[37.]

DARIUS DAVISON.

Improvement in the Manufacture of Illuminating Gas.

No. 119,329. Patented Sep. 26, 1871.

Fig: 1.

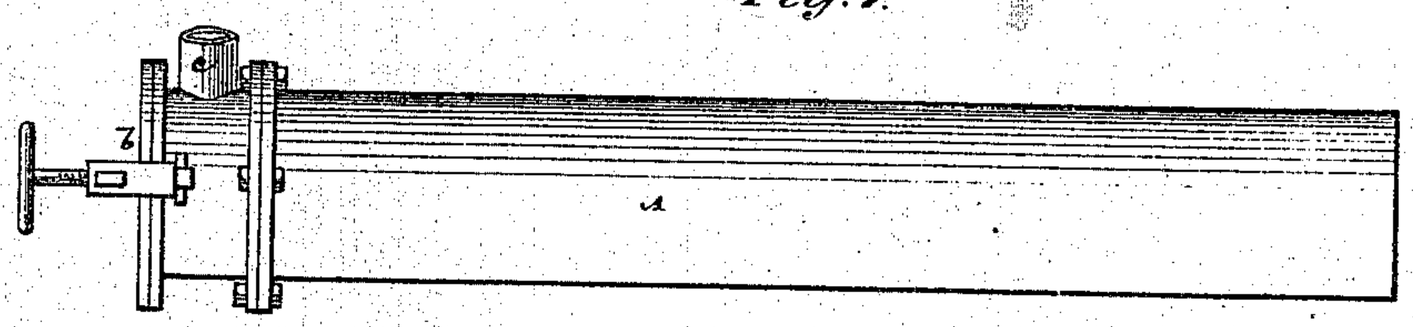


Fig: 2.

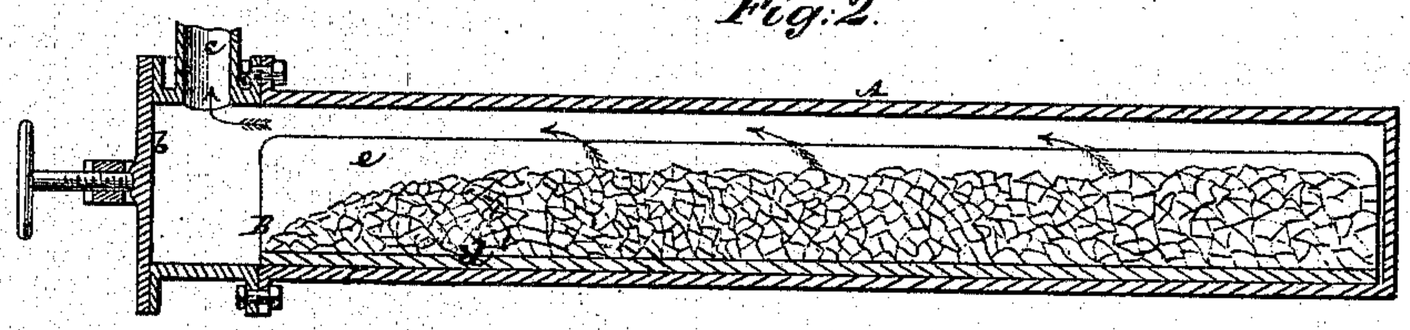


Fig: 3.

