

(No Model.)

2 Sheets—Sheet 1.

J. FLANNERY.
HYDROCARBON GAS GENERATOR.

No. 294,602.

Patented Mar. 4, 1884.

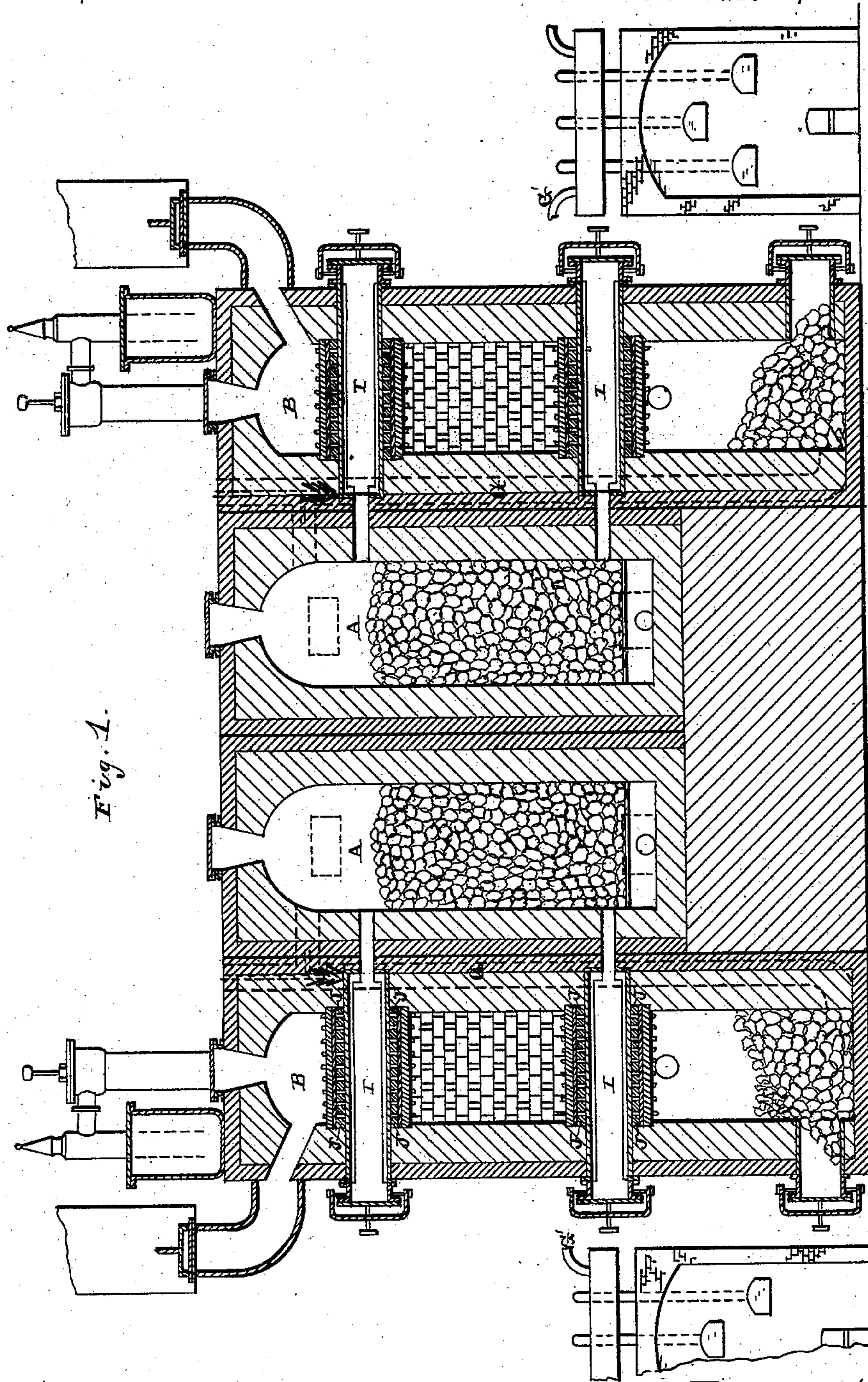


Fig. 1.

— WITNESSES. —

Louis F. Gardner
C. W. York,

— INVENTOR. —

Jos. Flannery
per
J. A. Lehmann,
att'y.

