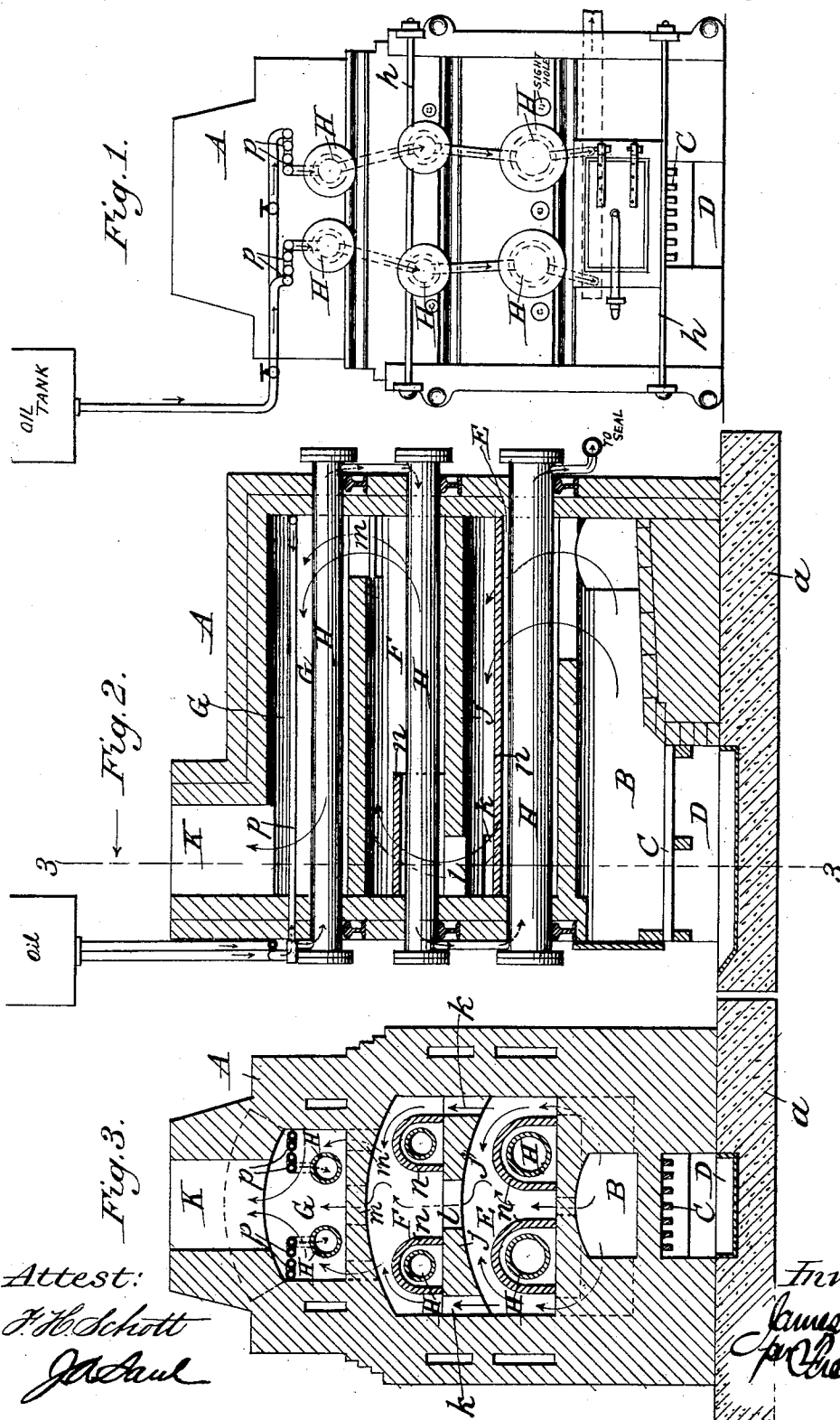


(No Model.)

J. TWAMLEY.
GAS RETORT BENCH.

No. 586,466.

Patented July 13, 1897.



Attest:

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UNITED STATES PATENT OFFICE.

JAMES TWAMLEY, OF GRAND FORKS, NORTH DAKOTA.

GAS-RETORT BENCH.

SPECIFICATION forming part of Letters Patent No. 586,466, dated July 13, 1897.

Application filed November 11, 1896. Serial No. 611,708. (No model.)

