

D. DAVISON.
Manufacture of Coal-Gas.

No. 148,187.

Patented March 3, 1874.

Fig. 3.

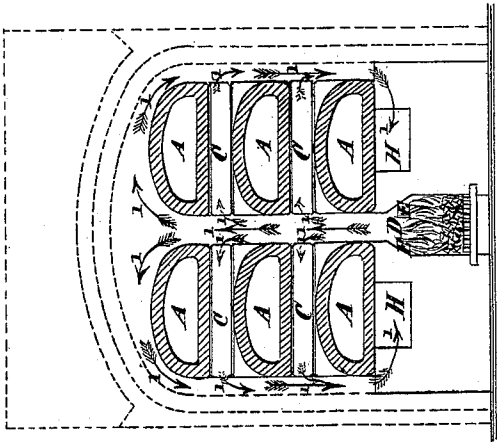


Fig. 1.

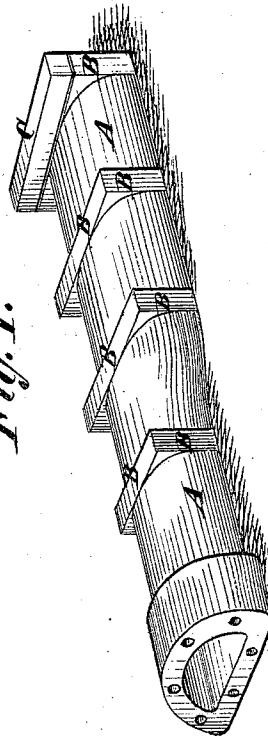


Fig. 2.

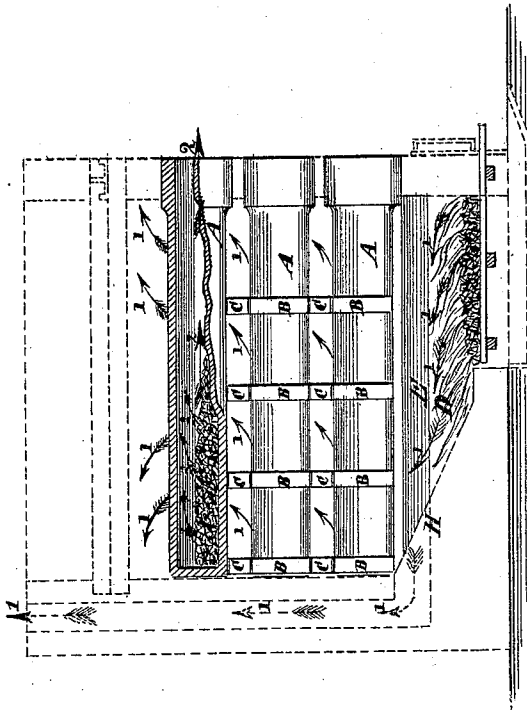
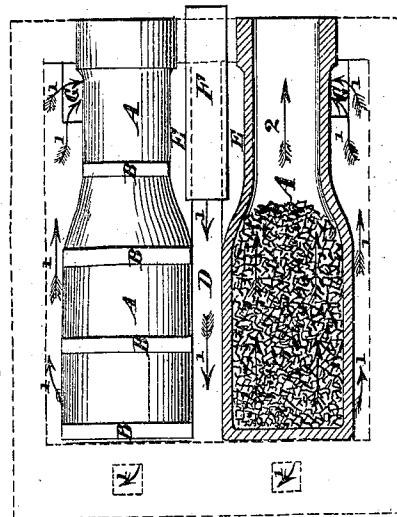


Fig. 4.



Witnesses
John Becker
Fred Harnes

Darius Davison
by his attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

DARIUS DAVISON, OF NEW YORK, N. Y.

IMPROVEMENT IN THE MANUFACTURE OF COAL-GAS.

Specification forming part of Letters Patent No. 148,187, dated March 3, 1874; application filed October 17, 1873.

