(No Model.) 2 Sheets—Sheet 1.

J. C. GARVIN & H. MOODY.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 397,639. Patented Feb. 12, 1889.

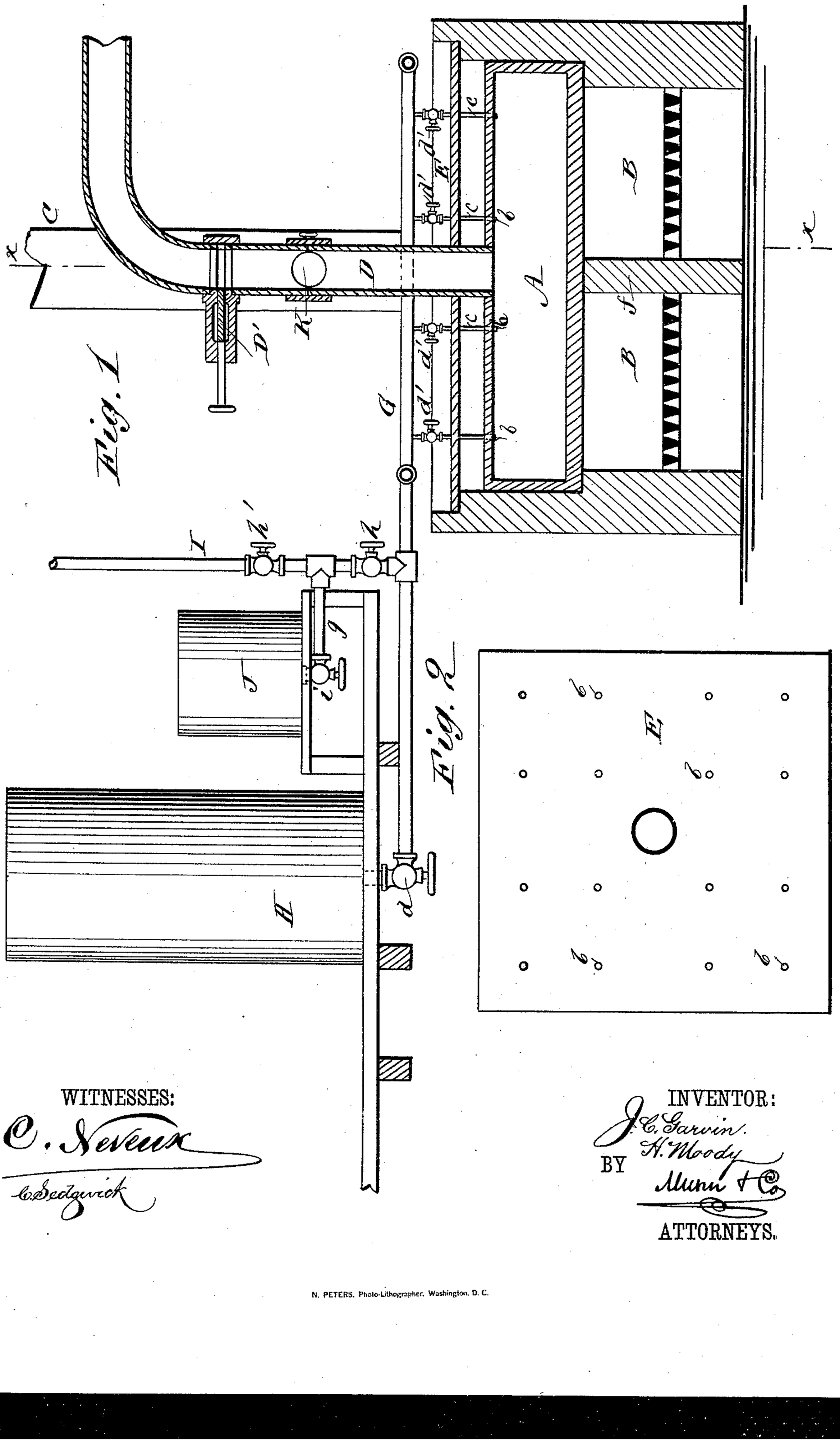

Fig. 1.

Fig. 2.

WITNESSES:

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Fig. 3.

