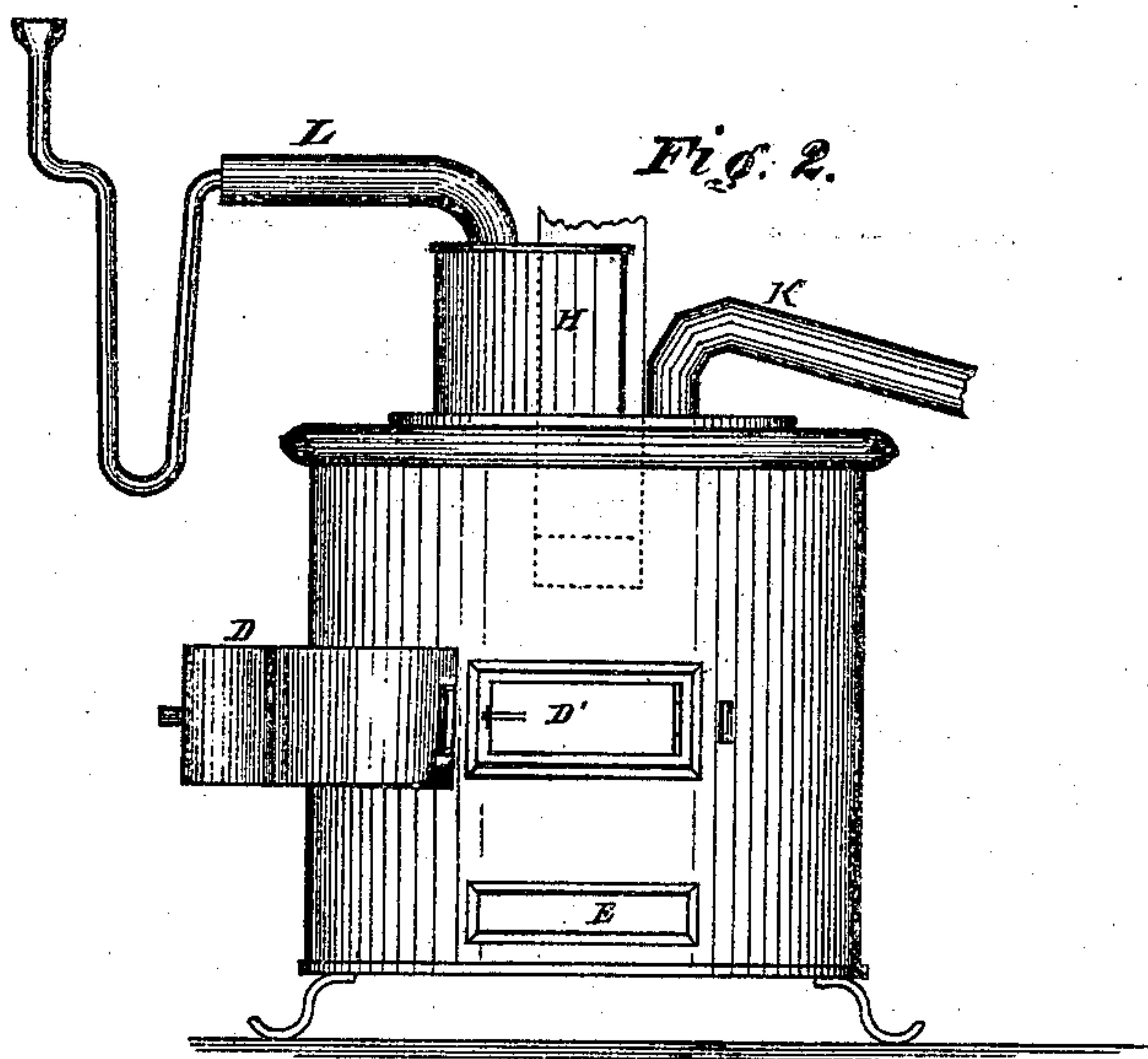
