

M. L. Callender,

Gas Retort.

No. 108328.

Patented Oct. 18. 1870.

Fig. 2.

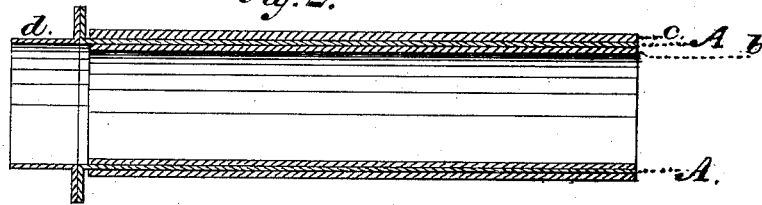


Fig. 1.

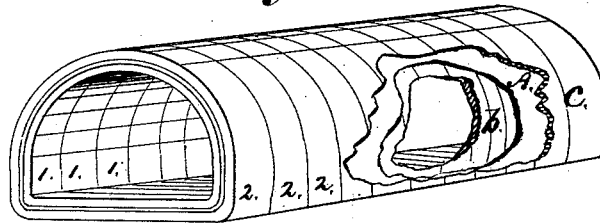
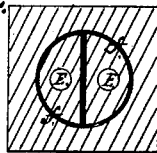


Fig. 3.



Fig. 4.



Witnesses,  
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MILLS L. CALLENDER, OF BROOKLYN, NEW YORK.

Letters Patent No. 108,328, dated October 18, 1870.

## IMPROVEMENT IN SUPERHEATERS FOR GAS-WORKS, &c.

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

I, MILLS L. CALLENDER, of Brooklyn, New York, have invented a new and valuable Improvement in the Construction of Superheaters for Steam or Gas, and the like, of which the following is a specification.

My invention consists in employing both iron and clay in constructing superheaters, whereby I gain the advantage of the strength of the iron together with the durability of clay.

This improvement in constructing superheaters applies not only to the manufacture of gas, but to other chemical operations, and to superheaters or decomposers for both gas and steam.

Figure 1 is a perspective view of the body of a gas-retort having this improvement, with a section broken away from the side, showing plainly both the iron and the clay.

Figure 2 is a longitudinal section of a retort, with the mouth-piece *d* of the iron retort *a*, and the inner lining of clay *b* and the outer casing of clay *c*.

Figures 3 and 4 are longitudinal and cross-sections of a superheater for increasing the temperature of either gas or steam.

### General Description.

I first construct the iron retort *a*, figs. 1 and 2, in the usual manner, excepting the casting is much thinner than common.

The interior of the retort is then lined with fire-clay, which may be made in sections, as shown at 1 1 1, or fire-brick or tile can be used.

Another plan is to make the clay retort entire and introduce it into the iron retort; or, the raw clay may be molded in the interior of the iron retort, and baked afterward.

When the retorts are to be subjected to great heat I employ an outer casing of fire-clay or tile, &c., *c*, in a similar manner, as described, for the inner lining.

The superheater may be made of any required form.

In figs. 3 and 4, a cast-iron tube, *f*, having a dia-

phragm or partition, *k*, is inserted into a casing of fire-clay, *g*; semi-cylindrical cones of fire-clay, having the chambers or passages *e e*, are inserted into the cast-iron tube *f*.

The partition *k* has an aperture in the rear end to allow free communication between passages *e e*.

Connections of the superheater for gas or steam are made in the usual way.

The outer casing *c* may be entire, or only cover such parts of the iron retort *a* as are mostly exposed to the force of the blast or heat of the furnace.

### Advantages.

The difficulty heretofore experienced in using iron superheaters and retorts, especially where high heats were employed, has been their rapid oxidation and destruction.

Clay superheaters and retorts are not liable to oxidation, but are wanting in strength, and cannot be "heated up" and then "let down" or cooled off like iron retorts, without being cracked and destroyed, owing to the unequal contraction and expansion.

My improvement overcomes all these difficulties.

The combination of iron with the clay or tile lining and casing gives all the advantages of both iron and clay retorts, without their corresponding disadvantages when employed by themselves in the usual way.

This style of retort and superheater is eminently qualified for the hydrocarbon or Gwynne Harris gas process, as well as for ordinary use.

### Claim.

I claim as my invention—

A superheater for steam or gas, constructed with an iron frame-work, protected, both externally and internally, by fire-clay or other refractory material, substantially as and for the purposes set forth.

MILLS L. CALLENDER.

Witnesses:

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