2 Sheets—Sheet 1.

R. CARKHUFF.

Gas Retort.

No. 43,668.

Patented Aug. 2, 1864.

Fig. 2.

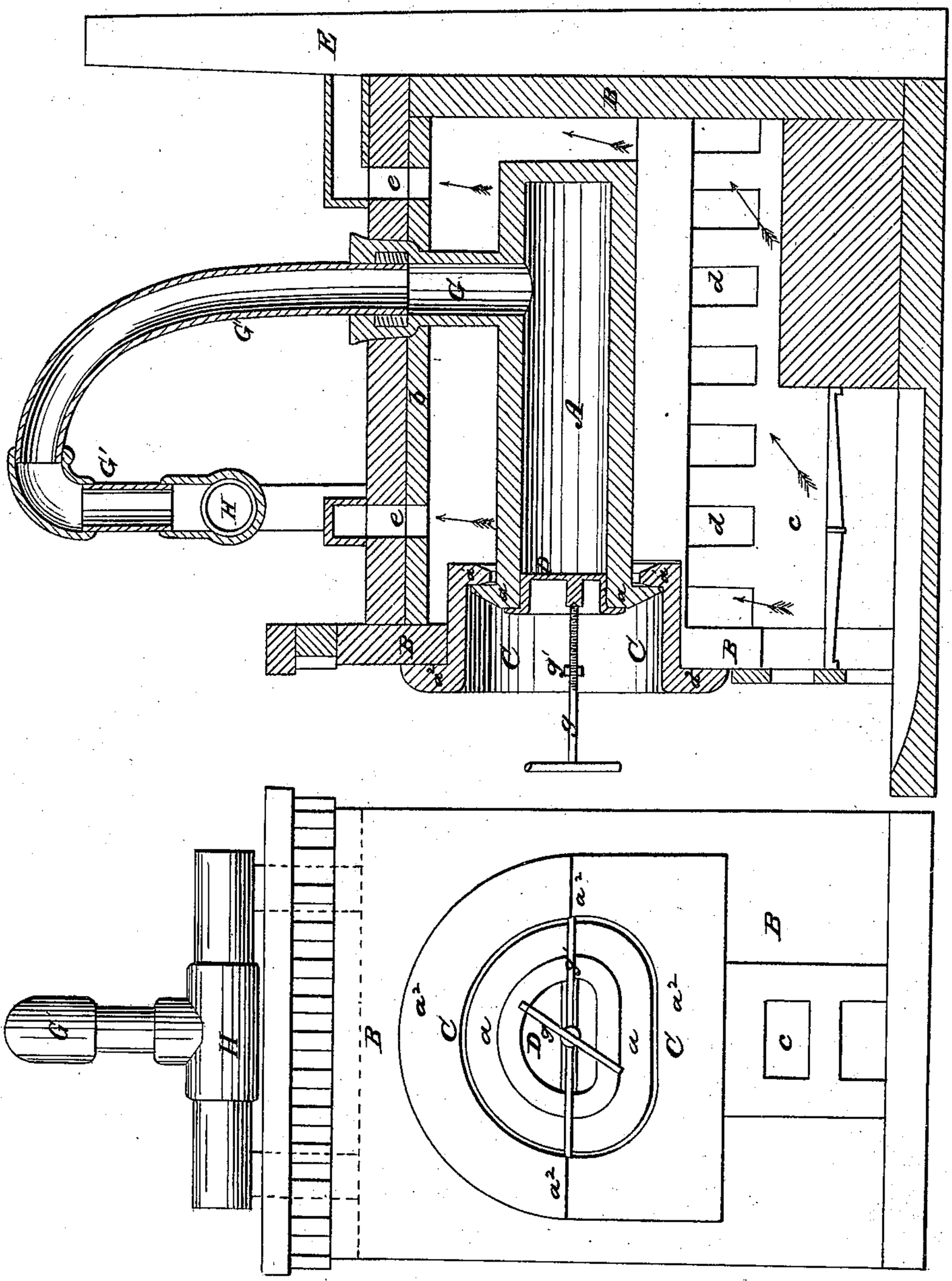

Fig. 1.

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2 Sheets—Sheet 2.

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Gas Retort.

No. 43,668. Patented Aug. 2, 1864.

Fig. 5.

