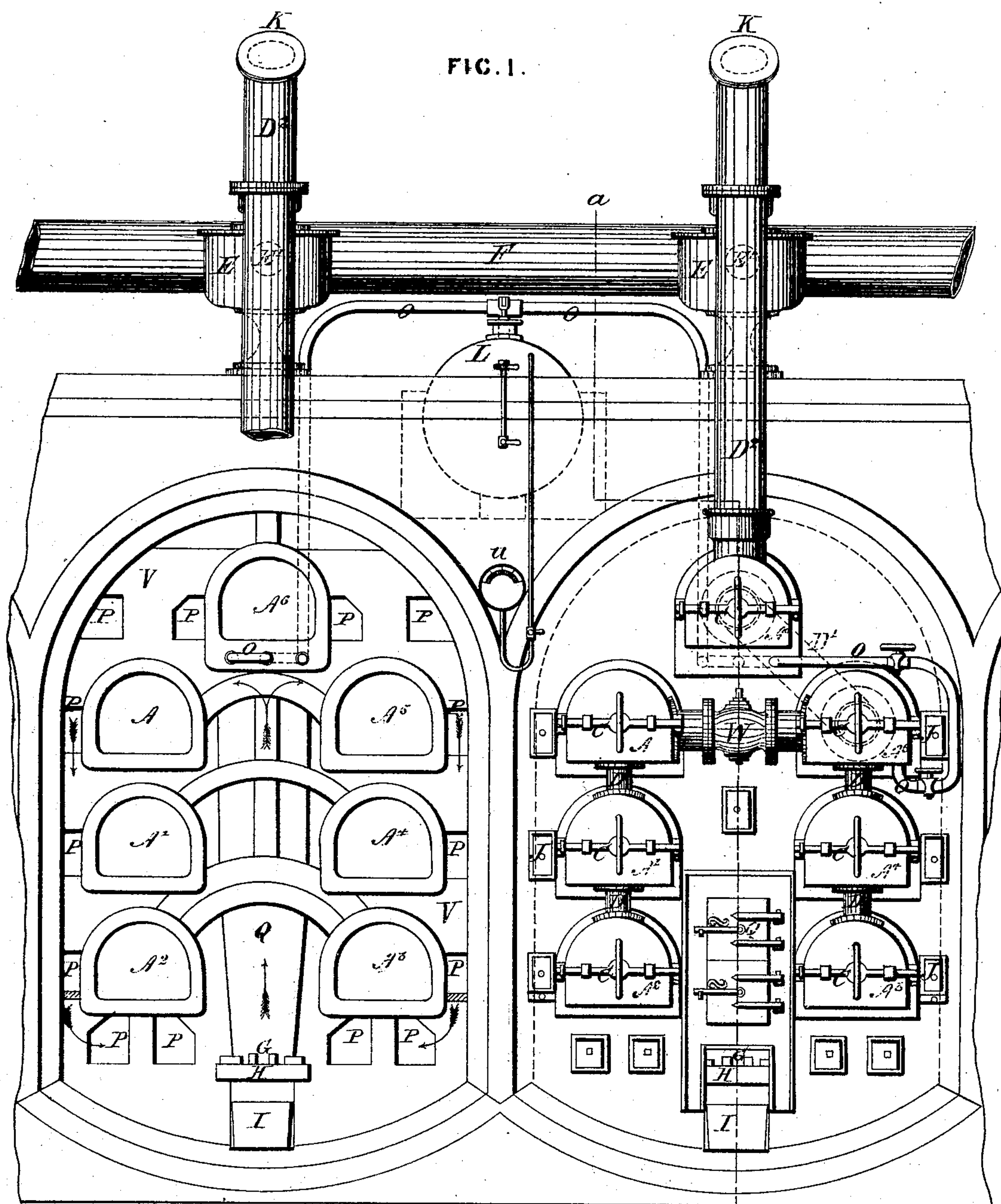


H. SKOINES.
Manufacture of Gas.

No. 145,021.

Patented Nov. 25, 1873.



