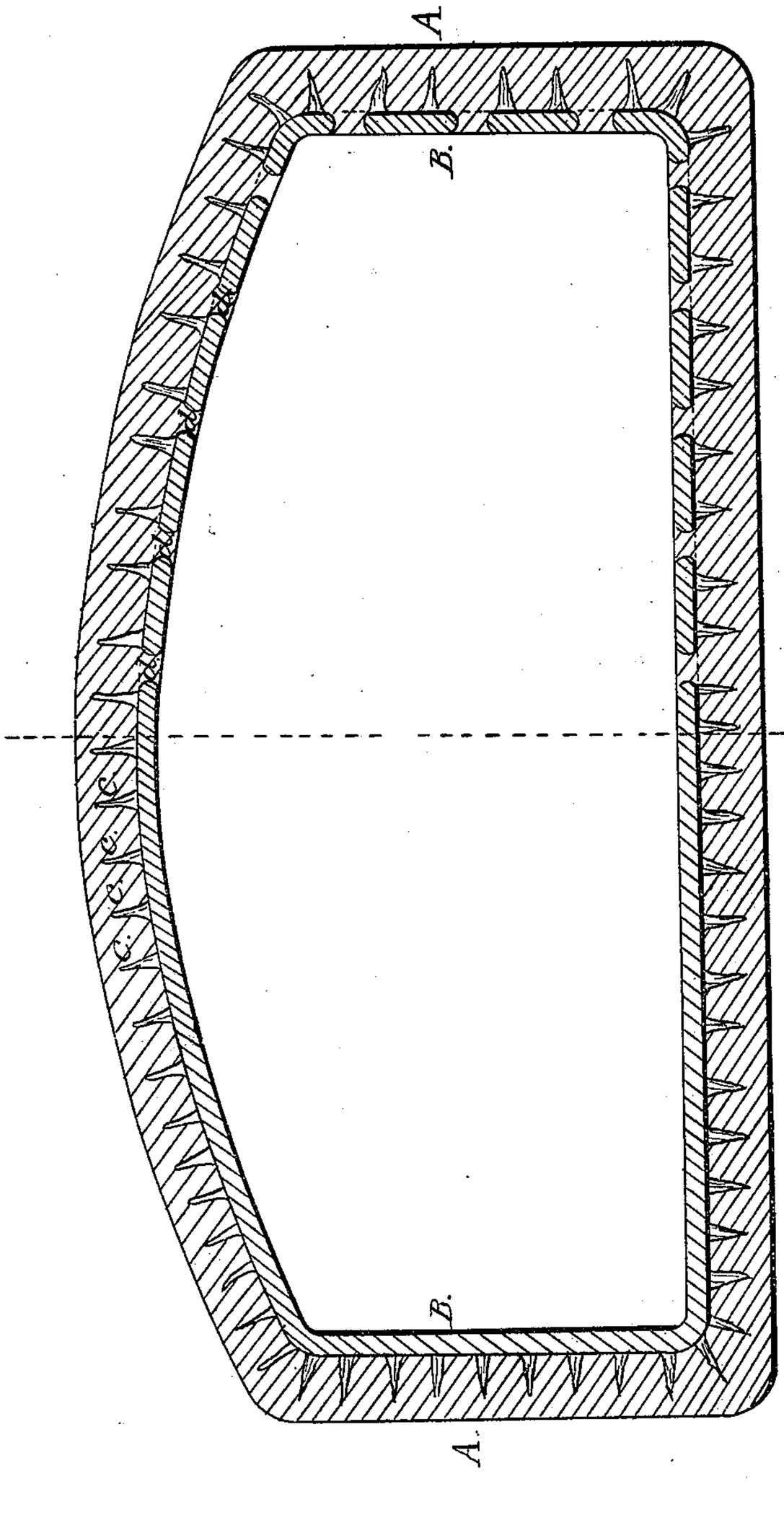
# W. J. Cochran

## Making Gas Retorts.

No. 90,819. Patented Jun. 1, 1869.

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WILLIAM J. COCHRAN, OF BALTIMORE, MARYLAND.

*Letters Patent No.* 90,819, *dated June* 1, 1869.

## IMPROVEMENT IN THE CONSTRUCTION OF RETORTS FOR THE MANUFACTURE OF COAL-GAS.

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

*To all whom it may concern:*

Be it known that I, WILLIAM J. COCHRAN, of the city and county of Baltimore, and State of Maryland, have invented a new and useful Improvement in the Construction of Retorts for the Manufacture of Coal-Gas, and for other purposes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, making part of this specification.