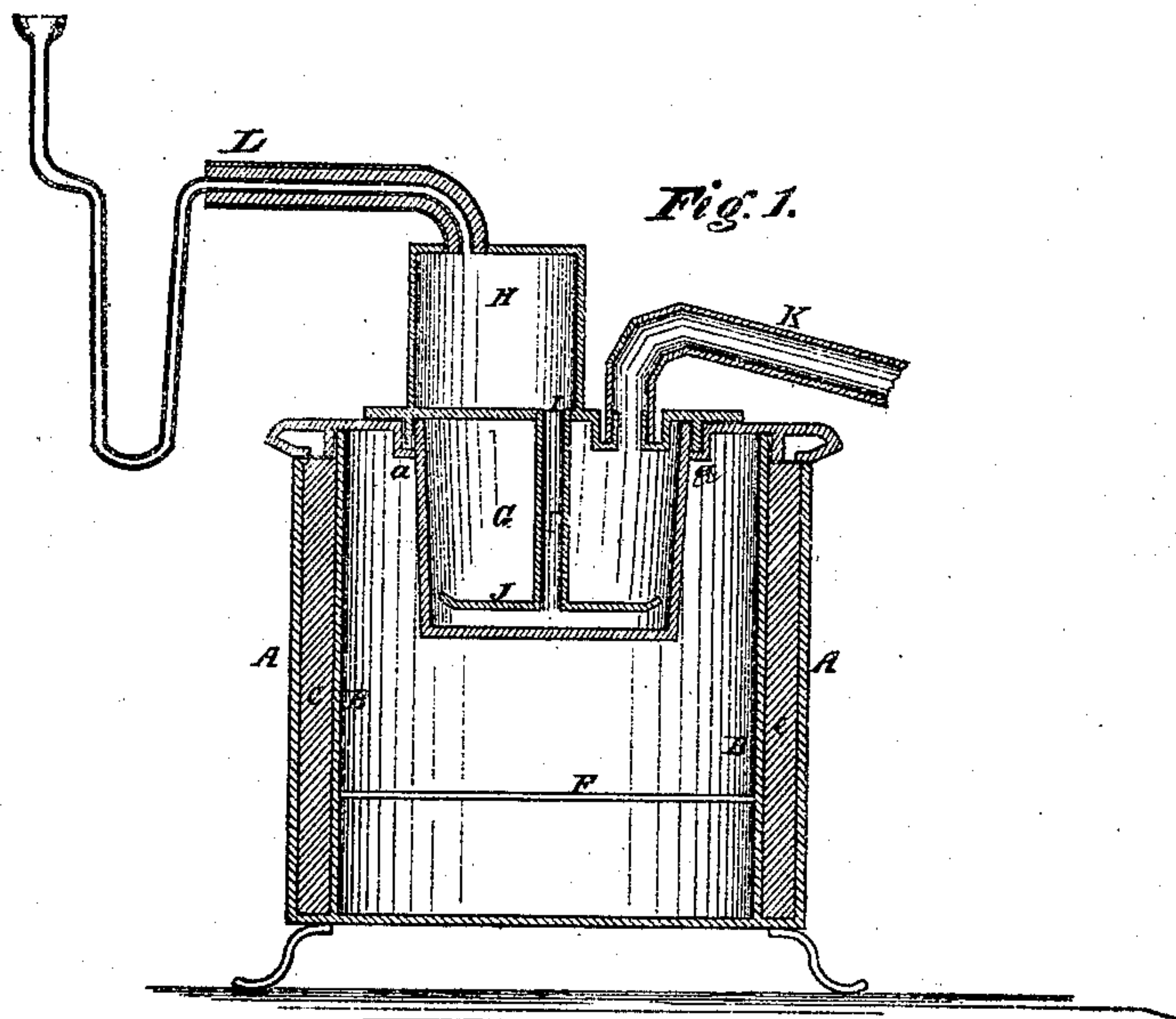