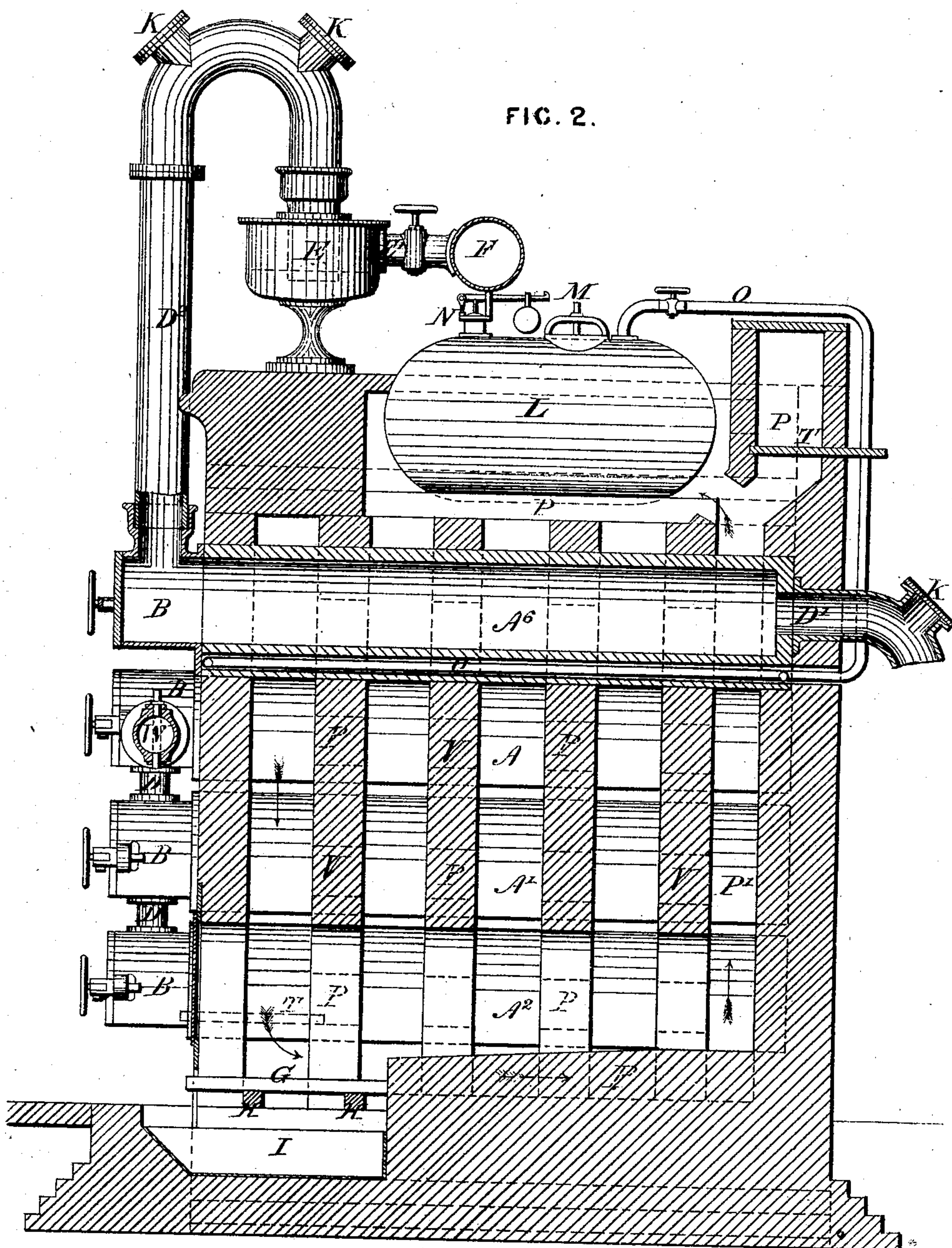
Witnesses, Thomas McIlhenny
Harry Smith

Henry Skornes
By his Atty.
Housar and Son

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UNITED STATES PATENT OFFICE.

HENRY SKOINES, OF LONDON, ASSIGNOR TO WALTER SANDELL MAPPIN,
OF STANLEY CRESCENT, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF GAS.

Specification forming part of Letters Patent No. **145,021**, dated November 25, 1873; application filed
October 8, 1873.

