 653, I have described a method of manufacturing gas in which gas produced in one or more, preferably a multiple, series of closed externally-heated retorts, such as coke-ovens, is divided into two portions, one of said portions being preferably richer in illuminants than the other, the one portion—that poor in illuminants—being then subjected to treatment to extract from it such illuminants as it contains, said illuminants being then mixed with the richer portion of gas in order to increase its illuminating power and the portion of gas robbed of its illuminants being preferably used to heat the ovens or retorts. This process, while affording a large amount of high grade and cheap illuminating-gas, is subjected to certain limitations as applied in practice—first, because a certain amount of gas being required to heat the ovens or retorts only the residual gas of that produced is available for use as illuminating-gas, and this under certain conditions is considerably less than the amount of gas which the available illuminants would enrich to a standard degree; second, the illuminating-gas thus produced being that derived from the earlier distillation of the coal is frequently largely contaminated with sulfurous impurities which are driven off in the earlier stages of the distillation, and therefore involves considerable expenses in its purification.

The object of my invention is to provide a suitable apparatus by which an increased amount of illuminating-gas may be produced and by which said increased volume of gas contains a smaller percentage of sulfurous impurities, and this I accomplish by providing a water-gas generator and connecting it so that it will deliver its produced water-gas into the receiver for the enriched gas produced in the ovens; also, preferably connecting said generator so that the producer-gas resulting from the blowing-up operation will be delivered into the receiver for the poor gas and delivered in admixture with said gas to the gas-furnaces heating the ovens. In this way I provide at the same time for an increased volume of rich gas, the actual volume being regulable so that any desired standard of illumination can be secured. The increased volume available is not only because of the admixture of the water-gas with the enriched portion of the gas, but also because a larger amount of surplus production of retort-gas is available for illuminating purposes, owing to the fact that the producer-gas takes the place of a certain percentage of retort-gas which would otherwise be necessary for heating the ovens.

The method above indicated forms the subject-matter of my before-mentioned application, filed August 29, 1900, Serial No. 28,390, my present invention being strictly limited to what is new in the apparatus especially devised for carrying said method into effect and which apparatus is illustrated in the accompanying drawings, forming part of this application, and in which—

Figure 1 is a diagrammatic view illustrating the plant as a whole; Fig. 2, an enlarged and partly-sectional view of a part of the apparatus used for extracting gas, and Fig. 3 a sectional view through the ovens and the furnaces provided for heating them.

A indicates the bank of coke-ovens, the individual ovens being indicated at A′ A′ and each of them being shown as provided with

two gas-outlet conduits, (indicated at a and a',) the respective conduits connecting through pipes a^2 and a^3 with the mains B and B', valves a^4 and a^5 being provided to close the connection with either main at will. The main B, through which the richer portion of the gas generated in the ovens is drawn, connects in the condensing-house with the usual apparatus, as indicated, said apparatus consisting of spray-washers c c', coolers c^2 c^3 c^4, a tar-scrubber c^5, an exhauster c^6, final cooler c^7, and bell-washers c^8 c^9, the gas treated in this apparatus passing then through the mains B^2 and B^3, through either one or both of the conduits B^4 and B^5, having valves b^4 b^5 and connecting with the purifying-chambers G and G', which in turn connect through the pipes B^6 and B^7 with the pipe B^8, leading to a receiver I. The other main B', into which the poor gases are delivered, passes through a similar condensing plant, (indicated at the top of Fig. 1,) thence through the pipe B^{10} into the oil-scrubber D', from which it passes through the pipe B^{11} to the second oil-scrubber D, passing thence through the pipe B^{12} to the poor-gas receiver K.

D^2 is a reservoir containing oil having the property of absorbing illuminants from gas and connected through a pipe E, having a spraying device at its end, with the head of the scrubber D, both the scrubbers D and D' being, as shown, fittted with a multiple series of transverse perforated partitions. From the bottom of the scrubber D the oil is drawn by a pump e through the pipe E' into the head of the scrubber D', and from the bottom of this scrubber the oil passes through the pipe E^2 to the reservoir D^3, from which it is drawn by the pump e' through the pipe E^3 into the top of the still D^4, in which the absorbed illuminants are driven off from the oil passing through the pipe F, while the oil freed of illuminants passing through the pipe E^4 into the receiver D^5, from which, as shown, it is drawn by the pump e^2 and forced through the pipe E^5, through the cooler D^6, and thence through the pipe E^6 into the reservoir D^2.

B^9 indicates a pipe through which a certain amount of gas is forced from the main B^2 into the still D^4, said gas facilitating the distillation of the illuminants and passing with them through the pipe F, preferably, as shown in Fig. 1, to a point in the condenser-house for the rich gas on the suction side of the exhauster c^6.

L indicates a water-gas generator of the usual type having air and steam pipes, (indicated at P and P'.)

L' indicates a gas-delivery passage for the water-gas, which connects with a reserve-holder O, as shown, through either the conduit L^3, the washer and condensers N^2 N^3 N^4, and pipe L^5, or through the carbureting plant, (indicated at the left-hand side of Fig. 1,) comprising, as shown, the carbureter and superheater N N', the washer N^2, and condensers N^3 N^4, the gas after leaving the carbureting plant passing through main L^5 to the reserve-holder O.

l' indicates the valve by means of which the gas-conduit pipe L' can be either closed or connected with the reserve-holder O, through either of the alternative connections described. From the holder O the gas is drawn by an exhauster o and forced through mains L^6 into the purifying-chamber G^2. Thence through the meter H and main L^7 it enters the receiver I, where it mixes with the enriched gas from the ovens.