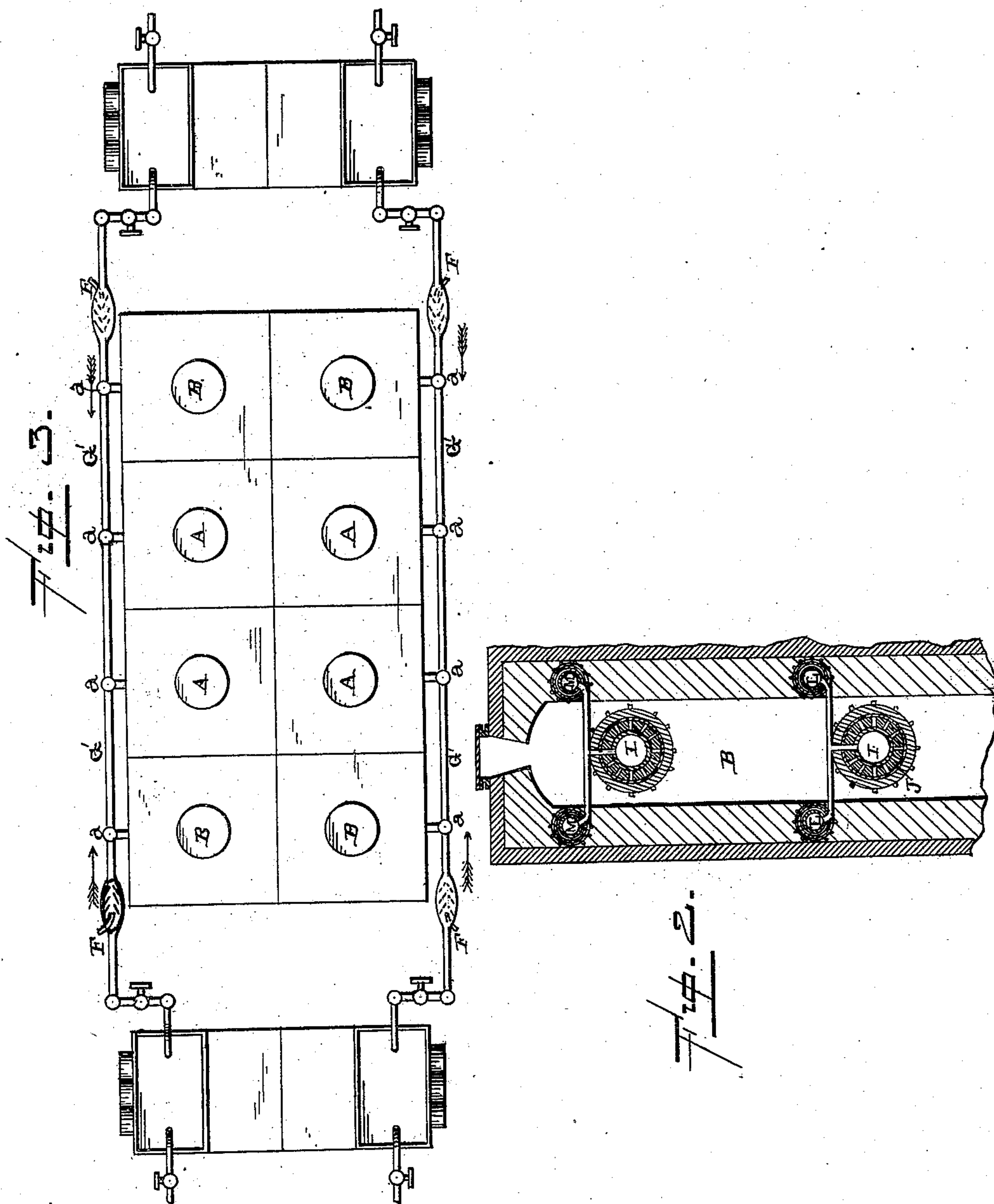
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— Inventor. —
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UNITED STATES PATENT OFFICE.

JOSEPH FLANNERY, OF PHILADELPHIA, PENNSYLVANIA.

HYDROCARBON-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 294,602, dated March 4, 1884.

