

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN GAS-RETORTS.

Specification forming part of Letters Patent No. **208,710**, dated October 8, 1878; application filed
September 22, 1877.

To all whom it may concern:

Be it known that I, WILLIAM FRANK BROWNE, of the city, county, and State of New York, have invented some new and useful Improvements in Gas-Retorts; and I hereby declare the following specification and drawings to be a clear, full, and exact description and illustration of the construction and application thereof.

My invention relates to certain improvements in the construction and operation of gas-retorts. This retort, as shown in the drawings, is designed for the purpose of making carbonic-oxide gas, although this gas can be sufficiently carburated for illuminating purposes; but for the exclusive purpose of manufacturing illuminating-gas a retort of another construction would be desirable. But when steam, in combination with carbon, is to become an agent in the production of gas, the construction of said retort, hereinafter described, will be found to be very advantageous.

In order to decompose steam rapidly when combined with carbon, it is necessary that a high temperature should be obtained and maintained within the incandescent carbon, and also the steam before entering the retort should be as near the same temperature as it is possible to make it without destroying the means for its production.

Now, in order to make water-gas properly, the steam should be admitted beneath the carbon and caused to rise through it, whereby it is brought into direct contact therewith, thus causing its rapid decomposition. Furthermore, the gas which is now formed should never be allowed to pass through a mass of carbon and steam which is at a lower temperature than the gas itself, which would be the case were the gas to make its exit from the front end of the chamber in which the carbon is deposited. Therefore, special provision is made for the eduction of the gas at or near the point of recomposition.

The retort-head is designed to be durable and economical in its use. The leading features of said retort-head are the sliding and swinging bar, which supports the door or lid, said door being provided with a sight-hole, which is covered with mica, thus affording a

permanent view of the interior of the retort at all times without removing any of its parts.

Another improvement consists in the packing of the joint between the lid and the seat. This packing is made of an elastic and non-combustible material, and when of a fibrous material, like asbestos, it should be covered with wire-gauze or some similar material, which will prevent the fiber from sticking to the bearing-surfaces and separating when the door is swung open.

The bearing-surfaces can be fitted to a very close joint, after which a copper-plate corrugated packing can be inserted between the door and its seat, and brought to a steam or gas tight joint by a screw or cam pressure.

Another improvement consists in casting a flue on the top of the retort-head, said flue connecting with a corresponding flue in the retort, and for the purpose hereinafter specified.

Figure 1 represents a longitudinal section of a retort, showing the interior. Fig. 2 is an external view of Fig. 1, Fig. 3 being a cross-section of the same, cut on the dotted line *x x*, seen in Fig. 2. Fig. 4 is a sectional view of the retort-head. This section is taken on the dotted line *y y*, Fig. 2. Fig. 5 is a front-end elevation of a retort-head in position, Fig. 6 being a top plan of the same. Fig. 7 represents a packing to be used in conjunction with the door of the retort to prevent the escape of gas.

Like letters refer to corresponding parts in all of the figures.

In Fig. 1, A represents the body of the retort. *c c* is a cast-iron plate extending from the mouth of the retort to the rear end thereof. This plate covers the area of the bottom of the retort, being perforated from one-half to two-thirds of its length, and rests upon projections which are molded in the clay. The projections, which are seen in Fig. 3, are about one inch in height. Consequently the projections *c' c' c'*, in conjunction with the perforated plate, form two chambers the length of the interior of the retort.

d' d' are two pipes connected to an elbow which is cast in the retort-head. Steam is conducted through these pipes to the interior

chamber $g' g'$, and escapes through the perforations in plate $c c$ into the large chamber C . While passing through this chamber it comes in contact with a mass of carbon, B , after which it escapes through the small flues $a a$ into the flue a' , thence along to the front of the retort, where it makes its final escape through the stand-pipe c' .

A' in Figs. 1, 2, and 3 represents a reinforcement or additional thickness of clay on the top of the retort. This extra thickness is for the purpose of allowing the flue a' to be constructed therein without increasing the thickness of the remaining portions.

i is a plug, (seen in Figs. 1, 2, and 5,) which is to be taken out whenever it becomes necessary to clean out the flue a' . g is the door, and h is a sight-hole therein for the purpose of observing the heat within the retort. w is a sliding cross-bar, to which the door is suspended, as seen in Figs. 1, 2, 5, and 6. k is a wheel, provided with a screw, which passes through the cross-bar w and turns tightly against the door g .

l represents asbestos packing for the joint between the door and the head C' . This packing is cut out of asbestos-board which is about one-fourth of an inch in thickness. A reduced form of the packing is seen in Fig. 7. This packing should be covered with wire-gauze, or its equivalent, for the purpose of keeping it together and preventing its adhesion to the head of the retort when the door is swung open.