To all whom it may concern:

Be it known that I, HENRY SKOINES, of Argyle street, King's Cross, London, Kingdom of Great Britain and Ireland, have invented Improved Processes and Apparatus for the Manufacture of Illuminating and Heating Gas, of which the following is a specification:

The object of my invention is to produce gas, whether for illuminating or for heating purposes, of better quality and more economically than has heretofore been usual. For this purpose, I subject cannel-coal, peat, petroleum, or analogous gas-producing substances, in any suitable retort or retorts, to the ordinary process of coking or first carbonization, and I remove the sulphur and ammonia and convert into gas certain resulting products heretofore treated as residues, by causing the whole of the crude gases, vapors, or products, as they arise or issue from the coal or carbonaceous substance in the coking retort or chamber, to pass with superheated or other steam, or with water, into a separate retort or chamber charged with chalk or analogous material in a highly-heated state, which highly-heated chalk or analogous material will retain the sulphur and ammonia, the aqueous products, tar, and ammoniacal liquor deposited on the chalk or its substitute being taken up by and combined with the superheated or other steam, thus forming gases. The gases from this retort or chamber I cause to pass into another or final retort or chamber charged with coke, or other suitable carbonaceous material, in a highly-heated state for amalgamating such gases and rendering them one homogeneous and permanent gas. I use three or more retorts in a suitable setting, as usual, but, instead of connecting each retort directly with the hydraulic main by a separate ascension-pipe, I connect the retorts together, by special connections, in sets or series in such manner that the several operations above mentioned may be performed systematically or in their turn, and I so construct the setting that a portion of the heat from the retort-furnace may, if so desired, be utilized for generating in a suitable generator, and, when required, superheating the necessary steam, which is con-

veyed, through pipes, into the intermediate retort, into which also the steam flows in close proximity to the products entering from the coking or first carbonizing retort.

I may sometimes pass air, water, or superheated or other steam through the retort or chamber containing highly-heated chalk or analogous material or materials, and pass the resulting gases through the retort charged with highly-heated coke or analogous substance, as aforesaid, and thence while in a highly-heated state, through the retort charged with cannel-coal, bitumen, or other analogous substances, after which the gases may be passed through vessels or tanks containing tar, tallow, petroleum, or other suitable oleaginous substance, taking care to exclude air from the tanks or vessels during the process.

Illuminating-gas may be made by this process, dispensing with the use of the retort charged with cannel-coal, bitumen, or analogous substances, and passing the heated gases directly from the retort charged with coke or analogous material through the tanks or vessels containing the tar, tallow, petroleum, or other oleaginous substances.

Figure 1 shows, in front elevation, my plan of arranging the retorts when two benches or beds of seven retorts each are placed side by side, one bench being shown with the front wall and retort mouth-pieces removed, and the other bench being shown complete. Fig. 2 is a vertical section at right angles to Fig. 1, and taken in the line *a b* of that figure.

$A A^1 A^2 A^3 A^4 A^5 A^6$ are retorts, which may be made of iron, clay, or other suitable materials, and set in the usual manner. They are provided with mouth-pieces *B*, furnished with lids secured by ordinary cross-bars *C*, and screws. *D* are pipes between the mouth-pieces, connecting the retorts together. *W* is a valve, which is opened when the whole of the seven retorts are worked, the retorts $A A^1 A^2$ being shut off from the others when the valve is closed. The upper or final retort of each bench or bed is connected to the retorts beneath it by a pipe, D^1 . D^2 are the ascension-pipes from the upper or final retorts, and dip into the hydraulic sealing-vessels *E*, which

are connected by pipes E' to the gas-main F; but the pipes D² may, if preferred, be arranged to dip into a hydraulic main of the ordinary kind. G are the fire-bars, resting upon bearing-bars H, and having ash-pans I below them. L is a steam-generator, formed with a man-hole, M, and provided with a safety-valve, N, and steam-gage U. From this generator to each bench or bed of retorts is a steam-pipe, O, which, after passing to and fro within the bed of the final retort A⁶, terminates within the intermediate retort A⁵.