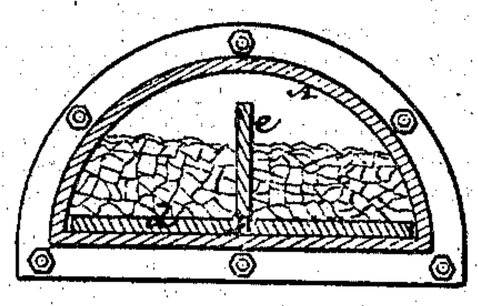
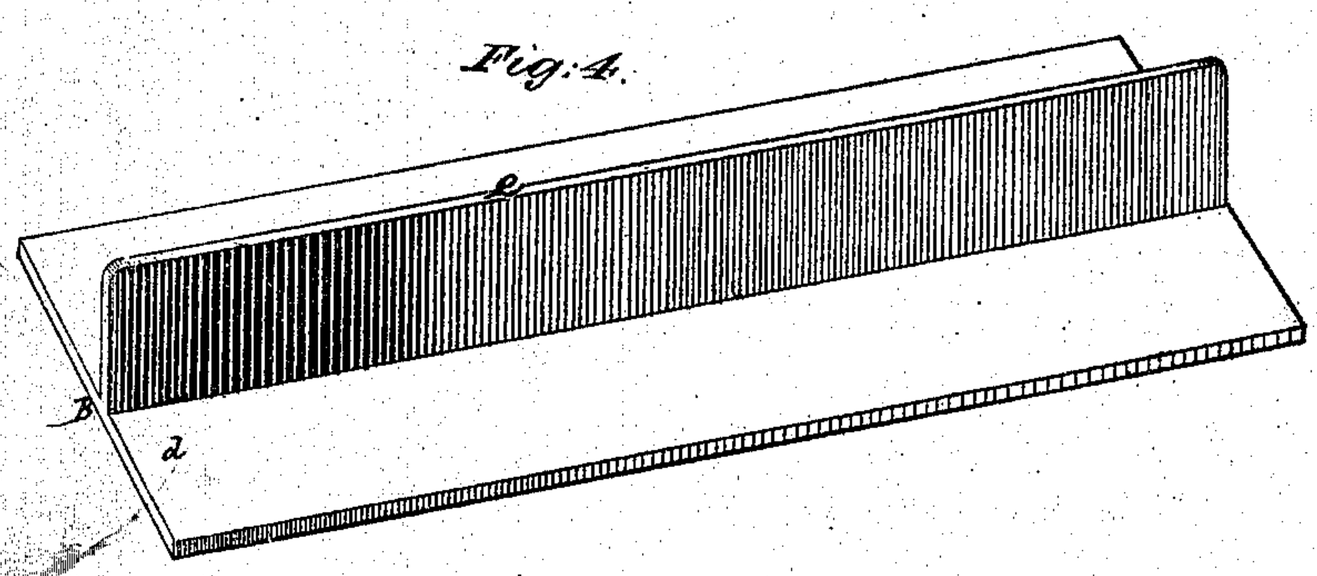


Fig: 4.



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IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 119,329, dated September 26, 1871.

To all whom it may concern:

Be it known that I, DARIUS DAVISON, of the city, county, and State of New York, have invented a new and useful Improvement in the Manufacture of Gas for Illuminating Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a side elevation of a gas-retort having my invention applied to it; Fig. 2, a longitudinal section of the same; Fig. 3, a transverse section thereof; and Fig. 4, a view in perspective of a device used in carrying out the invention.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

This invention is applicable to the manufacture of illuminating-gas from coal and other substances. It will suffice here, however, to refer to coal as the substance to be distilled. The chief object of the invention is to operate longitudinally-divided charges of coal, both in retorts of ordinary construction and in retorts provided with return-flues or pipes, and in which the gas and vapor are caused first to flow backward in the retort and then forward through the return-pipe or flues to the outlet. The invention consists in a system or mode of operation which constitutes a new process of manufacturing illuminating-gas by distilling longitudinally-arranged half or partial charges of coal in each half of the retort, and side by side, at successive intervals of time, alternately, by means of a vertical longitudinal dividing-plate or partition within the retort, whereby a better quality of gas is produced, and at a cheaper rate or with less waste, than is obtainable by the ordinary process of distilling a full charge simultaneously; and other advantages are obtained. The invention also includes a device or interior structure applicable to either new or old retorts, and consisting of a horizontal bottom plate and vertical dividing-plate or partition for carrying into effect such improved process. The divided charges of coal are placed alternately upon either side of the vertical dividing-plate at successive intervals, equal to about the time required for a half distillation of each successive half or partial charge in each longitudinal half of the retort.

In the accompanying drawing, A represents the retort, of ordinary construction; *b*, its mouth; and *c*, its stand-pipe or outlet for the gas; B, an interior device or structure, consisting of a horizontal bottom plate, *d*, and central vertical plate *e*, the same being of a length nearly equal to that of the retort and of a breadth at its base corresponding with the width thereof, or nearly so. Said device is designed to be made of iron, and so that it can be placed loosely in the retort so as to admit of its expansion and contraction without straining the retort. If preferred, the same may be made of clay. The vertical dividing-plate *e* is arranged to extend throughout the whole length and project upward within the retort to about three-quarters the height of the interior of the latter, so as to leave free communication over its top edge from one side of the retort to the other, to admit of the ready mingling of the gas and vapor evolved during the process of distillation from the partial charges in the two longitudinal divisions or halves of the retort. The central vertical dividing-plate *e* may, if desired, connect with and be made to form a fixed part of the retort and be formed of the same piece with it, either when of iron or clay, thereby dispensing with the bottom plate *d*. In such case, as in the previous one, the same longitudinal opening over the top edge of the plate *e* must be preserved for the purpose hereinbefore specified. The bottom plate *d*, when used in a retort in connection with the vertical plate *e*, subserves the purpose, in addition to its support of the vertical plate, of protecting the bottom of the retort and preventing wear or injury thereto consequent on the introduction of the coal and withdrawal of the coke after distillation.