Application filed March 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH FLANNERY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hydrocarbon-Gas Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in gas-generators; and it consists, first, in the combination of a series of gas retorts or generators, a pipe leading therefrom and connecting with the base on the generating-chamber, a steam-jet nozzle, which is placed in the pipe for exhausting the gas from the retorts or generators, and the generator-chamber in which the fire is made, and up through which fire the commingled steam and gas is made to pass for the purpose of fixing the gas; second, in the combination of the generator and regenerative chambers, both chambers having a fire made in them, and through both of which fires the gas is made to pass, a passage-way between the two chambers, and suitable retorts, which are passed through the regenerative chamber and connected with the generator-chamber; third, in the combination of the generator and regenerative chambers, located side by side, and connected together, the gas generators or retorts, a pipe connected with the retorts and the chambers, a steam-jet nozzle connected with the pipe, for exhausting steam from the retorts, and by-pass valves, whereby the gas directly from the retorts may be forced into either of the chambers; fourth, in the combination of the retort or chamber with the jacket and the filling of lead or other metal between the jacket and the retort.

One of the main objects of this invention is to dispense with the steam-boiler for the purpose of generating steam for running the engine, thus doing away with skilled labor required to run the engine and tending the boiler. Another object is to build a fire in the regenerating-chamber, and thus dispense with the additional chambers which have heretofore been used in the generation of gas.

Figure 1 is a vertical longitudinal section. Fig. 2 is a vertical section taken through the regenerating-chambers at right angles to Fig. 1. Fig. 3 is a plan view of my invention complete.

For the sake of compactness, two sets of my chambers are built in the same casing, as shown in Fig. 3. Each set will be operated independently of the other; but they may be connected, if so desired. In each set there will be two generator-chambers, A, and two regenerative chambers, B, which are connected together by a pipe or other connection, through which the gases generated in the chambers A will pass into the chambers B. In each of the generator-chambers will be made a fire, as fully described in my former patents, and each one of these chambers will be connected with a bench or series of benches of retorts in which coal or other gas will be made in the usual manner. The pipes leading from these retorts will be connected to one or both of the generator-chambers A, and these pipes will be provided with by-pass valves, by means of which the gas from the retorts may be turned into either the generator-chambers or the regenerative chambers, or both at once, if so desired. In order to exhaust the gas from the coal-gas retorts, a jet, F, is located in each of the pipes G', leading from the gas-retorts, and the gas and the steam are forced forward beyond the steam-jets into the bottom of one or both of the generator-chambers A. The pipe or pipes are provided with by-pass valves a, of the usual construction, so that when the conditions for making gas are lost in one generator-chamber the gas and steam may be by-passed into the other.

In the connecting-pipes G, between the chambers A B, will be placed the exhausting-jets H, which will operate in the manner fully described in an application filed by me, and bearing even date herewith. In the bottom of the regenerative chambers will be built a fire of graphite or other carbonaceous material, through which the gas and steam is passed. This fire is made in the bottom of this regenerative chamber, in place of in the bottom of the third chamber, D, as is fully shown and described in the patent granted to me February 8, 1881, and No. 237,663, and the ad-

5 advantages gained by this fire are fully enumerated in the said patent. By making this fire in this regenerative chamber I gain all of the advantages set forth in that patent, with
 10 the additional advantages that I am enabled to dispense with one or more chambers, and that I am enabled to make this regenerative chamber larger and use a greater amount of heat-absorbing material, and hence store up a
 15 greater quantity of heat, which will be utilized, as more fully described hereinafter.

In order to utilize the heat which is passing through this chamber B more quickly, I inclose the retorts I, through which oil and
 20 steam are passed, as fully described in my former patents, in inclosing-jackets J, and fill the intervening space between the jackets and the retorts with lead, or any other metal or amalgam of metals having a low specific heat.
 Outside of this inclosing-jacket will be placed
 25 fire-brick or other similar material, for the purpose of protecting this inclosing-jacket. This lead absorbs the heat and parts with it readily and quickly, and hence enables me to
 vaporize the oil or the water more quickly than can be done where the retorts alone are used. In order to enable the lead and the
 30 bricks or the fire-clay which encircle the jacket to part with the heat, I pass through the bricks or the fire-clay and through the filling of lead suitable metallic rods which are good conductors of heat. The inner ends of these rods will bear against the retorts or the jackets, and thus convey the heat from
 35 the surrounding portions of lead or fire-brick to the retorts much more rapidly than can be done where no such conductors are used. The fire-clay or fire-brick absorbs the heat slowly, but holds it with great tenacity, and these
 40 rods absorb and convey away the heat with great rapidity. Instead of retorts such as are shown in my former patents being used, I may take a series of pipes, which are run back and forth through the inclosing-body of lead, and
 45 they will then act in the same manner as the retort itself. I do not limit myself either to the retort or a series of pipes, for either one can be used at the will of the operator.