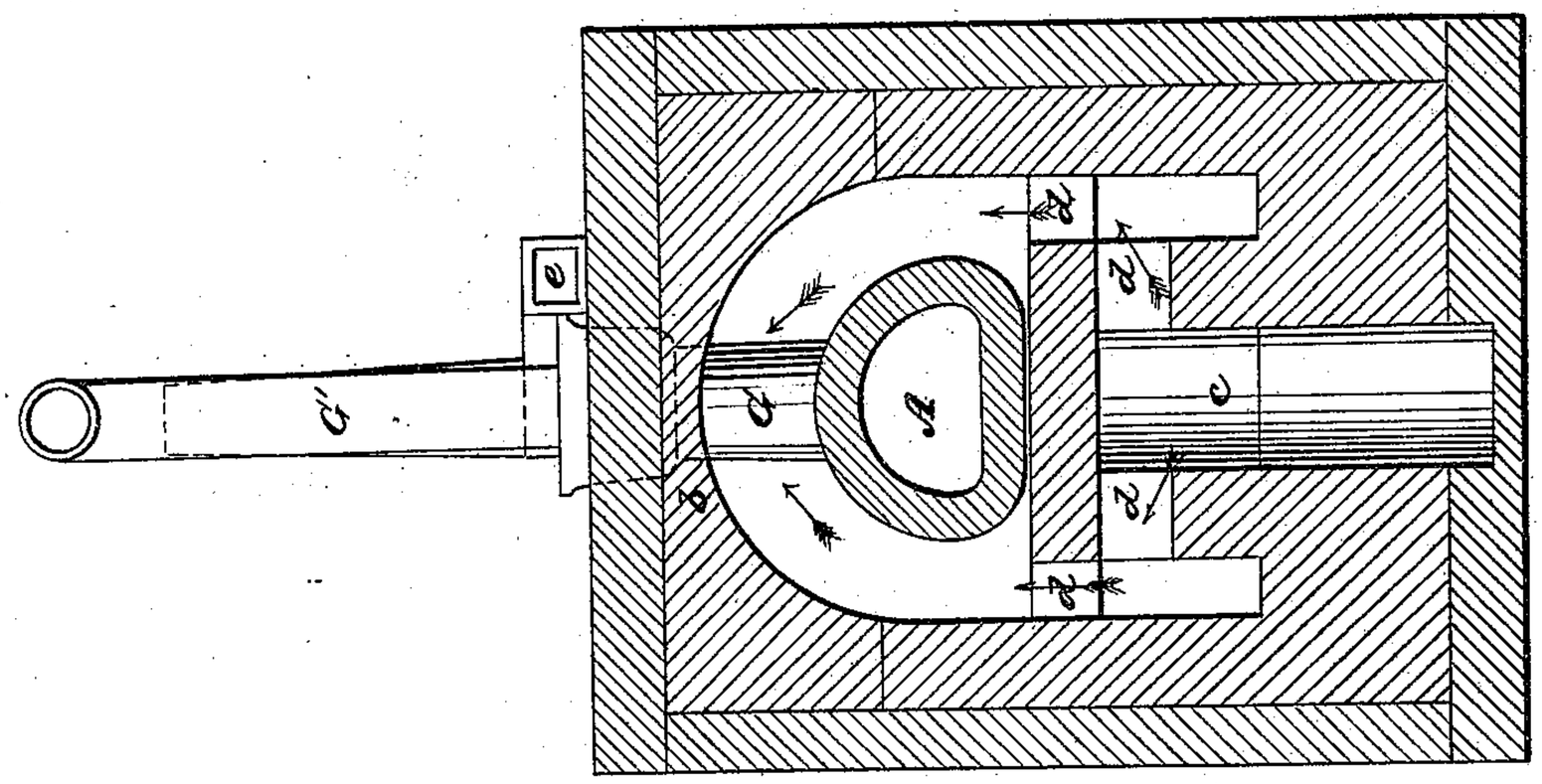


Fig. 3.