To all whom it may concern:

Be it known that I, JAMES TWAMLEY, a citizen of the United States, residing at Grand Forks, in the county of Grand Forks and State of North Dakota, have invented certain new and useful Improvements in Gas-Retorts; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in retorts for generating gas from oil or other carboniferous matter, and the object thereof is to so construct the same that it will be durable, cheap, and simply constructed.

With this object in view my invention consists in the construction, combination, and arrangement of parts and in the various details thereof, as will be first pointed out in the specification and then claimed.

In the drawings forming a part of this specification, and in which like symbols of reference represent corresponding parts, Figure 1 represents a front elevation of my invention. Fig. 2 represents a longitudinal section of the same, and Fig. 3 represents a vertical section on the line 3 3 of Fig. 2.

A represents the main structure of my retort; B, the fireplace thereof; C, the grate of the same, and D the ash-pit.

E denotes the first chamber or oven of the bench, F the second chamber, and G the third chamber or oven of the bench, the oven being set on concrete foundations *a*, built of hard-burned brick with air-space on side walls to prevent the expansion of the bench. The front and rear walls are stayed or braced with suitable iron braces or stays *h*, and the benches are braced by brick stays on all the four corners.

The first chamber E is walled up and arched over, as *j*, with fire-brick, the center arch to extend to within about fourteen inches of the side walls, there to meet two small arches built for the purpose of protecting the retort from the excessive heat generated in the fire-box. Spaces *k* are also provided on each side and *l* at the center for the purpose of allowing the flames to travel the length of the retort, which is heated to a very high degree for the purpose of generating a fixed gas that will not stratify in cold weather. The flame

then passes through *k* to chamber F, travels the full length of the retort, and passes through the passages *m* to chamber G. After passing the length of the chamber G it escapes at the stack *k*.

One of the principal objections to benches built of tile is that in practical operation they are liable to crack from contraction and expansion and drop continually into the fire-box, thereby damaging the plant. With my invention this objection is overcome.

My arches protect the fire and do not waste it. I have found that in order to generate a uniform fixed gas it is necessary to cover the retorts with a suitable fire-clay sleeve, graphite, or any other substance that will protect retorts. For the purpose of generating a uniform fixed gas I cover the retorts with suitable fire-clay sleeves, graphite, or any other substance to protect the same, and indicated by *n*. In the upper part of the bench of retorts I pass four small oil-pipes *p* for the purpose of heating the oil to a high degree of temperature. The oil then passes to the upper retorts, where it takes a gaseous form, and thence passes to the lower retort, where it is highly superheated and becomes a permanently-fixed gas. It then passes to the seal, which is filled with flowing water, supplied with an overflow-pipe, for the purpose of extracting the tar or other heavy hydrocarbons.

In my fire-box I can burn either hard or soft coal or wood.

I have found in practical operation that it is unnecessary to heat the air to mix with carbon, as I have experienced considerable trouble in the bench firing back, or, in other words, the pipe between the exhaustor and the bench becoming superheated to such a degree that it was dangerous to generate gas, and I also find that the heated carbon coming from the seal has an affinity for the oxygen and a perfect mixture thus takes place immediately. I find much better results by admitting the oxygen without being superheated. I use about one-half oxygen and one-half carbon, as shown by the analysis. The gas is then taken from the seal by an exhaustor and passed through a center seal and purifying-box or scrubber, where the heavy material and moisture are extracted from the gas. I have found it unnecessary after a practical experience under this sys-

tem to pump the drips. I then pass it to the holder for distribution on the line of the main. The plant is thoroughly protected by cut-off and by pass valves and clean-out hand-holes, 5 so that the system is under the perfect control of the engineer. I claim particularly for this gas that it will stand in cold climate and will not stratify or condense.

It can be used for power, for heating, or for 10 lighting with open tip or mantle.

It is apparent that I may make many modifications to my invention without departing from the spirit of the same.

Having now described my invention, what 15 I claim is—

In a gas-generator, the combination with the furnace, comprising the fireplace and the se-

ries of superimposed chambers having flame-passages at alternately opposite end openings, 20 the retorts located in said chambers, connected together at their alternate ends, the oil-supply pipes located in the upper chamber and connected with the upper retorts, the protecting-covers above the lower retorts and 25 extending from end to end thereof, and the coverings above the intermediate retorts and extending part way the length thereof, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES TWAMLEY.

Witnesses:

MINA MEEMS,
C. L. SPRING.