To all whom it may concern:

Be it known that I, DARIUS DAVISON, of the city, county, and State of New York, have invented certain Improvements in the Construction, Setting, and Operation of Retorts for the Manufacture of Coal-Gas, of which the following is a specification:

Figure 1 is a perspective view of one of the retorts, which, in part, constitutes the subject of my invention. Fig. 2 is a vertical longitudinal section of a bench of six retorts, the upper retort of the three represented in said figure being shown partly in section, and with the coal in position to be distilled, also showing the fire-grate and furnace burning coke underneath. Fig. 3 is a cross-section of Fig. 2, through about the center of the retorts, with the spaces surrounding the same for the circulation of the hot air to heat the retorts. Fig. 4 is a horizontal section immediately below the top retorts, showing one of the retorts next beneath the latter in section, for the purpose of illustrating its interior shape and the position of the coal for distillation therein.

The dotted outlines in Figs. 2, 3, and 4 represent the usual surrounding brick-oven in which the retorts are set for use, and these figures show also the size and shape that the retorts bear to such surrounding oven, and the draft-spaces therein for the circulation of the hot air around the retorts to heat them.

Similar letters of reference indicate corresponding parts.

My invention consists, in part, in a novel construction of retorts with transverse outer ribs made on the same, not merely to strengthen the arched top of the retorts, but to form a support or bearing for the superincumbent retort to rest upon. Furthermore, the retorts are considerably enlarged laterally at their back halves, and in which enlarged part it is designed to place the coal for distillation. My invention also embraces the process of distilling the coal in about the back half or enlarged portion of the retort.

I will now proceed to more fully describe the construction, operation, effects, and objects of my invention.

In the several figures, A represents the retorts, as set in a bench of six; B, the transverse ribs, made on the retorts. C are sepa-

ately-made transverse blocks between the retorts, resting their whole length on the ribs to support the superincumbent retort or retorts, and to keep the retorts apart, with a proper space between the same for the free circulation of the hot air in the oven all around them. D is the fire-chamber, and E the overhanging sides of the latter, drawn in on each side the whole length of the oven to a width of opening at the top of the fire-chamber, midway of the same, about equal to the center space between the retorts at their widest part, to concentrate and distribute the hot air properly the whole length of the retorts. F is a horizontal damper, made of fire-brick, to cover a portion of the space between the top of the walls of the fire-chamber at the front end thereof, and extending through an aperture in the front wall of the oven, so that it can be moved backward or forward, when required, to force the hot air more or less to the back of the oven, as the distribution of heat in the oven may require, to produce a proper heating and distillation of the gas-coal in the retorts. G are the down-draft flues in the bottom of the oven, at the front end thereof, to allow of the draft-air in the oven passing under the lower retorts, and from thence along the bottom of the same into the vertical flues in the back wall of the oven. H are flues for hot air under the bottom of the lower retorts. These flue arrangements are similar to those already in use. The brick ovens for setting these retorts in can be constructed in any of the usual ways. The iron mouth-pieces on the exterior front ends of the retorts can be made and bolted onto the front ends of the clay retorts in the usual way, with the usual connections for the stand-pipes and the hydraulic main. In making the retorts, of clay, on the plan and for the purpose herein described, the transverse ribs B are molded on the retorts when the latter are made, and thus form an integral part of the retorts when they are burned and completed. In setting up these retorts in a bench, they stand firmly and solidly on each other, with free spaces between and around them for the free circulation of the hot air about them. No saddle-tile, arch, or tie-blocks are required, as with the ordinary retorts, and which obstruct the spaces around the retorts,

increase the expense, and prevent the proper cleaning of the ashes and dust off from and around the retorts. The lodgment of ashes and dust on the retorts, after their use a short time, decreases the power of the fire in the oven to properly heat the retorts to a sufficient degree for an effective distillation, and hence the active utility of the retorts from that cause is materially decreased.

