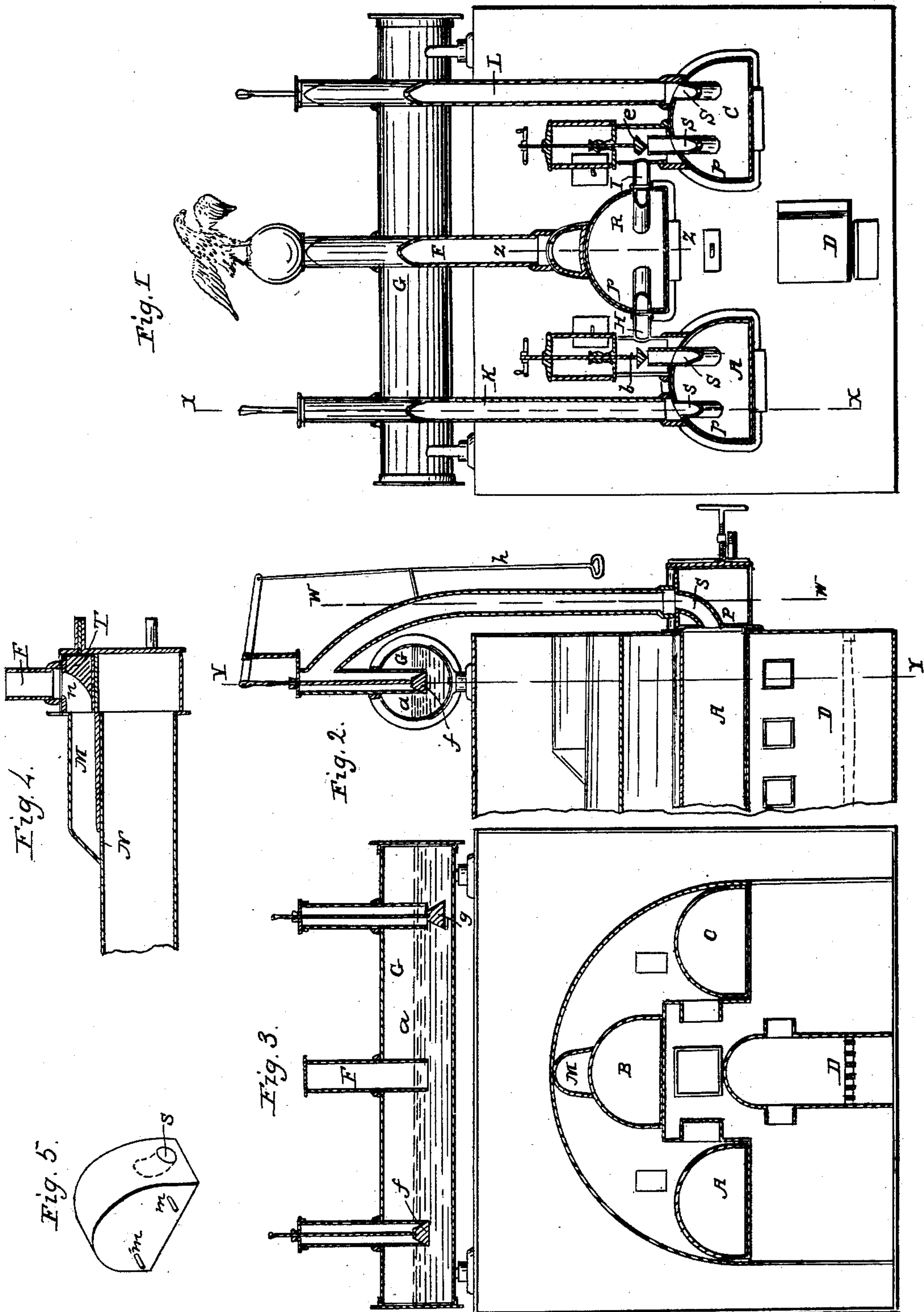


J. L. STEWART.

Gas Retort.

No. 20,453.

Patented June 1, 1858.



UNITED STATES PATENT OFFICE.

JOHN L. STEWART, OF EAST BOSTON, MASSACHUSETTS.

MANUFACTURE OF GAS.

Specification of Letters Patent No. 20,453, dated June 1, 1858.

To all whom it may concern:

Be it known that I, JOHN L. STEWART, of East Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in the Arrangement of Gas-Generating Retorts and in the Manner of Operating Them, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section upon the line W, W, of Fig. 2, Fig. 2, a vertical section upon the line X X of Fig. 1, Fig. 3, a vertical section on the line Y, Y, of Fig. 2, Fig. 4 a vertical section on Z, Z Fig. 1, Fig. 5, a view of one of the mouth piece stoppers.

Gas generating retorts as ordinarily constructed and arranged are worked four hours before recharging. The gas formed the first two hours is far richer than that produced during the latter part of the process, the former being too rich, the latter too poor, and unless these two products can be chemically combined, the rich gas will deposit a large portion of its illuminating material in the form of tar, without enriching the poorer gas, and thus a waste and loss is sustained. This chemical union or combination must take place in a heated chamber and before the rich gas has been cooled in any way so as to deposit its tar.