$z z$ is a flange on the retort-head, which projects over the end of the retort, to which it is screwed by the bolts $j' j'$.

In Figs 5 and 6, $o o' r r'$ represent a slotted hinge-joint, on which the bar w and door g turn.

u represents a bolt, which passes through the slot w' and is secured to the door g . These bolts are used to keep the door in position, and from falling while being opened.

n is a bracket cast on the head C' , and n' a slot therein. This slot receives the end of the sliding cross-bar w , and receives one-half of the strain of the screw when the door is brought to a tight joint.

The retorts are made of any suitable material, such as cast-iron or clay. When made of cast-iron, less thickness is required than when made of clay, and the clay retorts should not be less than two and one-half inches in thickness.

The retorts are designed especially for gases produced by the decomposition of steam in contact with highly-heated carbons, and in order to thoroughly decompose them it is necessary to institute a means whereby a direct contact with the carbon is secured.

The construction of the means employed is as above described.

The process of making the gases is as follows: The interior C of the retort is charged with carbon, which, before its introduction, should be in a finely-divided condition, so as

to present as great a surface as possible, whereby it becomes more readily oxidized and converted into carbonic oxide by the decomposition of steam. The decomposing into elements of the old combination and their recombination forming new combinations is effected by the steam coming in contact with carbon heated to a white heat, as decomposition takes place rapidly when heated to that degree of temperature. The carbon upon the plate c and beneath the flues $a a$ wears away by the action of the steam, and requires to be replenished once in about eight or ten hours. This is done by opening the door and forcing back the heated carbon which lies in front of the flues $a a$ and perforations in bottom $c c$; and after the deficiency is supplied in the rear of the retort the front end should receive a new charge of carbon, which will become heated while the carbon in the rear is consumed. By adopting this method of renewal a continuous action can be maintained.

I am aware that retorts have been made with a secondary perforated bottom, said feature being found in several English and United States patents. The novelty of this feature I disclaim.

The eduction of gas through openings in the top of the retort is old, together with a flue for conducting gas away. This device I lay no claim to.

I also am aware that swinging retort-lids with the hinging device either upon a bar which supports the lid or upon the lid are in use. These devices I lay no claim to.

Sight-holes within the retort door or lid have heretofore been in use; but the aperture therein is covered by a screw-cap or a similar device, for the purpose of preventing the escape of gas therefrom, and, in order to view the interior of the retort, said cap must be removed while the gas will be flowing therefrom. To these devices I lay no claim.

I am also aware that an elastic packing fitted into grooves specially provided for the reception thereof has been devised and is now in use, said packing being for the purpose of forming a gas-tight joint between the lid and retort-head. This device I lay no claim to.

When said elastic packing is covered with wire-gauze the material will protrude from the meshes by the pressure from the screw or cam, whereby a tight joint is obtained. Perforated sheet metal would answer the same purpose; also, two or more thicknesses of wire-gauze without any substance between them would, under pressure, form a tight joint.

What I claim, and desire to secure by Letters Patent, is—

1. The retort A , provided with projections c' and perforated plate thereon and flues $a a'$ cast or molded therein, in combination with steam-pipes $d d$, for the purpose specified.

2. The sliding swinging bar W , provided with slots o' and n' , in combination with the retort-head C' , having brackets o and n , with catch n' , and the door g , supporting-bolts u ,

and screw *k*, substantially as and for the purpose specified.

3. The retort-head *C'*, having the flue *e* therein, in combination with the retort *A*, having flues *a* and *a'*, for the purpose specified.

4. The retort-head having a removable plug, *i*, leading to flue *e* in said retort-head, in combination with retort *A*, having flues *a'* *a*, for the purpose specified.

5. The re-enforcement *A'*, molded with retort *A*, provided with a flue, *a'*, communicating with the interior of the retort by flues *a*, for the purpose specified.

6. An elastic packing covered with wire-gauze, in combination with a retort-head and door thereto, for the purpose specified.

7. The retort-head *C'*, steam-pipe *d'* *d'*, and flue *e*, in combination with retort *A*, having a perforated bottom, and flues *a* *a'*, for the purpose specified.

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Witnesses:

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