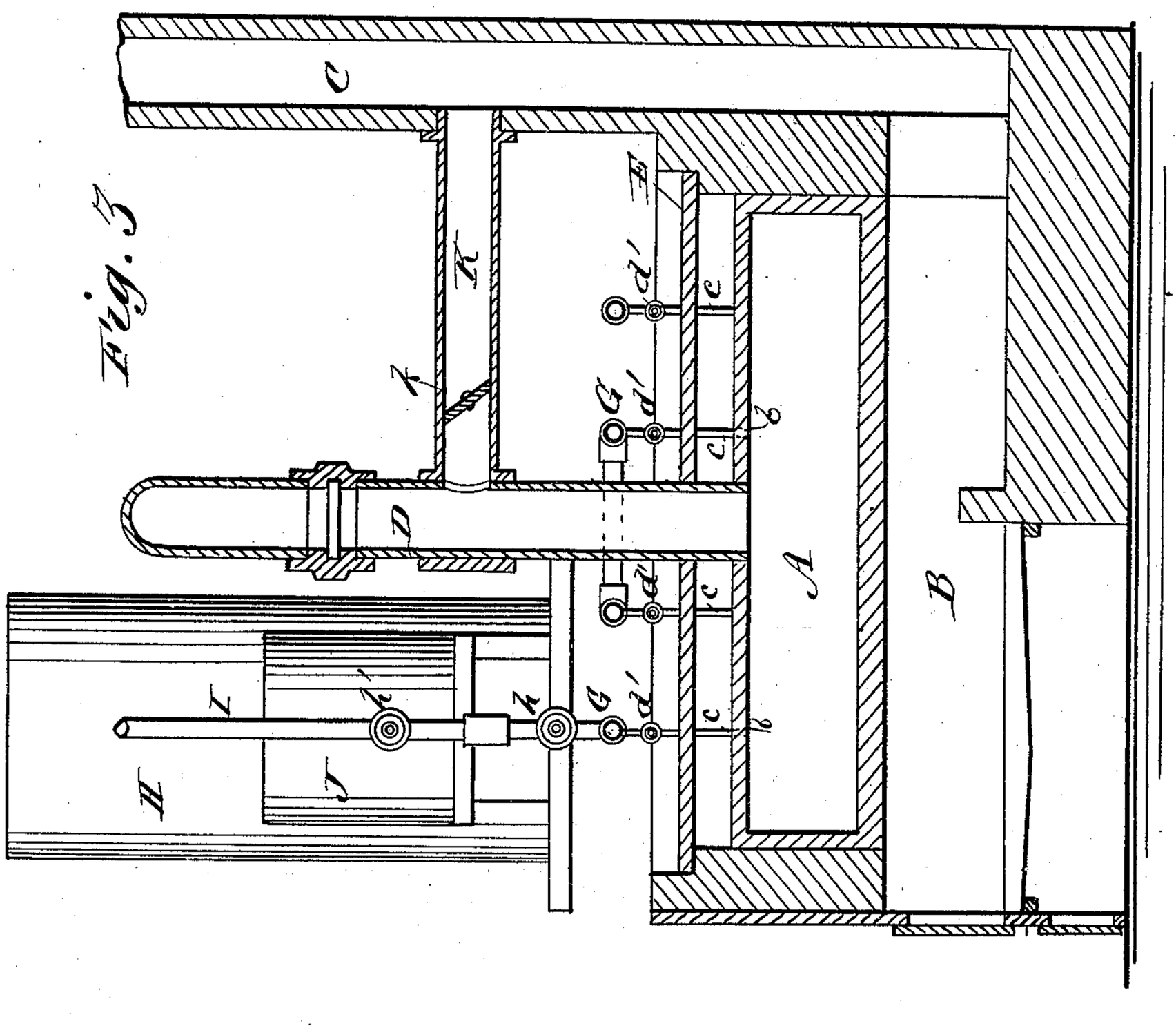
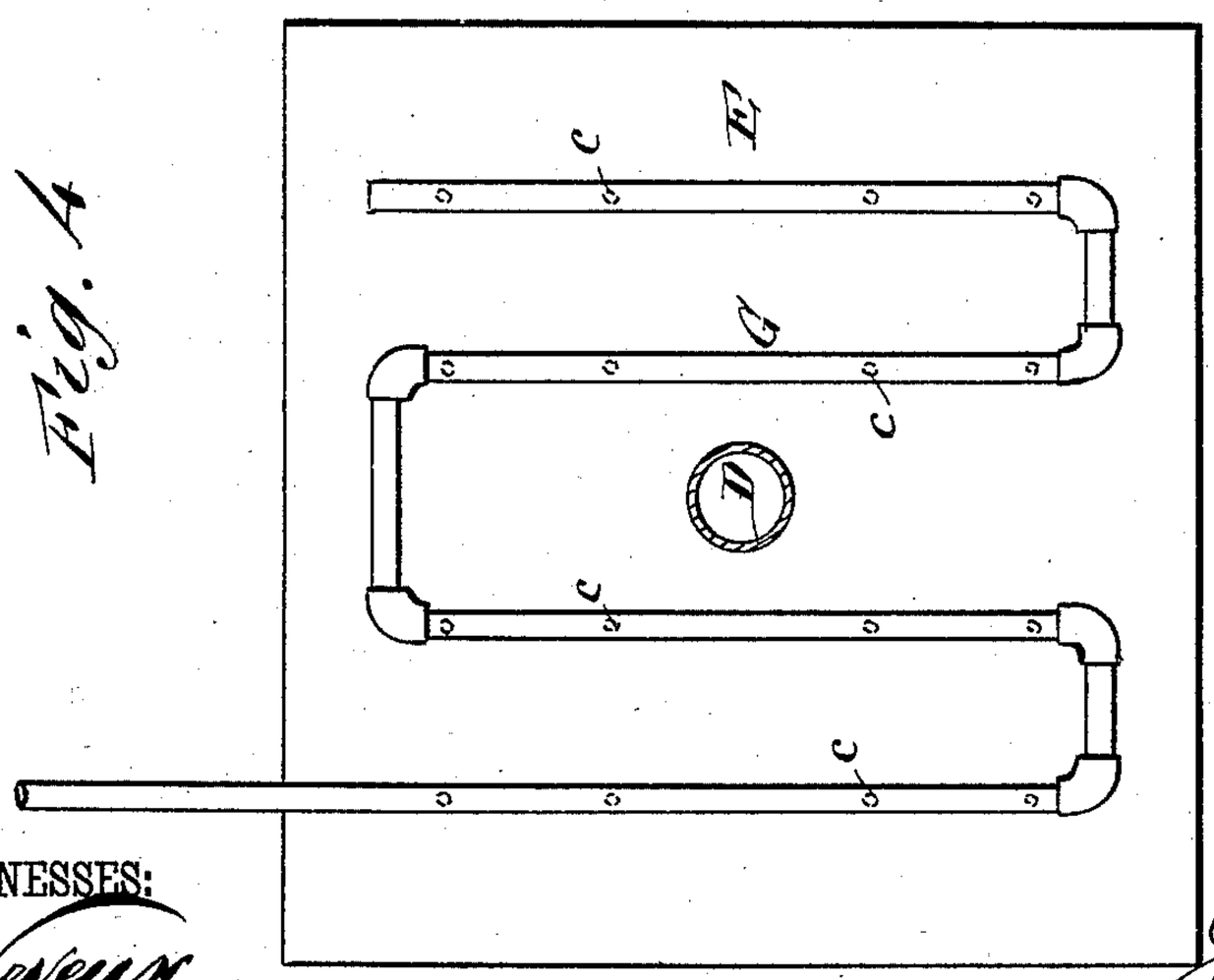