My invention has for its object to mix the gases both poor and rich immediately after they are formed, and before the latter is allowed to cool, and this end I accomplish by such an arrangement of retorts and connecting passages that the gas formed simultaneously in several retorts is brought into contact and intimately mixed before any portion of the gas has an opportunity to cool, the mixing being accomplished in one of the retorts or in a separate chamber which is kept heated for the purpose, no portion of the gas being allowed to pass over the surface of the heated coke in another retort except so far as may be necessary to mix the different qualities, as this contact with the highly heated coke decomposes the olefiant gas and greatly deteriorates the quality of the mixture as well as diminishes its quantity.

Owing to the inconvenience and impracticability of attaching a stand pipe to the retort at a point with which the fire is al-

lowed to come in contact, it becomes necessary to construct the generating retorts with a mouth piece which projects out beyond the brick work in which the retort is set, this mouthpiece remains comparatively cool and a large portion of the richest gas is condensed therein. In carrying out the first part of my invention were the gases admitted directly into this mouthpiece, or cold chamber, a portion of them would be condensed before they reached the retort in which they were to be commingled.

To obviate this difficulty is the object of the second part of my invention which consists in the employment of a "stopper" which entirely fills the mouth piece when the retort is in operation, and is furnished with conduits for the passage of the gas, which passes rapidly through them, and is not condensed as when it is allowed to circulate through the cold mouth piece.

To enable others skilled in the art to understand my invention I will proceed to describe the manner in which I have carried it out.

In the said drawings A, B, C, are retorts which are set to be heated by one or more fires as may be deemed desirable. In the bench here represented the three are heated by a single fire at D. The stand pipe F, of the central retort B, is connected in the customary manner with the main G, the pipe dipping as usual below the surface of the tar at *a*.

H and I are passages of communication between the side retorts and the central one B. These passages are commanded by valves *b*, *c*, which may be opened and closed as required. The stand pipes K, L, of the retorts A and C enter the main, their terminations having valves *f* and *g*, which may be closed by means of rods *h*. The gases from the retorts A, C, pass into the center retort where they are commingled with that generated in this retort, the whole passing off through the passage M to the stand pipe F. It is necessary that this commingling take place before any one of the gases has an opportunity to cool, or in any degree deposit its illuminating material. For this purpose they may all be brought together and mixed within one of the retorts or within a separate chamber heated for the purpose. The former is however the plan which I prefer, and when it is adopted care should be taken that the gas be not caused

to pass a greater distance along the retort in which the mixture takes place than is simply necessary to commingle that from the different retorts, as otherwise a portion of the gas will be decomposed and its carbon deposited; the opening N, from the center retort to the passage M should however be placed a short distance back of the mouth piece that the gas from the different retorts may not rush into the stand pipe before being intimately mixed. In the hot chamber or passage M the gases are still more perfectly mixed before entering the stand pipe by which means the products of the different retorts are so united as to form that mixture of poor and rich gas best adapted to purposes of illumination, without the loss which results from the exposure of the too rich gas to condensation as has heretofore been the case. In passing from the side retorts to the central one the rich gas would be exposed to condensation were it poured directly into the cold mouthpiece of the latter. To remedy this I have contrived what I call a mouth-piece stopper which consists of a hollow box constructed of galvanized sheet iron that entirely fills the mouthpiece and is furnished with suitable conduits for the passage of the gas. As this stopper is not exposed to the fire it may be made light and is not burned out or destroyed as would otherwise be the case. This stopper is seen in perspective in Fig. 5 and in section at *p* in Figs. 1 and 2; it is removed from Fig. 4. The inner plate of this stopper serves as a door by which the entrance to the retort proper is closed, the joint being luted, thus compelling the gas to pass through the conduit flue, and in order that the stopper may be pressed up with sufficient force, handles *m* projecting from its front face enter the hollow handles *r* of the doors, the handles *m* being forced forward by springs *q*, as seen in section Fig. 4. These stoppers are provided with suitable funnels or passages S, also made of galvanized sheet iron through which the gas passes from one retort to another or to the stand pipes. In Fig. 4 is seen a smaller stopper T, which fills the mouth piece of the

chamber or passage M, and has a conduit *n*, through which the gas passes to the stand pipe F. When the coal employed is very rich one of the retorts may be worked constantly with wood or some other material forming poorer gas.

Operation: The fire being started at D and the retorts heated, the central one B is charged, the valves *b* and *c* being closed. After the lapse of one hour when the richest of the gas begins to form in this retort, the retort A is charged and the valve *b* opened and *f* closed. The poor gas formed in A now passes into the center retort and is mixed with the rich gas being there made, the two passing off by the passage M and stand pipe F. After another hour the retort C is charged, the valve *g* is closed and the valve *c* opened. The products of the three retorts now commingle in the center one, A producing the rich, and B and C poorer gas. At the end of the third hour the valves *b* and *c* are closed and the valves *f* and *g* are opened while the center retort is being recharged. In lieu of three retorts any suitable number 4, 5 or more may be run together the products of the whole being united as described in one of them.

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

1. Mixing the gases from the several retorts of a series alternately in one or other of them, and charging the retorts successively at stated intervals as set forth when the retorts are arranged with valves and passages of communication with each other whereby the gases of different qualities are commingled before being cooled as described for the purposes specified.

2. I claim conducting the gas from one retort to the other, through a nonconducting stopper or other equivalent device temporarily inserted in the mouth piece as set forth.

JOHN L. STEWART.

Witnesses:

JAIRUS PRATT, JR.,
SAML. C. ALLEN.