The operation is as follows: Supposing the time for the distillation of an ordinary full charge of two hundred and fifty pounds in a retort to be five (5) hours, then, instead of placing the whole charge at once in the retort, I place half of it, or about one hundred and twenty-five pounds, in one of the longitudinal divisions of the retort as formed by the plate *e*, and allow the same to distil in the one-half of the retort for about two and a half ($2\frac{1}{2}$) hours, or half the time required to distil a whole charge. At the expiration of this time I open the retort and introduce into the other half of it, on the opposite side of the plate *e*, another one hundred and twenty-five pounds,

or remaining half, of the whole charge, and, closing the retort, allow the two half charges to distil for two and a half (2½) hours, which additional period completes the distillation of the first-introduced half charge; that is then withdrawn, and another half charge of one hundred and twenty-five pounds (more or less) introduced in its place within the retort, and allowed to distil for two and a half hours before removing the other half charge in the retort and replacement of a fresh half or partial charge; and so on indefinitely—that is, alternately charging and withdrawing from the retort, in or by half charges, successively at intervals, as stated.

To show the advantages of this system of operation it may be explained that, when the ordinary full charge of coal is placed in a retort at one time and there allowed to remain till distilled, as heretofore practiced, it has the effect of cooling the retort too much at once, and each of such fresh large charges throws off a very large volume of gas and vapor rapidly at first, which still further reduces the temperature of the retort, and which passes rapidly out of the retort, and improperly heated for after treatment, forming, by condensation in a subsequent process, part of the coal-tar deposit, and thus being lost for conversion into illuminating-gas, and reducing both the volume and illuminating qualities of the gas. Furthermore, as the distillation is continued the flow of gas and vapor from the retort gradually diminishes, both as regards volume and illuminating properties, until the end of the distillation. The poor non-illuminating gas produced at the latter part of the distillation passes out of the retort and simply mingles mechanically with the rich gas produced at the first portion of the distillation. This materially reduces the illuminating power of the whole volume of gas produced.

My invention obviates these defects. Thus the charges or half charges introduced at successive intervals of time in either half of the retort or longitudinally on opposite sides of the vertical dividing-plate, as described, throw off but half the volume of rich gas and vapor that a whole charge introduced at one time would, and, consequently, said gas and vapor move out of the retort only half as rapidly as they would from a whole charge, thus giving more time for the vapor to be acted upon by the heat to convert it into gas. Furthermore, as the first-introduced and half-distilled half charge begins to evolve gas slowly and of a poor illuminating quality, consisting mostly of hydrogen and carbonic-oxide gases, the same chemically combines with the rich carbonaceous vapor evolved by the fresh half charge in the retort when the two are brought into immediate and intimate contact in the hot retort, in their nascent state, over the top of the longitudinal vertical plate *e*. This produces a large increase in the volume and illuminating quality of all the gas distilled from the coal. Such mode of charging and operating the charges also produces a steadier and more uniform flow of gas out of the retort during a continuous distillation, and thus more effectually secures a uniform heating of the retort, and thereby a more uniform and thorough conversion of the vapor produced by the distillation of the coal into a permanent, voluminous, and rich illuminating gas.

The invention is applicable to retorts now in use, as well as to new retorts.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The process, substantially as herein described, of manufacturing illuminating-gas by distilling the coal or other substance in half or partial charges introduced alternately within the retort, upon opposite sides of a longitudinal partially-dividing vertical plate, at successive intervals, equal to about the time required for a half distillation of each half or partial charge.

2. The device B, composed of a horizontal bottom plate, *d*, and vertical longitudinal dividing-plate *e*, for use in a loose or detachable manner within the retort, substantially as specified.

3. The horizontal bottom plate *d* and vertical longitudinal plate *e*, to be used together, or the vertical longitudinal division-plate *e*, to be used separately, in combination with retorts now in use and with new retorts, essentially as and for the purpose herein set forth.

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Witnesses:
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