

S. C. SALISBURY.

Retort for Generating Gases from Oils.

No. 54,214.

Patented April, 24, 1866.

Fig. 1.

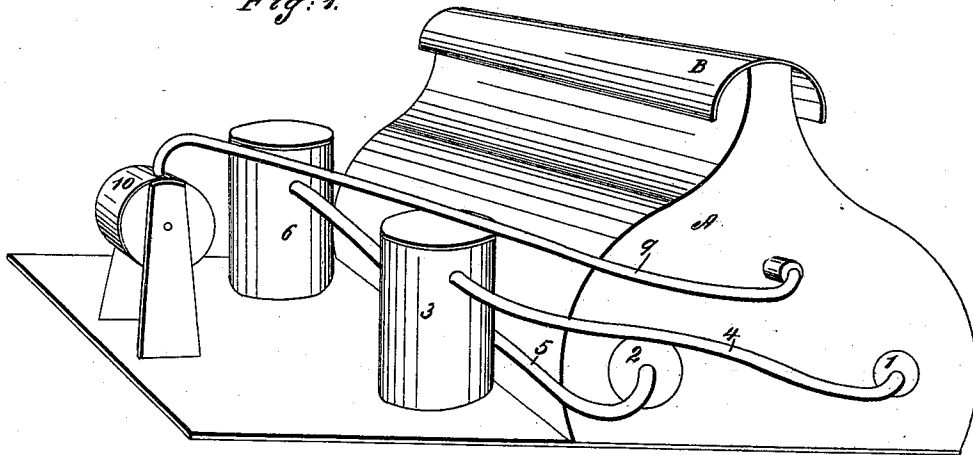


Fig. 2.

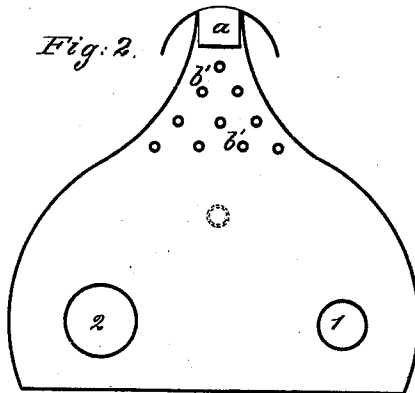
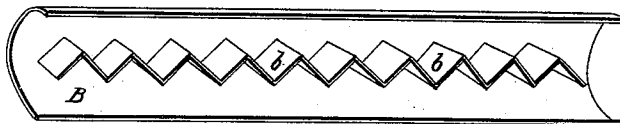


Fig. 3.



Witnesses:

J. D. Laws
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Inventor.

Silas C. Salisbury.

UNITED STATES PATENT OFFICE.

SILAS C. SALISBURY, OF NEW YORK, N. Y.

IMPROVEMENT IN RETORTS FOR GENERATING GASES FROM OILS.

Specification forming part of Letters Patent No. 54,214, dated April 24, 1866.

To all whom it may concern:

Be it known that I, SILAS C. SALISBURY, of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Retorts for Generating Gases from Oil, Water, &c., for use in combustion; and I do hereby declare that the following is a full, clear, and exact description thereof and of their mode or manner of operation, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The character of my invention consists in the production of a retort which can be used in connection with any ordinary engine, boiler, locomotive, &c., by which gases can be produced from petroleum or other hydrocarbon, and from water and air, and in such proportions that when united with the gases produced from the coal and heated air of the furnace they may be used with great economy and effect for combustion in the furnace.

Figure 1 is a general view of the retort in combination with oil and water reservoirs and air-blast. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a view of the deflecting-cover of the retort.

The retort A is generally made a few inches shorter than the grate on which it is to be placed, and more than one may be used in any furnace. In such case they should be placed a few inches—say from six to ten or twelve inches—from the sides of the fire-box and from each other, so that there may be ample room around and between them for sufficient coal to keep them (the retorts) highly heated.

I prefer to make such retort the broadest at the bottom—say from three to six inches, according to the size of the place in which to be used—and converging toward the top, such form securing greater stability. The opposite sides of the retort do not, however, meet or come together at the top, but between them there is left a longitudinal opening, *a*, ordinarily about half an inch wide, and extending the whole length of the retort A. In such opening *a* is placed a fluted or corrugated valve, *b*, which is secured to and made a part of the cover B, which is shaped somewhat like an inverted U, as shown in Fig. 1. This cover should be heavy enough to retain its position over the

top of the retort by its own weight, and not be liable to be displaced by the action of the gases escaping underneath it. The fluted valve *b* fills the space between the contracted sides of the retort, but does not fit so closely therein as to occasion any inconvenience in placing or removing the cover B.