The water-gas generator L has also a second gas-exhaust pipe L^2 for the producer-gas, said pipe having a valve l^2 and connecting through a washer M and pipe L^4 with the poor-gas holder K, where it mixes with the poor gas from the ovens. This poor gas is drawn through the main Q into the common delivery-pipe Q', which in turn connects by a series of pipes q' with burners q^2, (see Fig. 3,) said burners being situated in the gas-furnace chambers Q^2 Q^3, by means of which the ovens A' are heated.

The operation of my plant is practically indicated in the above description.

To recapitulate briefly, the ovens A' are connected when producing rich gas with the main B and when producing poor gas with the main B'. Both of these mains connect with condensing plants of usual type, by means of which the gases are partly purified and particularly are freed from tarry matter and from ammonia. The poor gas after being subjected to the condensing operations is deprived of its illuminants by being scrubbed with oil in the scrubbers D and D' and is then delivered into the holder K. The oil used for scrubbing the poor gas is drawn from the scrubbers into the still D^4, where the illuminants are drawn off from it, and conducted into the main or conduit carrying the rich gas from the ovens, preferably, as indicated, on the suction side of the exhauster c^6, and the enriched gases are then carried either through the purifying-chambers G and G', in accordance with the amount of purification necessary, and stored in the receiver I. While the gas produced by the fuel treated in the ovens is undergoing the foregoing treatment another body of carbonaceous material is subjected in the generator L to alternate blasts of air and steam. The gas produced while air is being used to blow up the generator is carried through the pipe L^2 and its connections to the poor-gas receiver K, while the water-gas produced when the steam is turned on is carried to the reserve-holder O, being first carbureted, if desired, and thence, through the purifying-chamber G^2, passes to the receiver I, where it mixes with the enriched gas from the ovens and is delivered to the city mains or point of use, passing through the meter-house J. The poor gas from the holder K is carried through the mains Q to the gas-fur-

naces heating the ovens A′ and utilized to carry on the coking operation in said ovens.

While my application is chiefly intended for use where the described treatment of the retort-gases is practiced and the illuminants absorbed from one portion of said gas are mixed with the other portion, it is also useful where no separation of illuminants is made, and as I believe the described combination of the retort system and water-gas plant to be new irrespective of the presence of the apparatus for extracting illuminants I therefore wish to claim it broadly.

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

1. A plant for manufacturing gas having in combination a series of externally-heated gas-retorts having gas-furnaces for heating them, two conduits, each connected to receive gas from one or more of the retorts, a connection from one of said conduits to the gas-furnaces and a connection from the other conduit to a gas-reservoir, a water-gas generator adapted to produce alternately water and producer gas, connections from said generator to the two conduits leading from the retorts and means as valves whereby the water-gas is directed into the reservoir and the producer-gas into the gas-furnaces.

2. A plant for manufacturing gas having in combination two or more externally-heated gas-retorts, two conduits, each connected to receive gas from one or more of the retorts, an apparatus for extracting illuminants connected to treat the gas passing through one of said conduits and to deliver the extracted illuminants to the other conduit, a water-gas generator and connections from said generator to the conduit carrying the enriched gas.

3. A plant for manufacturing gas having in combination two or more externally-heated gas-retorts having gas-furnaces for heating them, two conduits, each connected to receive gas from one or more of the retorts, an apparatus for extracting illuminants connected to treat the gas passing through one of said conduits and to deliver the extracted illuminants to the other conduit, a reservoir arranged to receive the gas treated for the extraction of illuminants, a water-gas generator adapted to produce alternately water and producer gas, connections from said gas-generator to the poor-gas reservoir and to the enriched-gas conduit and valves for directing the gases through either connection at will.

4. A plant for manufacturing gas having in combination a series of closed externally-heated gas-retorts, two conduits leading from said retorts and means for connecting said conduits with each retort at will, apparatus for extracting illuminants from gas arranged to connect with one conduit so as to treat the gases passing through it and to connect with the other conduit to deliver the extracted illuminants therein in admixture with the gases passing through it and a water-gas generator connected to deliver water-gas into the conduit containing the enriched gas.

5. A plant for manufacturing gas having in combination a series of closed externally-heated gas-retorts, two conduits leading from said retorts and means for connecting said conduits with each retort at will, apparatus for extracting illuminants from gas arranged to connect with one conduit so as to treat the gases passing through it and to connect with the other conduit to deliver the extracted illuminants therein in admixture with the gases passing through it, a water-gas generator, a carbureting plant, and connections from the water-gas generator to the conduit containing the enriched gas both direct and through the carbureter plant.

6. A plant for manufacturing gas having in combination a series of closed externally-heated gas-retorts provided with gas-furnaces for heating them, two conduits for the gas produced in the retorts, means for connecting each retort with either conduit at will, apparatus for extracting illuminants from gas connected to treat the gas passing through one conduit and to deliver the extracted illuminants into the gas in the other conduit, a reservoir arranged to receive the gas robbed of its illuminants and connected to deliver gas to the gas-furnaces heating the retorts, a generator adapted to produce alternately water and producer gas, a connection from said generator to the rich-gas conduit, a second connection from said generator to the poor-gas reservoir and valves whereby the said connections can be opened or closed at will.

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