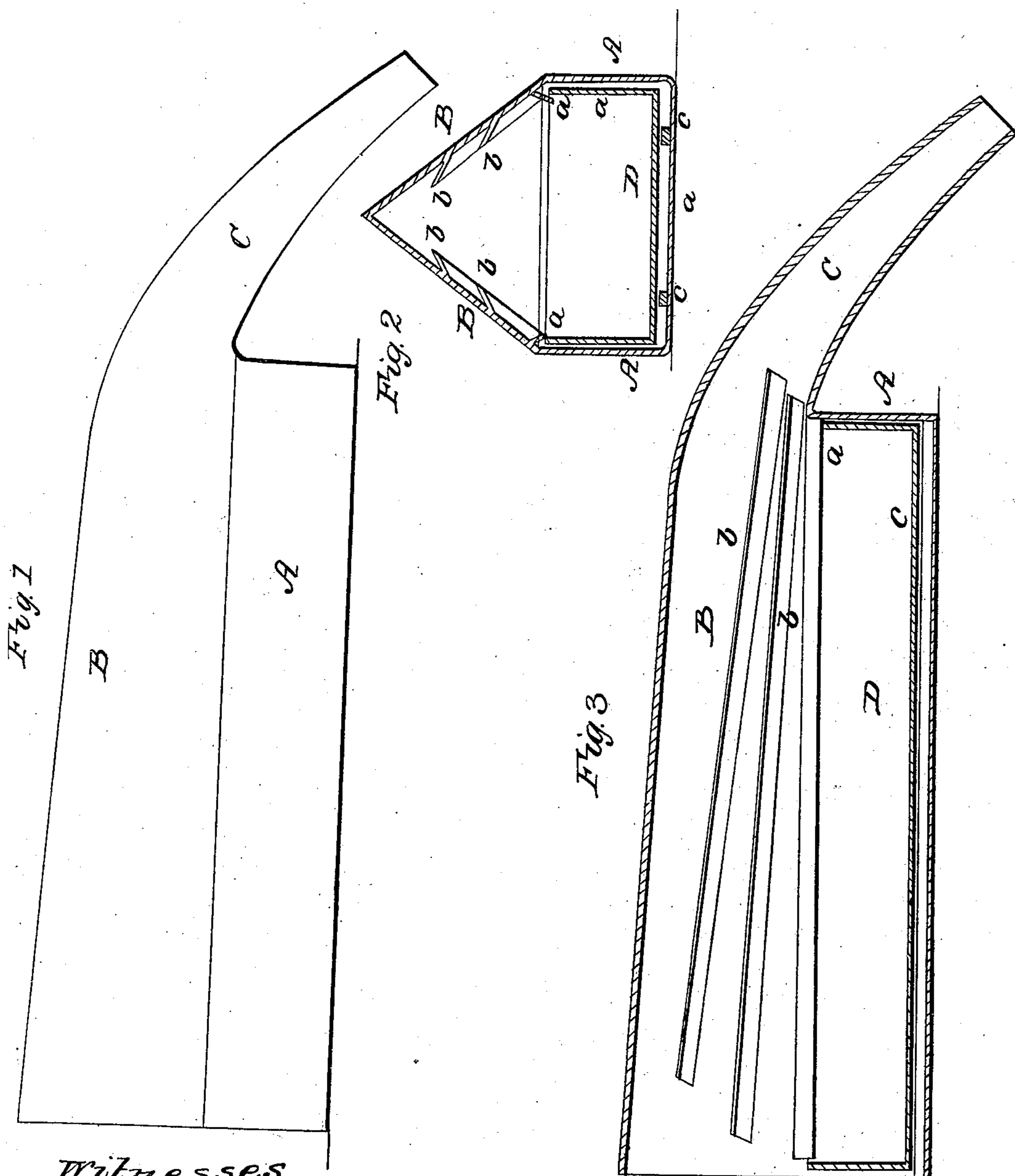


HAZLETT & HOBBS.

Retort.

No. 24,211.

Patented May 31, 1859.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ROBERT W. HAZLETT AND JOHN H. HOBBS, OF WHEELING, VIRGINIA.

## IMPROVEMENT IN RETORTS FOR DISTILLING COAL-OIL.

Specification forming part of Letters Patent No. 24,211, dated May 31, 1859.

*To all whom it may concern:*

Be it known that we, ROBERT W. HAZLETT and JOHN H. HOBBS, of Wheeling, in the county of Ohio and State of Virginia, have invented a certain new and useful Improvement in Retorts for Distilling Purposes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side view of a retort constructed according to our improvement; Fig. 2, a transverse vertical section thereof, and Fig. 3 a longitudinal vertical section with the head of the retort removed.

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

The retort here referred to we would have regarded as applicable to distilling purposes generally—that is, we do not (as there is no such necessity) confine it to any one article of distillation—though we would particularize as one of its uses the destructive distillation of coal for the production of coal-oil and for refining the same. The retort, however, is applicable to the distillation of all or most distillable bodies or matter, whether solid or fluid, and may be used for the manufacture of gas, spirits, and various other distilled products.

The object aimed at in our improvement is to facilitate and expedite the obtaining or “carrying over” of the “charge” with the least deleterious effect upon the substance to be distilled and upon the wear of the retort; and the nature of our invention consists in certain peculiarities of construction and mode of action, as fully set forth in the following description and claims.