*J. Butler,*

*Gas Generator.*

*No. 111,174.*

*Patented Jan. 24, 1871.*



*Witnesses.*  
*Hillard F. Ward*  
*Charles D. Brown*

*Inventor.*  
*John Butler*



# United States Patent Office.

JOHN BUTLER, OF NEW YORK, N. Y.

Letters Patent No. 111,174, dated January 24, 1871.

## IMPROVEMENT IN GAS-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

### *To whom it may concern:*

Be it known that I, JOHN BUTLER, of the city, county, and State of New York, have invented new and useful Improvements in Gas-Generators; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing forming a part of this specification, and to the letters of reference marked thereon.

My invention has for its object to partially convert any of the hydrocarbons into gas in one retort, and perfect the process in another, so as to perfectly utilize all the material, by which means no loss is sustained.

The nature of my invention relates to making gas in a novel and peculiar manner, by the employment of two retorts, one being placed above the other. The hydrocarbons or materials from which the gas is to be made are introduced into the upper retort where they are made, and partially made or formed into gas, in which made and half-made state they descend through a pipe connecting the two retorts into the lower retort, impinging in their descent on the sides of this hot pipe, and passing to the bottom of the lower retort, where they are confined between the bottom of the retort and a disk or flange provided for the purpose that extends from the bottom or lower end of the pipe above mentioned until they are all converted into fixed gas, which then passes off through the eduction-pipe into the receiver. It also consists in making the furnace with an outer and inner shell, one placed within the other, so as to form an annular space between the two shells, which is filled with any non-conducting substance so as to retain the heat within the furnace, and so that it will not radiate from the furnace and be lost, thereby effecting great economy in the use of fuel, and, at the same time, securing a higher heat on the retort. It also consists in providing an inner and outer door in combination with the furnace.

To enable others skilled in the art to make and use my invention, I will proceed more particularly to describe its construction and operation.

Figure 1 is a longitudinal sectional elevation of my retorts and furnace.

Figure 2 is a side elevation of the retort and furnace, with the outer and inner doors attached to the latter.

Letters of like name and kind indicate like parts in each of the figures.

A represents the outer and B the inner shell of my improved furnace for generating gas, both of which are made of suitable metal, the shell B being made much smaller in diameter than the shell A, so much so as to form or leave an annular space of say four or five inches between the two shells A and B.

The annular space thus formed I fill with ground

plaster mixed with water to a semi-plastic state, so that the said space may be perfectly filled, as seen at C, fig. 1.

It may be observed that I do not confine myself entirely to plaster as a non-conducting substance, but use any of the suitable or proper non-conducting substances.

D and D' are the doors of the furnace, D being hinged to the outer shell A and D' to the inner shell B, thus making the entrance to the furnace completely tight, so as to prevent any cold air from entering the furnace to diminish the heat of the retort.

E is the damper-door, located immediately under the doors D D', for the purpose of regulating the draught into the furnace.

F is the grating for the furnace, upon which the fuel is placed.

G is the lower or finishing retort, located within the furnace. The top of this said retort is closely fitted to the top of the furnace by means of grooved joints, as seen at *a*, fig. 1, which may be made air-tight by means of fusible metal.

Immediately over this retort G is the supplementary retort H, into which the hydrocarbons or other materials to be formed into gas are introduced by means of the pipe or siphon L.

The two retorts G and H are connected by a pipe, I, at the lower end of which is a concave disk or flange, J, extending to within a short distance of the sides and bottom of the retort G.

The hydrocarbons or other materials, having been wholly and partially made or formed into gas in the retort H, descend, in the form of gas and heavy oils and half-made gas, through the pipe I, into the lower or finishing retort G, impinging in their descent on the hot sides of the pipe I, and being conducted by the same to the hottest part of the retort G, which is kept at a high decomposing heat, where they are confined, by means of the disk or flange J, until converted into fixed gas, in which form they ascend to the eduction-pipe K, and pass through the same into a receiver.

The lower part of the pipe or siphon L, which passes into the retort H and is exposed to the heat from the furnace, is encased in an outer shell filled with non-conducting materials, for the purpose of keeping the said pipe cool, to prevent vaporizing and back-pressure of the volatile hydrocarbon as it passes through the same into the retort H.

The advantages of my invention are, first, that radiation of heat from the furnace is prevented by means of the non-conducting material filled in between the shells of the furnace, while, at the same time, a large saving of fuel is effected and a very high degree of heat is attained in the retort; also, that by means of the double doors to the furnace, cold air is pre-



vented from entering so as to strike on the retort and cool it; and that by the employment of two retorts all the material employed for making gas is utilized, and none of the gas is lost by being carried off with or in the form of volatile oils.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the retort G with the retort H, located substantially as shown and described, and for the purposes set forth.

2. The furnace A, with walls constructed of non-heat-conducting materials, and provided with double doors D D', combined and arranged with the retort G suspended from the roof of said furnace and the retort H above the said roof, as set forth.

3. The furnace, composed of two shells, the annu-

lar space C between the same being filled with non-conducting material, and provided with double doors D D', the latter to prevent cold air from entering the furnace and the former to retain the heat within the furnace, substantially as and for the purposes set forth.

4. The pipe L, encased in non-conducting material, to convey any of the volatile hydrocarbons to a gas-retort and prevent the vaporizing of such volatile hydrocarbons in their passage to the retort, and so constructed as to prevent any back-pressure and to insure their entrance into the retort in a liquid form, substantially as shown and described.

JOHN BUTLER.

Witnesses:

WILLARD L. WARD,  
CHAS. O. WESTERN.