The nature of my invention consists in making a retort of iron and fire-clay, in combination, the iron forming a lining or foundation-frame for the retort, and the fire-clay the exterior covering, or principal component thereof.

To enable others skilled in the art to make and use my invention, I will proceed to describe the manner of constructing the same.

I make my retort of any required size or shape, the accompanying drawing representing a transverse section of the form of retort usually adopted in the manufacture of coal-gas, the interior portion, B B, of which is a thin cast-iron shell, or lining, having upon its outer surface numerous spines, or prickers, *c c c*, for the purpose of holding or securing thereto the outer covering of fire-clay A A.

The inner casting or lining, B B, being thus prepared, is covered with the fire-clay, in a plastic condition, to the proper thickness and shape, during which operation the casting B B should be mounted on bearings at its ends, in any convenient manner, to admit of rotation upon its axis, so as to facilitate the covering and moulding-process. The retort is then dried and burnt, or fired in the ordinary way.

The tempering of the clay and the treatment of the retort, after claying, is substantially the same as in the manufacturing of fire-brick retorts.

Formerly retorts for the production of coal-gas were exclusively made of cast-iron; but the long-continued action of the great heat to which they are necessarily exposed while in operation rapidly destroys the integrity of the iron, and causes it to crack into numerous fissures, more or less open, through which the gas escapes from the retort into the fire-chamber, and is wasted.

The wastage in this manner, even from small fissures, soon amounts to more than the original cost of the retort.

An iron retort seldom remains perfect for more than two months, but they are generally allowed to remain in use for three months, or longer, before being renewed, notwithstanding the great wastage of gas thus incurred.

With the view of obviating these defects or difficulties, retorts of fire-clay have been substituted for those of iron, and as these have proved much more durable than the iron retorts, under the action of the fire, a saving in first cost was thereby effected, as such retorts may be continued in use for two years and upwards, although not in a perfect condition, for when removed from the bench they are generally in a dilapidated condition, having more the appearance of a dry wall of rubble-stone than the smooth continuous surface of a tight and serviceable retort, thus indicating a great wastage of the gas.

Fire-brick, however, is at best a porous substance, and the hydrogen and other subtile elements of the gas readily pass through it. And it is well known that new brick retorts will waste the gas by its permeating through their substance; but it is alleged that in time the grosser particles of the gas lodge in the pores, and thus stop the wastage.

The cost of this wastage, however, is said to be equal to twice the cost of the new retort before it is thus stopped, and by the time the retort is made impervious deterioration commences, in the form of cracks and fissures, the wastage from which goes on increasingly, until the retort becomes unfit for use.

The wastage from fire-brick retorts from these causes, notwithstanding their apparent superior durability, is so great, when compared with the wastage and expense of iron retorts, that many intelligent and careful gas-engineers continue the use of iron retorts in the establishments controlled by them, as the more economical of the two.

My improved retort, combining the impermeable properties of the iron with the refractory properties of the fire-brick, the greatest possible economic result is thereby produced, for it is obvious that there is no wastage from such retort while new, and as the iron lining secures the proper form and integrity of the retort, so long as it is protected, by the fire-brick covering, from the action of the external heat, no wastage can take place while this condition is maintained. And as the two elements of this composite retort mutually sustain each other, such retort must be and is more durable and more economical than if composed of either element separately.

I have herein described a retort which is intended for the production of coal-gas; but the same mode of construction may be used for retorts for other purposes, and such changes adopted therein as the nature of such purposes may require; thus, the lining B B may be made with holes through it, as shown at *d d d d*, into which holes the covering of fire-clay may enter, as shown in the drawing, and in some cases, or for some purposes, these holes may be made so large, and the iron between the holes so small, that the iron part will more resemble a skeleton of the retort han an interior lining; and in such case also the fire-clay may be caused to spread over the interior of the retort, so as to completely imbed such iron former or skeleton within the walls of the retort, in which cases,

also, if preferred, the spines or prickers *c c c c* may be dispensed with.

I do not confine myself to any particular form of the retort, nor to any particular mode of combining the iron and the clay together, but claim the right, under this patent, to vary the construction so as to obtain the best result, in view of the purpose to which the required retort is to be applied.

Having thus described the nature and construction of my improvements in retorts for the production of coal-gas or other purposes,

What I claim therein as my own invention, and desire to secure by Letters Patent of the United States, is—

A retort for the production of coal-gas, or for other purposes, composed of iron and fire-brick, or fire-clay, in combination with each other, in the manner and by the means substantially as herein described.

WM. J. COCHRAN.

Witnesses:

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