The retort we construct, as shown in the drawings, horizontal and in what may be termed, though joined, in two distinct parts or of two distinct configurations—that is, the base A of the body of the retort may be of rectangular shape for flat or advantageous exposure to the action of the fire, while the upper portion or sides, B B, are made shelving from their junction with the base portion A toward each other, and meet in an angle at or along the top, which latter is set inclining downward toward the neck C of the retort.

Of course varying circumstances—such as change in the size of the retort or change of product to be distilled—may require some deviation from this as the contour of the retort; but such is the configuration or construction, as a whole, that it is preferable to preserve.

To facilitate a clear understanding we shall in further description refer more particularly to the manufacture of coal-oil.

Retorts, it is well known, have been variously shaped; but those in common use for the destructive distillation of coal to make coal-oil are of cylindrical form, which does not present an advantageous bottom surface to the action of the fire. These cylindrical retorts are usually embedded in the fire, as well for the production of the necessary heat on the substance being distilled as to prevent condensation of the distilled matter within the retort. Such large amount of fire exposure soon destroys the exterior of the retort, and the carbonaceous matter in its interior effects a similar destruction, so that the retort requires soon to be replaced by a new one—say after seven or eight months of wear in each case. The form shown in the annexed drawings does away with such rapid destruction of the retort, as the base portion, A, only is exposed to the fire, the upper portion or inclining sides, B B, being exposed to the air to produce condensation instead of avoiding it, as in the former instance; and said lower or base portion, A, is protected from destruction by carbonaceous matter or clinker inside by the charge being contained in a drawer or pan, D, so arranged as to leave an air-space, a, between the charge or charger and bottom portion of the retort. By the employment, also, of the drawer D, destructive wear consequent on raking out the residuum from the bottom of the retort is avoided. A retort thus constructed and provided, as here and hereinafter specified, may, for the same amount and character of work as in the former instance, be made to last from two to three years.

It has before been stated that the top of our retort is set or constructed inclining downward toward the neck C. This is to facilitate escape of condensed matter into the neck, and the inclined sides B B, meeting in an angle at or along the top, serve most effectually to conduct the

condensed fluid into open conduits or gutters *b b*, arranged along each side of the retort on the inside and running from the head of the retort to the neck, with a dip or inclination throughout their length toward the neck, and terminating in the neck *C*. By these means the condensed fluid is hastened off to the neck, and time consumed in its redistillation saved by its return to the surface under exposure to the fire being so effectually prevented.

In the use of the common cylindrical retort for making coal-oil, ordinarily but two charges are made in twenty-four hours. One hour is occupied in charging, the residuum is taken out by a hand-rake, and the coal introduced by a shovel. The temperature, too, has to be carefully guarded, or the bottom of the furnace becomes unduly heated and burns and chars the coal under distillation, which produces an inferior coal-oil that can never be effectually purified. The heated air-space *a*, intervening between the charge and bottom of the retort in the retort shown in the accompanying drawings, dispenses with all such particularity and careful watching in the manipulation, and, though an undue or excessive heat may be applied, no charring or burning of the coal under distillation takes place; consequently a generally better quality of oil is produced. We however derive a double advantage by elevating the charger *D* a little above the floor of the retort, as such arrangement not only serves to establish the heated air-space *a* at the bottom, but it facilitates the sliding in and out of the drawer *D* on anti-friction appliances interposed between the bottom of the drawer and floor of the retort, such as rails *c c* on the floor of the retort, rollers or their equivalents, and whereby much labor and time are saved in removing the residuum and entering a fresh charge.

By using two chargers or drawers *D* to each retort only five minutes need be occupied in charging. Thus, the man-head of the retort being removed, the pan, with the residuum, is taken out and a second pan containing the necessary charge inserted, and while distillation again goes on the original pan, with the

residuum, may be cleared and loaded with a fresh charge, for reinsertion in its turn. Of course much labor is economized in both clearing and filling an open pan as compared with a close retort, and to further facilitate cleaning the pans may be provided with a lid or door in their bottom, or with one or more of their sides made to open. As compared to the ordinary retort, at least double the number of charges may be "carried over" in the same period of time, and the consumption of fuel be proportionally reduced.

We would observe, in conclusion, that the lower part of the upper portion of the retort is provided with inclined flanges *s s*, arranged immediately above the drawer *D* and running from end to end of the retort, to return any vapor which might condense before it reaches the first of the conduits *b b* back to the pan *D*. The importance of this provision will be seen in the application of the improvement to the distillation of liquids.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. Constructing the horizontal retort with a pan or flat-shaped base, *A*, and inclined upper sides or top, *B B*, and with open conduits or gutters *b b*, running from end to end of the retort, and arranged on the inner sides thereof, and set inclining and emptying into the neck of the retort, the whole for united operation, substantially as and for the purpose herein set forth.

2. The drawer or charger *D*, when open at top and in no way or at any time attached as a fixture to the retort, and yet serving during the distilling process as a part of the generating-chamber, and being kept elevated above the bottom of the generating-chamber and allowed to slide in and out without the necessity of removing or disconnecting any portions of the retort or generator, substantially as and for the purpose herein set forth.

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Witnesses:

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