The flues P are arranged so that the products of combustion from either of the furnaces Q, after acting upon the retorts, may be brought into contact with the steam-generator L, besides superheating the steam contained in the pipes O within the beds of the final retorts. The products from each furnace travel up between its two rows of retorts, striking against the under part of the final retort; thence they divide and descend on the outer sides of the retorts, after which they enter near the front a couple of flues, which pass under the two lower retorts to the back of the setting, and which conduct the products to the back flue P', whence they travel in a horizontal direction around the lower part of the steam-generator to the chimney, suitable dampers being used for regulating the draft, as will be readily understood.

V are the blockings; J, the sight-boxes; K, the cleaning-doors; and T are the dampers.

The retorts A A¹ A² A³ A⁴, in the arrangement shown, are carbonizing or coking retorts; but, to make my process clearly understood, I will suppose only the three retorts or chambers, A⁴ A⁵ A⁶, to be used.

The retort A⁴ is charged with cannel, or coal, or bitumen, or peat, wood, and paraffine, or with other analogous material, the crude gas or vapor or rising products from which will pass up, by the pipe or connection D, into the intermediate retort or chamber A⁵, which is charged with chalk or analogous material,—preferring chalk in small lumps—so as to present to the gas as much highly-heated porous surface as practicable. The highly-heated chalk or porous material will absorb the sulphur and ammonia, the aqueous products—tar and ammoniacal liquor—being taken up by the steam flowing in by the pipe O, or it may be by steam formed within the retort A⁵ by introducing water into it.

By this admixture of steam with the aqueous products—tar and ammoniacal liquor—in the retort A⁵, charged with highly-heated chalk or analogous material, as aforesaid, gas is formed.

From the retort or chamber A⁵ the gases pass, by the pipe D', to the upper or final retort or chamber, A⁶, containing coke, brick, iron-stone, furnace-slag, or analogous material or materials, which will render the gases

homogeneous and permanent. From this final retort A⁶ the gases may be conducted to the condenser, purifier, and holder in the usual way.

In some cases I may reverse the process—that is to say, instead of passing the products from the coking or carbonizing retort A⁴ through the chalk or analogous substances in the retort A⁵, I may simply pass air, superheated or other steam, or water through the chalk or analogous material in the retort A⁵, and through the coke or analogous substance in the retort A⁶, and the resulting gases may afterward be caused to pass, while in a highly-heated state, through the highly-heated retort A⁴ charged with cannel-coal or analogous material, and, if it be desired to still further enrich the gas, it may be passed from the retort A⁴ through tar, tallow, petroleum, or analogous oleaginous substance, in suitable tanks or vessels.

In carrying out that part of my invention which has reference to the manufacture or production of illuminating-gas from tar, tallow, petroleum, or analogous oleaginous substances, the gases produced, by passing air, water, or superheated or other steam through the highly-heated chalk or analogous substance, and thence through the final retort, as hereinbefore described, on leaving the final retort, instead of being conducted to a condenser, are caused to pass, in their heated state, through the tar, tallow, petroleum, or analogous material, which, for this purpose, may be placed within the hydraulic main, the gas-pipe dipping into them, or special tanks or vessels may be provided, taking care to exclude atmospheric air.

I am aware it has before been proposed in the manufacture or production of gas to employ superheated steam, and to illuminate it by means of cannel or petroleum spirit, to which I lay no claim; nor do I claim the use of the several substances hereinbefore mentioned or referred to, except when the same are used in and for the purposes of my invention.

I claim—

1. The process of treating the crude gases, vapors, or products arising from the coking or first carbonization of cannel-coal and analogous substances, by introducing such products, with superheated or other steam, or with water, into retorts or chambers charged with chalk or analogous material in a highly-heated state, as above described.

2. The above-described process of manufacturing or producing gas for illuminating or heating purposes by coking or carbonizing cannel-coal or analogous substances in coking retorts or chambers, treating the resulting gases, vapors, or rising products with superheated or other steam, or with water, in other or intermediate retorts or chambers containing chalk or analogous material for absorbing the sulphurous compounds and am-

monia, and amalgamating the gases in final retorts or chambers charged with coke or analogous substance.

3. The process of manufacturing or producing gas by passing air or superheated or other steam through a retort or chamber charged with highly-heated chalk or analogous material, thence through a retort or chamber charged with highly-heated coke or analogous

substance, and afterward through a highly-heated retort charged with cannel-coal or analogous substance, as above explained.

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