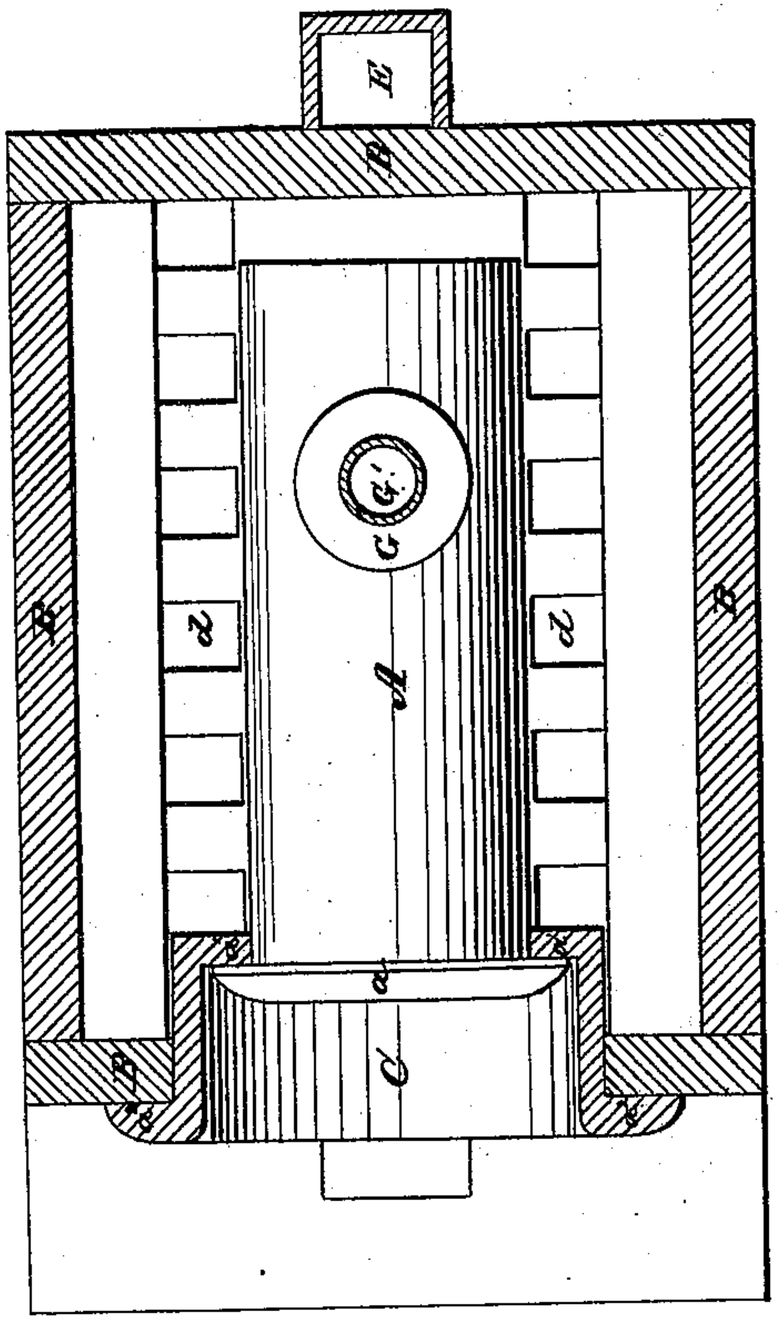
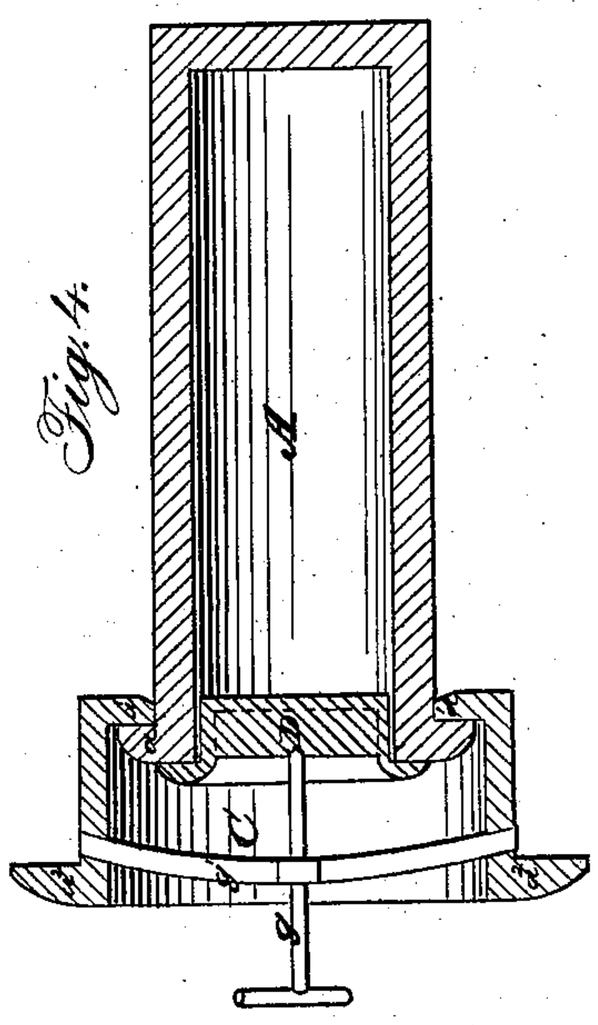


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

RALPH CARKHUFF, OF LEWISBURG, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR MANUFACTURING GAS.

Specification forming part of Letters Patent No. **43,668**, dated August 2, 1864.