The supporting-blocks C, when put upon the ribs of the retorts as set in the oven, are designed to be bedded on the top of the ribs B with the usual flux mortar, which will melt at the temperature to which the retorts are heated when ready for use, and thus be cemented upon the top surface of the ribs, and form an integral part thereof, giving additional strength to the arched top of the retort to support the superincumbent weight thereon. The top retorts in a bench are made in the usual way without the ribs B, as nothing rests on them. The back halves of the top retorts, however, are made wider than the front halves, the same as the lower retorts, in a bench of retorts. Thus, the back halves of the retorts are made as wide as admissible for the oven they are to be placed in, so as to obtain bottom surface and capacity for a full charge of coal to be placed in the back halves of the retorts, while the front halves of the retorts are kept down to the usual size to admit of the usual mouth-pieces and their connections being properly joined thereto. The reduction in the width of the retorts is made gradual, and at or near the center of the length of the retorts, as shown in Fig. 4.

By placing the coal to be distilled in the large or back halves of the retorts, and leaving the front halves or thereabout free from coal, a more equal time and distance are obtained for the passage of all the vapor distilled from the coal through and out of the retorts, and in more thorough and general contact with their hot-air surfaces, especially in the front halves of the retorts, than is obtained in retorts of the ordinary form and proportions, and subject to the usual method of distributing the coal therein for distillation throughout nearly their whole lengths.

By the process of placing all the coal to be distilled in about the back halves of the retorts, the front halves are left vacant, and become more highly heated than if coal laid therein to be distilled, and all the vapor being distilled from the coal in the back halves, has to pass in more or less intimate contact with the hot gas-producing surfaces of the top, sides, and bottom of the front halves of the retorts in its passage through and out of the retorts.

The more equal distance, and the more equal time, and the more equal hot surfaces of the retorts (to the extent required,) that all the vapor distilled from the coal in a retort are subjected to, the more thorough and complete will

be the conversion of such vapor into permanent illuminating-gas before it passes from the hot retort, and consequently the greater will be the volume of gas obtained from the coal thus distilled, with a corresponding decrease in the volume of the coal-tar produced, and, furthermore, the more thorough heating of all the vapors from the coal by the form of retort and process combined, converts more of the heavy illuminating-oil into permanent gas, which has high illuminating power when burned, and thus a gas of a higher candle-power is obtained, as well as a large increase in the volume of gas made.

The plan of constructing clay or other retorts with the transverse ribs B, and the process of placing the coal to be distilled in the back half of the retort, for the purposes before described, I do not confine to this particular form of retort, but they may be either both together or separately applied to retorts of the ordinary or different construction.

The objects accomplished by this invention are, first, greater durability in the retorts and in the setting; second, reduced cost of the setting; third, a large increase in the volume of gas made; fourth, a large decrease in amount of coal-tar produced; fifth, an increase in the candle-power of the gas made.

All of these results are obtained by the instrumentalities described, as compared with the results obtained by the ordinary retorts and the processes by which they are manipulated.

I claim as my invention and desire to secure by Letters Patent—

1. The retorts formed with their back halves or portions wider on their bottoms than the front halves thereof, to give bottom surface and room in the back parts of the retorts in a bench for the whole charge of coal, said retorts being gradually reduced in width at or near the center of their lengths, substantially as shown and described, and for the purposes herein set forth.

2. The transverse outer ribs B, made in connection with and as an integral part of the retorts, irrespective of the form of the latter, substantially as and for the purposes specified.

3. The supporting-blocks C, in combination with the outer transverse ribs B of the retorts, substantially as and for the purposes described.

4. The damper F, in combination with the furnace D and retorts A, of different widths, as described, for the purposes specified.

5. The process, substantially as herein described, of distilling the whole charge of coal in or about the back halves of the retorts, for the purposes specified.

DARIUS DAVISON.

Witnesses:

MICHAEL RYAN,
FRED. HAYNES.