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN C. GARVIN AND HENRY MOODY, OF LEADVILLE, COLORADO.

APPARATUS FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 397,639, dated February 12, 1889.

Application filed March 31, 1888. Serial No. 269,124. (No model.)

To all whom it may concern:

Be it known that we, JOHN C. GARVIN and HENRY MOODY, both of Leadville, in the county of Lake and State of Colorado, have invented a new and useful Improvement in Apparatus for the Manufacture of Gas, of which the following is a full, clear, and exact description.

This invention relates to the manufacture of gas from hydrocarbon and other liquids for illuminating, heating, and other purposes by the bringing of the liquid into contact with suitably-heated surfaces to decompose or convert it into gas; and the invention consists in a novel construction of parts for producing the gas, and when the gas is made from hydrocarbon fluids—such as oils of various kinds—for cleaning the retorts and pipes connected therewith, without disturbing them, from time to time of deposits of foul matter, substantially as hereinafter described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a partly-sectional elevation of an apparatus embodying our invention. Fig. 2 is a plan view of a perforated slab which is used over the retort. Fig. 3 is a vertical section upon the line *x x* in Fig. 1; and Fig. 4 is a plan view of the slab which is used over the retort, with a distributing-pipe for the fluid or liquid to be converted into gas in its position over said slab.

A is the retort, set in a furnace, B, to which C is the chimney. This retort, which is here shown, is of a shallow square or rectangular construction, but which may be of circular or any other desired shape, is made of cast-iron, steel, or any other suitable heat-conducting material, and is provided with an aperture for the insertion or connection of a gas-exhaust pipe, D, fitted with a valve, D′, and is further provided with a series of fine perforations, *b*, in its top, into or through which a corresponding series of small feed-pipes, *c c*, are fitted to convey the liquid to be decomposed into the retort. These feed-pipes *c c*, which act as distributers of said liquid in fine and divided streams over the whole area of the bottom of the retort, pass through a correspondingly-perforated slab, E, arranged over the retort and forming a covering to the furnace, and connect at their upper or receiving ends with a main distributing-pipe, G, which, supposing the liquid to be converted into gas be oil, connects with a tank, H, containing oil. Said main distributing-pipe G and feed-pipes *c c* are fitted with valves *d d′* to open or shut off and regulate the supply of oil or liquid as required. The gas-exhaust pipe D connects with any suitable washer, condenser, and gas-holder.

