(No Model.)

T. B. STILLMAN.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 377,694. Patented Feb. 7, 1888.

Fig. 2.

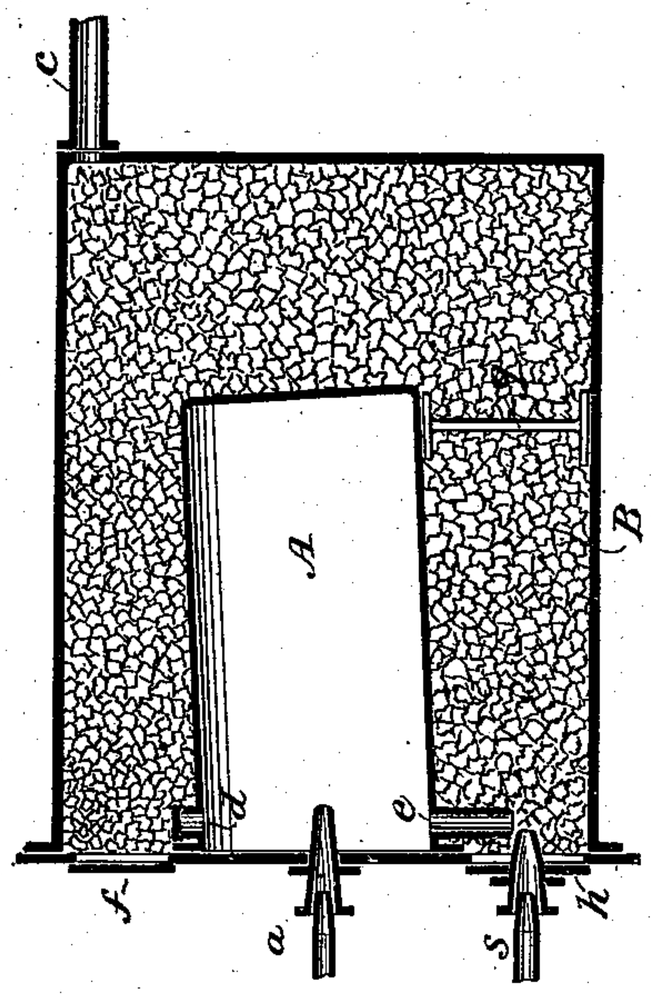
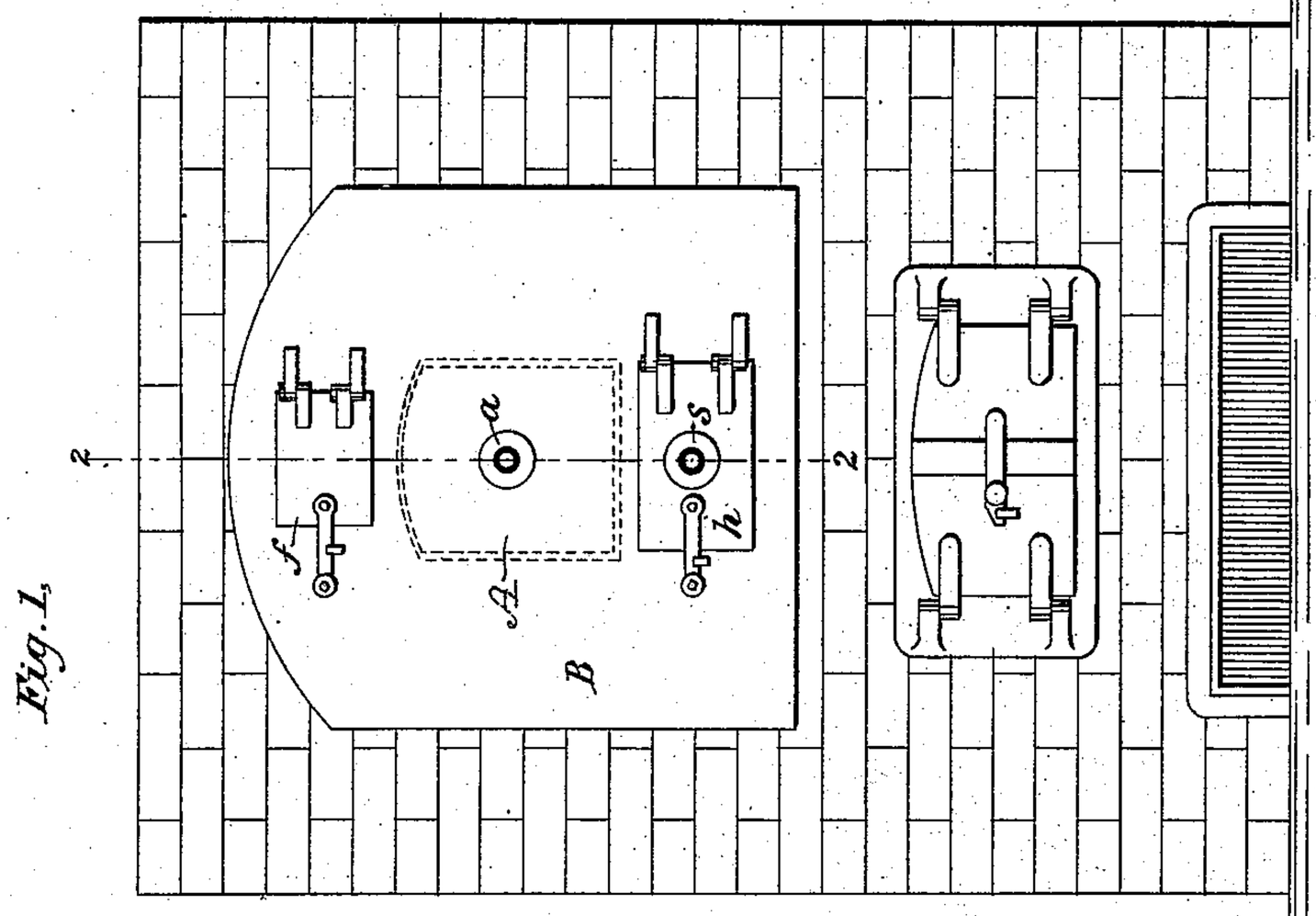


Fig. 1.