50 Heretofore in the manufacture of gas a steam-engine has always been required to run the blower, and hence skilled labor is required to run the engine and attend to the boiler. As the consumption of coal by the boiler is very great, it is a matter of the utmost im-
 55 portance, and especially where small plants are used, that the boiler and steam-engine should be gotten rid of. For this purpose I place a steam-vessel or evaporator, L, in the casing, or inside of the chamber B, into which
 60 the water will flow by gravity, and in which generator, boiler, or vessel the water will be converted partially into steam before it is introduced into the retort. In the same manner additional retorts or generators, M, are
 65 placed in the top of the chamber, and into which the oil will first run before passing into

the oil-decomposing retorts. The waste heat will be utilized in gradually reducing the oil to a vapor and a fixed gas, and gradually bring it to a state of destructive distillation, 70 thus increasing its illuminating-power. These additional steam and oil chambers, in which the oil and steam are first vaporized, will also be jacketed in lead or other metal, as above described, and for the same purpose. 75

Instead of using a steam-boiler to run the engine, I propose to use a gas-engine for the purpose of running the blower, and as no skilled labor is necessary to run one of these engines the cost of skilled labor in the pro- 80 duction of gas is greatly decreased.

Instead of losing the steam which has been used to exhaust the gas from the retorts, as has heretofore been done, the steam and the gas are conducted directly into the bottom 85 of the generator-chambers, and passed up through the fire for the purpose of removing the deleterious compounds existing in the gas. In the passage of the gas and the steam through the fire in the generative chamber, the steam 90 is decomposed into its elements, and the tarry vapors brought over in the gas are converted into a fixed gas, and the particles of solid carbon are absorbed by the excess of oxygen from the steam and are converted into carbonic 95 oxide. The gas taken directly from the retorts or generators and intimately commingled with steam which has already performed the useful function of having exhausted the gas from the retorts or generators, and then 100 passed through a fire in the bottom of the generator-chambers, and the heated refractory material beyond in the regenerative chamber, is not only robbed of its deleterious compounds, but has them converted into val- 105 uable illuminating and combustible qualities. By this treatment of the gas its purification, after leaving the regenerative chamber, is reduced to the lowest possible cost.

I am aware that jets of steam have been 110 used in gas-retorts for the purpose of exhausting gas from one retort to another, and for the purpose of forcing the gas in any desired direction, and this I disclaim. By my invention gas is not only exhausted from the gen- 115 erators, but new qualities are added to the gas, which is then forced through the fire in the generating-chamber for the purpose of fixing the gas.

Having thus described my invention, I 120 claim—

1. The combination of a series of gas re-
 torts or generators, a pipe leading therefrom and connecting with the base of the generat-
 ing-chamber, a steam-jet nozzle, which is 125 placed in the pipe for the purpose of exhausting the gas from the retorts or generators, and the generator-chamber in which fire is made, and up through which fire the commingled steam and gas is made to pass for the purpose 130 of fixing the gas, substantially as shown.

2. The combination of the generator-cham-

ber A and regenerative chamber B, both chambers having a fire made in them, and through both of which fires the gas is made to pass, a passage-way between the two chambers, and suitable retorts which are passed through the chamber B and connected with the chamber A, substantially as described.

3. The combination of the chambers A B, located side by side and connected together, 10 the gas generators or retorts, the pipe G, connected both with the retorts and the chambers, a steam-jet nozzle connected with the pipe for exhausting the steam from the retorts, and the by-pass valves a, whereby the

gas directly from the retorts may be forced 15 into either the chamber A or B, substantially as set forth.

4. The combination of a retort or chamber with a jacket and a filling of lead or other metal between the jacket and the retort, substantially as specified. 20

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

JOSEPH FLANNERY.

Witnesses:

J. W. GARNER,
GEORGE B. READ.