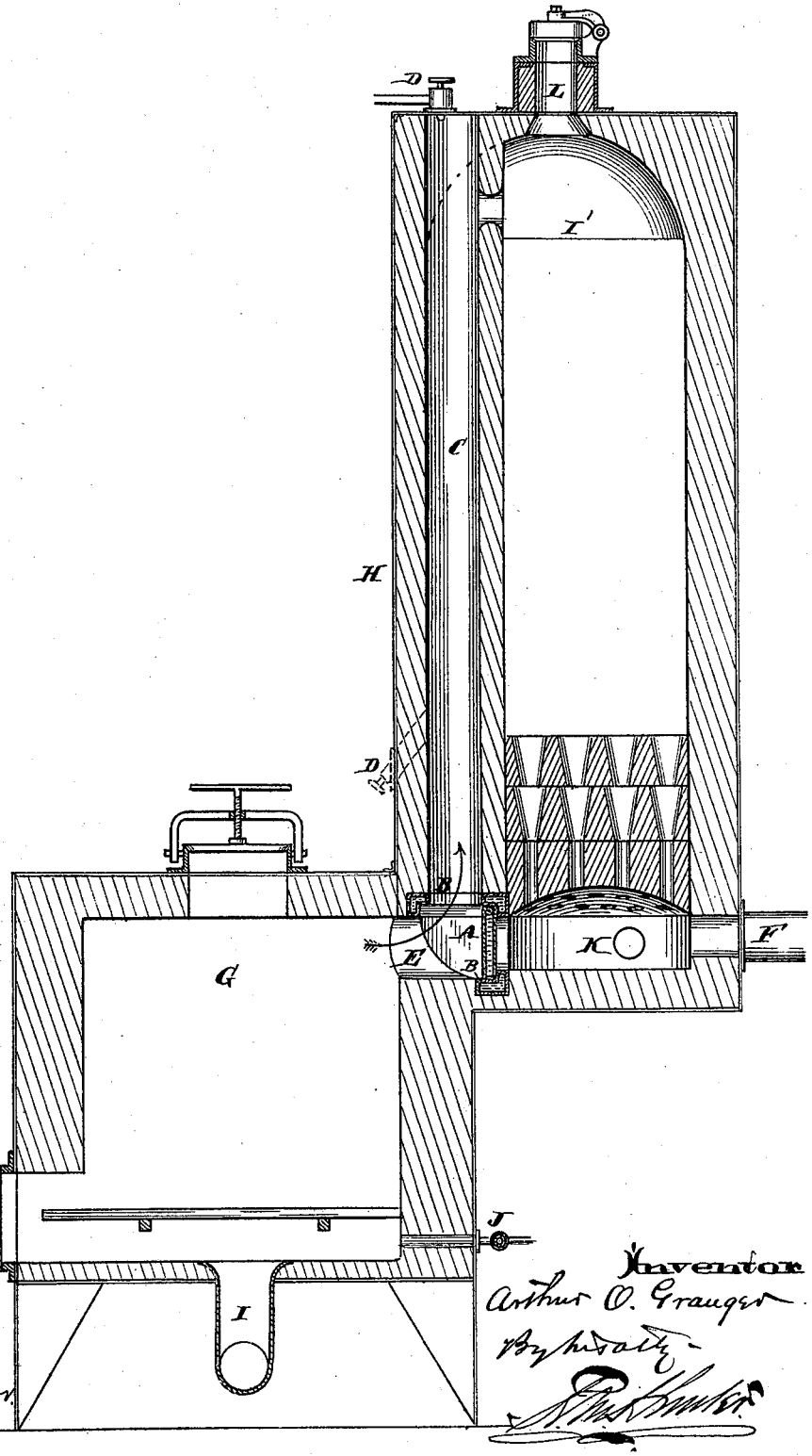
(No Model.)

A. O. GRANGER.

PROCESS OF MANUFACTURING GAS.

No. 418,711. Patented Jan. 7, 1890.



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UNITED STATES PATENT OFFICE.

ARTHUR O. GRANGER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE UNITED GAS IMPROVEMENT COMPANY, OF SAME PLACE.

PROCESS OF MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 418,711, dated January 7, 1890.

Application filed June 2, 1885. Serial No. 167,384. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR O. GRANGER, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in the Process of Manufacturing Gas, of which the following is a specification.

My invention has reference to a process for the manufacture of water-gas; and it consists in first heating up a bed of carbon in a generator, and with the products of combustion therefrom heating up a superheater or fixing-chamber by internal combustion, then passing steam into the bed of carbon-producing water-gas, then passing the water-gas mixed with carbureting-fluid through the superheater, entering at the end where it is least hot, and causing it to pass through the superheater, gradually entering a zone of greater temperature, until it finally escapes to the washer or holder from the end which is hottest, as is fully set forth in the following specification and referred to in the claim.