Witnesses
G. C. Berry
C. B. Harris

Inventor
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UNITED STATES PATENT OFFICE.

THOMAS B. STILLMAN, OF HOBOKEN, NEW JERSEY, ASSIGNOR OF THREE-FOURTHS TO CHARLES B. HARRIS, OF NEW YORK, N. Y.

APPARATUS FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 377,694, dated February 7, 1888.

Application filed March 25, 1886. Serial No. 196,575. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. STILLMAN, of the city of Hoboken, in the county of Hudson and State of New Jersey, have invented a new and Improved Apparatus for the Manufacture of Illuminating-Gas, of which the following is a specification.

I have invented an improved process of manufacturing gas from liquid hydrocarbon, which forms the subject-matter of another application filed September 26, 1886, and numbered 214,208.

That process, stated broadly, consists in the volatilization of hydrocarbon gases from oil, and then subjecting such hydrocarbon gases, when mixed with steam, to heat in the presence of heated or ignited carbonaceous material—such, for instance, as coke or coal.

The apparatus forming the subject-matter of this application is more especially designed for the practice of that process, though I do not wish to be understood as limiting its use to that particular purpose.

In the accompanying drawings, Figure 1 is a front elevation of my improved furnace, and Fig. 2 a longitudinal section through the gas-converting retorts.

I employ two retorts, A and B, the former being arranged within the latter, which is suitably mounted in the furnace. The interior retort, A, is shown as supported upon standards or uprights *g g*, and its bottom is inclined slightly from the rear toward the front, so as readily to deliver any matter remaining in the retort A, as presently described, through an aperture, *e*, into the exterior retort, B. At the top of the retort A, and also preferably near its front end, is an aperture, *d*, for the escape of hydrocarbon gases into the retort B, as presently described.

c is an escape-pipe leading from the retort B to the gas-receivers. The retort B is provided with doors *f* and *h* for the purpose of introducing coal, coke, or other suitable carbonaceous material into the retort. An injector, S, for injecting steam is also arranged in the front face of the retort B, being shown in this instance as mounted in the door *h*. A similar injector is arranged in the face of the retort A for the purpose of introducing hydrocarbon oil and steam in the form of a spray.

The operation of the apparatus in the practice of my improved process is as follows: The exterior retort, B, is filled or partly filled with coke or coal or other suitable carbonaceous material, and a proper heat being developed in the furnace, oil is injected into the retort A, preferably commingled with steam, in the form of a spray. The retort A should be heated to such a temperature—say, for instance, 900° Fahrenheit to 1,500° Fahrenheit—that the lighter illuminating hydrocarbons are not "cracked up" into marsh-gas and hydrogen, (non-illuminants,) but after being distilled or volatilized from the oil pass from the rear end of the retort A, and, returning to the front, enter the retort B at *d* mingled with the steam. The mixed steam and light hydrocarbon gases are then, in the presence of heated coke or other carbonaceous material in the retort B, heated to such a temperature (the lowest possible to produce a proper chemical change)—say 3,500°—that the steam is properly decomposed, and its hydrogen unites with the partially decomposed hydrocarbons of the oil to form a series of light hydrocarbon gases. The fixed gas produced in this manner is then carried off through the pipe *c* to a suitable receiver. The residuum or heavy hydrocarbon vapors or tarry matter mixed with steam in the retort A run into the retort B at *e*, and, passing over and through the heated or ignited carbonaceous material to an exit, *c*, are converted into a fixed gas varying in richness according to the heat employed and the amount of steam converted into carbonic oxide and hydrogen, which latter act as diluents. Steam, either superheated or not, is injected at *s* for this purpose, and also in such quantities as may be desirable to reduce the luminosity of the gas to the required degree.

I am aware of the patent of Archer, No. 341,622, which shows two vertical retorts arranged one within the other, and I do not claim any subject-matter shown or described in that patent.

I claim as my invention—

1. In an apparatus for the manufacture of gas from oil, the combination of an exterior retort adapted to be mounted in a suitable furnace or fire-place, and having an exit for communication with a suitable gas-receiver, and

an interior stationary retort having an inlet for the introduction of oil, and also upper and lower exits which lead into the exterior retort, substantially as and for the purpose set forth.

2. In an apparatus for the manufacture of gas from oil, the combination, substantially as set forth, of an exterior retort adapted to be mounted in a suitable fire-place or furnace, and having an exit, *c*, an interior retort having an upper exit, *d*, leading into the exterior retort, and of such size and so arranged with reference to the exterior retort that the space between the two retorts may be filled with coal or coke, for the purpose set forth, and an injector communicating with the interior retort, for the purpose described.

3. The combination, substantially as set forth, of the exterior retort adapted to be mounted in a suitable fire-place or furnace, its injector, the interior retort, its injector, and upper and lower exits, *d e*.

In testimony that I claim the foregoing as my own I have affixed my signature in presence of two witnesses.

THOMAS B. STILLMAN.

Witnesses:

G. C. BERRY,

C. B. HARRIS.