To all whom it may concern:

Be it known that I, RALPH CARKHUFF, of Lewisburg, county of Union, and State of Pennsylvania, have invented an Improved Gas-Making Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my gas-works. Fig. 2 is a vertical longitudinal section taken centrally through the improved gas-works. Fig. 3, Sheet 2, is a horizontal section showing the retort arranged in its proper position within the furnace. Fig. 4 is a horizontal section through the gas-retort when its mouth is closed. Fig. 5 is a vertical transverse section through the furnace having the retort arranged within it.

Similar letters of reference indicate corresponding parts in the several figures.

The object of my invention and improvement in gas-works is to prevent the condensation of tar within the retorts by exposing their entire surfaces to the action of the furnace, as will be hereinafter described.

Another object of my invention is to so arrange gas retorts within their furnaces that while they are more perfectly exposed to the action of the fire they can be readily removed when worn out and new retorts introduced in their stead without removing any portion of the furnace-wall, as will be hereinafter described.

Another object of my invention is to conduct off the gas, &c., from the retorts at an intermediate point between its ends instead of thereat, as will be hereinafter described.

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

I have represented in the accompanying drawings a single retort mounted within a brick furnace in such manner that its entire surface is exposed to the action of the heat. It will be seen by reference to Figs. 2 and 3 that no portion of the retort A is exposed outside of the furnace, and that the mouth *a* of this retort terminates within the front wall, B. The shape of the retort A need not differ materially from any hitherto used. The mouth *a* of the retort is, however, furnished with an outer flange around it, which fits within a flanged mouth, C, and keeps the retort in its place when pressure is applied to the cover D, as will be hereinafter described. The furnace-walls B are of such size interiorly as to leave a space-flue between the rear end of the retort and the rear wall, and also a space between the front end of said retort and the front wall. The arch *b* overspans the retort, and the fire-place *c* is directly beneath it, the flame and products of combustion escaping from the latter through the numerous flue-holes *d d* shown in Figs. 2, 3, and 5, and after passing over the retort finally escaping into the chimney E through the exit-flues *e e*, near the forward and rear parts of the furnace-crown, as indicated by the arrows in Figs. 2 and 5.

The flanged mouth C, within which the mouth *a* of the retort A fits, is constructed of two horizontal sections, which fit together, as shown in Figs. 1 and 2. This mouth C is fitted within the front wall of the furnace, and may be removed by slipping the retort forward until the top section can be lifted out of its place, after which the bottom section of said mouth, together with the retort, can be taken out of the furnace without disturbing the vertical or side walls thereof. The inner flange, *a'*, forms an abutment for the flange *a* of the retort, while the outer flange a^2 protects the wall of the furnace. The mouth of the retort is closed by means of a cover, D, which enters a sufficient distance to keep the coals, &c., (within the retort,) exposed to the fire-surface. This door D has a flange around its outer edge, which prevents it from being forced too far within the retort when pressure is applied to said door. This pressure is applied by means of a T-head screw-rod, *g*, passing through the removable hold-fast *g'*.

G represents a vertical pipe leading directly out of the crown of the retort A, through the furnace-arch, as clearly shown in Figs. 2 and 5. This pipe is located at an intermediate point between the ends of the retort, and to its upper end outside of the furnace a curved pipe, G', is attached, which leads upward and forward to a horizontal main, H, as shown in Figs. 1 and 2.

The advantage which is obtained by conducting off the products of distillation through the crown of the retort is that the leader G' will not so readily clog up with tar, there will

be no condensation of gas in the pipe G within the furnace, and the forward and rear ends of the retort will be more completely exposed to the action of the furnace-fire.

It will be seen from my description that the divided mouth C enables me to set the mouth of the retort so far back from the front wall, B, that the flame will impinge upon this mouth, and that when the retort is charged and its mouth closed there will be a uniform intensity of heat from end to end; consequently there will be no condensation of the gas within the retort. Where retorts are exposed to the cooling action of air, as in gas-works hitherto constructed, there will be more or less loss of gas in consequence of imperfect distillation, and those portions of the retorts which project from the walls of the furnace will always be found to contain large quantities of tar, &c., deposited there by the cooling or condensing surfaces which the gas must be exposed to in escaping from the retort. It will also be seen that the cover D of my retort is constructed in such manner as to push the coals back, and beyond the inner end of the divided mouth C.

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

1. So constructing and setting a gas-retort within a furnace that the entire surface of said retort will be exposed to the heat of the furnace, employing for this purpose the flanged holding-mouth C, substantially as described.

2. Constructing the flanged mouth which sustains and keeps the forward end of the retort in place of sections, substantially as described.

3. Conducting off the gas from the retort through its crown, and also through an inclined pipe, G′, leading into the main H, substantially as described.

R. CARKHUFF.

Witnesses:
A. KENNEDY,
H. ALBRIGHT.