As soon as the base of the retort A is heated to a cherry-red heat or thereabout, the valves *d d′*, controlling the main supply or distributing pipe G and feed-pipes *c c*, are opened, and the liquid or oil from the tank H flows by gravitation or injection in fine streams through the several feed-pipes *c c*, down onto the heated base of the retort A, which causes it to be decomposed and converted into gas that passes off through the exhaust-pipe D to a washer, condenser, and gas-holder, the valve D′ being opened. The valves *d′*, which serve to regulate the feed of oil through the small pipes *c c*, are for convenience and accessibility arranged upon or above the exterior of the furnace cover or slab E, that may be made of metal or other suitable material, and to prevent the several streams of oil from commingling and so reducing the temperature of the base of the retort below the heat necessary to produce the gas the apertures *b* in the retort, into which the feed-pipes *c c* fit, are placed somewhat widely apart.

The furnace cover or slab E, which may be of any suitable thickness, has, when made of metal, for instance, a signal advantage over a brick or stone furnace covering in that it is readily removable and replaceable without interfering with the general structure of the furnace.

When coal or coke is used as fuel, the dividing-wall *f* (shown as a central cross-support to the retort) may be dispensed with in the furnace.

As in using oil to make the gas there will always be more or less tendency of the retort and its pipe-connections to clog or foul by

reason of decomposed matter being deposited therein, the following additions are made to the apparatus:

I is a pipe through which steam is conveyed from a boiler and which connects below with the oil or liquid supply pipe G, and above such connection with a receptacle, J, by a branch pipe, *g*. This pipe I is fitted with valves *h h'*, arranged respectively above and below or on opposite sides of the branch connection *g*, which latter has also a valve, *i*.

A flue, K, with a valve, *k*, connects the exhaust-pipe D with the chimney C.

The receptacle or cistern J is charged with saltpeter in solution, which is used for the purpose of removing the deposit or clogging or fouling matter within the retort and its connecting oil-pipes. To do this, the valve *d* of the oil-supply pipe G is closed, as is also the valve D' of the gas-exhaust pipe D, and the valves *i*, *h h'*, and *k*, controlling the saltpeter receptacle J, steam-pipe I, and the flue K opened. This will cause the steam entering by the pipe I to carry the saltpeter solution from the receptacle J through the oil-pipes and into the retort and to effectually remove all clogging matter by vaporizing it and causing it to pass off by the flue K into the furnace-chimney C.

To manufacture water-gas by the apparatus, a duplicate retort, but without the perforations *b b* and feed-pipes *c c*, should be added, connecting with the first retort by an exhaust-pipe. Steam being admitted by the pipe I into the retort A along with the oil from the tank H, any suitable pump, injector, or inspirator and water-tank being used in connection. The gas from the first retort will then pass over the red-hot surface of the second retort and out at its other side and through a washer and condenser into a gas-holder.

If desired, too, the apparatus in part may be utilized for the generation of steam by the combination with the furnace of the retort, its feed-pipes and valves, a water-pipe and valve, a pump, injector, or inspirator, and a suitable water-tank.

As the entire working area of the retort is brought into direct and equidistant exposure at all points in the furnace, it will be seen that the cherry-red heat, which is the proper heat for the decomposition of the liquid hydrocarbons, is readily secured and maintained, especially when gas is the fuel used in the furnace, and it is generally our intention to employ the gas manufactured by the apparatus for that purpose. A certain fixed and steady heat is essential for the decomposition of oil into a permanent gas, and this our apparatus effectually accomplishes.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for the manufacture of gas, the combination, with the furnace, of the retort A, arranged above said furnace, provided with a series of perforations, *b*, in its top, and an exhaust-pipe, D, connected therewith, the perforated slab E, arranged over the retort and forming a cover for the furnace, the oil-tank H, the oil-supply pipe G, connected to said tank H, provided with a valve and the series of feed-pipes *c*, said pipes connected with the supply-pipe G at one end and passed through the perforated slab E and entered through the perforations *b* into the retort, substantially as and for the purpose described.

2. In an apparatus for the manufacture of gas, the combination, with the furnace, the retort A, mounted in the top of said furnace, the oil-tank H, a supply-pipe, G, connected therewith, provided with a valve, *d*, the series of oil-feed pipes *c*, having valves *d'*, connecting the supply-pipe with the retort, the gas-exhaust pipe D, provided with a valve, D', and the furnace-flue K, provided with a valve, *k*, of the liquid-detergent-holding receptacle J, and the steam-pipe I, connected with said receptacle, and oil-supply pipe and valves controlling said steam-pipe and receptacle J, all arranged substantially as and for the purpose specified.

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Witnesses:
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