In the bottom part of the retort A are placed two hollow tubes, 1 2, one of which connects with a fountain or reservoir of petroleum or other hydrocarbon oil, 3, through a pipe, 4, and the other of which connects, by a similar pipe, 5, with a reservoir of water, 6. The quantity of oil and water supplied to these tubes is regulated by means of the stop-cocks 7 8. The top surfaces of such tubes 1 2 are perforated with numerous small holes to allow any gases produced or generated in such tubes to pass freely out into the retort A. The tube designed for the reception of the oil need not be more than half the diameter of the other or water tube. Evaporating-pans may also be used in place of such tubes, if preferred.

In the upper part of the retort A, directly over the evaporating-tubes above described, and below the reach of the corrugated valve *b*, there is placed a number of small iron rods, *b' b'*, Fig. 2, say one-eighth of an inch in diameter. Small iron tubes will answer, however, even a better purpose than iron rods.

A suitable proportion of air is also admitted into the retort A through a pipe, 9, connecting with the air-blast 10.

As soon as the retort becomes heated the oil and water in the respective tubes 1 2 become vaporized and pass out through the orifices in such tubes into the retort, where they meet and become mixed with a current of air entering such retort through the pipe 9. These gases, thus mingled together, pass upward through or among the rods or pipes *c c* in the upper part of the retort, and thence on each side of the fluted or corrugated valve *b*, and are then deflected downward by the cover B and discharged on each side of the retort into the fire.

These retorts being designed more particularly to be placed upon the grate-bars of and to be used in ordinary furnaces, and the ordinary fuel of the furnace surrounding and partially covering such retorts, the shape or configuration of the cover B causes the gases gen-

erated in the retorts to be discharged directly in contact with the fuel of the furnace and the gases produced therein, and thus insures a more complete combustion of them, and with the most satisfactory results.

The gases produced in the retort from the oil, water, and air combined mix or unite with the gases derived from the coal and heated air of the furnace in a greatly-increased volume—say 8 to 1—and this combination produces a heat or flame more intense than that produced from the combustion of coal as 5 to 1.

The relative quantities or proportions of oil, water, and air supplied to the retort should be such as to insure such a combination of the different gases produced therefrom which shall not be explosive as it comes in contact with the gases produced or derived from the fuel and the heated air of the furnace. Experiment has proved that one cubic inch of petroleum to two and a half cubic feet of water and five cubic feet of air is a satisfactory proportion. This proportion may, however, be considerably varied and satisfactory results still be secured.

The required consumption of fuel is mainly to heat the retorts, and the quantity required for such purpose is only about one-tenth of that which would ordinarily be required; and such retorts, when heated, become themselves a source of heat, like the fuel consumed, and add just so much heat to the generation of steam. But little artificial draft is required, thereby retaining almost all the heat under the boilers and flues. The advantage of this in times of gales and storms at sea is fully equal to one-fifth of the combustion produced; and by the use of such a combination of gases as described it is believed that at least one day can be saved in the trip between America

and Europe, while fully one-half of the berth-room now required for the stowage of coal can be saved for freight.

The introduction of the iron rods or tubes in the upper part of the retort A has the effect to absorb or take up the oxygen set free, and thus render the hydrogen better available for consumption.

The particular form or shape of the retorts used for the purpose described may be varied, though I consider the form before set forth one of the best and most economical.

The use of oil and water alone for the production of the gases therefrom for the use above described will be found very advantageous, but the effect will not be as satisfactory as when air is used and combined therewith.

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

1. The application and use for heating purposes of the gases derived from oil, water, and air, or from oil and water, combined substantially as described, in combination with the gases produced from the fire of any ordinary furnace, for the purposes set forth.

2. The construction and arrangement of the retort A, substantially as described, for generating and combining the gases of oil, water, and air, for the purposes set forth.

3. The combination of a retort for generating such gases from oil, water, and air, or from oil and water, with the furnace or fire-box in which such gases are to be burned, when such retort is placed in and heated by such furnace.

SILAS C. SALISBURY.

Witnesses:

S. D. LAW,

W. R. RONALDS.