The object of my invention is to insure the illuminating-gas passing into the superheater at the least hot portion and leaving the same at its hottest part, by which the thorough decomposition and fixing of the gases result, and at the same time the production of lamp-black is entirely overcome. In apparatus in which the hydrocarbon vapors or liquids are caused to enter the superheater at its hottest portion part of the hydrocarbon is instantly converted into lamp-black and fixed upon the filling or lining of the superheater. By overcoming this production of lamp-black I greatly increase the production of illuminating-gas, as well as improve the working of the apparatus.

In the drawing is shown a sectional elevation of water-gas apparatus in which to carry out my improved process.

H is a superheater, and G is a generator, which are connected together in any suitable manner, as by the connecting flue or passage-way E, which opens from the top of the generator into the bottom of the superheater, or by an auxiliary flue connecting with the upper part of the said superheater. The generator is provided, as usual, with the blast-pipe I and the steam-pipe J, preferably entering below the grate-bars.

The superheater H is provided with a lower combustion-chamber K and auxiliary flue C, connecting the flue E with the upper part of the said superheater and above the filling I'.

A is a water-cooled valve and works on the water-cooled seat B, and is adapted to close the entrance to the chamber K or the flue C, by which the product from the generator may be caused to pass either into the chamber K or the flue C, as desired, thus causing the said products to pass into the top or bottom of the superheater.

L is the smoke-outlet opening from the top of the superheater, and F is the gas-outlet opening from the chamber K and connecting with the usual water seal or washer.

D is the hydrocarbon-spraying nozzle, which admits hydrocarbon fluid into the upper part of the superheater, preferably where the water-gas, which passes through the flue C, enters the superheater. If desired, the fluid hydrocarbon may be admitted anywhere in the flue C or in the superheater proper, or it might be admitted in the generator.

In making gas the valve A is turned up, so as to close the flue C and open the passage-way from the generator into the bottom of the superheater or its chamber K. The smoke-outlet L is opened and the blast from pipe I is turned on. The coal in the generator is brought to incandescence by the blast from the pipe I, and the products are caused to pass into the chamber K and are burned therein, the products therefrom passing up through the filling or internal brick-work of the superheater and escaping by the chimney-outlet. The air-blast from pipe I is then shut off, chimney L is closed, and valve A turned so as to close the entrance to the chamber K from the generator and open the auxiliary flue C. Steam is then admitted from pipe J, which in passing up through the generator is decomposed, forming carbonic oxide and hydrogen, which are conducted up through the flue C to the upper end of the superheater, where they are preferably brought in contact with a carbureting-fluid from nozzle D, and the mixed gases then pass down through the superheater, entering that portion thereof which is least hot and emerging from that part which is hottest, becoming thoroughly incorporated and fixed into an illuminating-gas, which then

passes off by flue F through the usual water seal to the holder, if desired, preferably passing through purifying apparatus before reaching the said holder.

If desired, the auxiliary flue C might be separate and distinct from the superheater and built in the form of an external tube, and in place of one valve A two valves may be used, one controlling the entrance to the bottom of the superheater or chamber K, and the other the auxiliary flue thereof; and it is evident that the smoke-outlet might be from pipe F and the gas-outlet from L; but of course in this case the hydrocarbon-nozzle D would be located at the bottom of the superheater or in the chamber K, the principle involved being identical with that hereinbefore described.

It is immaterial to my invention what the construction of the generator may be or what location may be given to the gas-outlet or the steam and blast pipes.

In this application I do not claim the apparatus, as that forms subject-matter of an application of mine filed January 9, 1885, Serial No. 152,385.

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

The process of manufacturing gas which consists in raising a body of carbonaceous material to a high degree of heat by burning it with air, and at the same time burning the gaseous products of combustion with air and highly heating a body of refractory material, then suspending the combustion and introducing directly into the coolest portion of the heated refractory material hydrocarbon liquid, causing it to pass through the refractory material in a direction the reverse of that in which the products of combustion passed through during the process of heating, then at the same time causing steam to pass through the highly-heated carbonaceous material and be decomposed into carbonic oxide and hydrogen gas, then causing such gas as fast as it is generated to pass through the refractory material in the same direction and in company with the hydrocarbon liquid, and thereby combine with the vapors and gases of the hydrocarbon as they are generated by contact of the oil with the refractory material at successively increasing temperatures.

In testimony of which invention I hereunto set my hand.

A. O. GRANGER.

Witnesses:
WILLIAM C. MAYNE,
R. M. HUNTER.