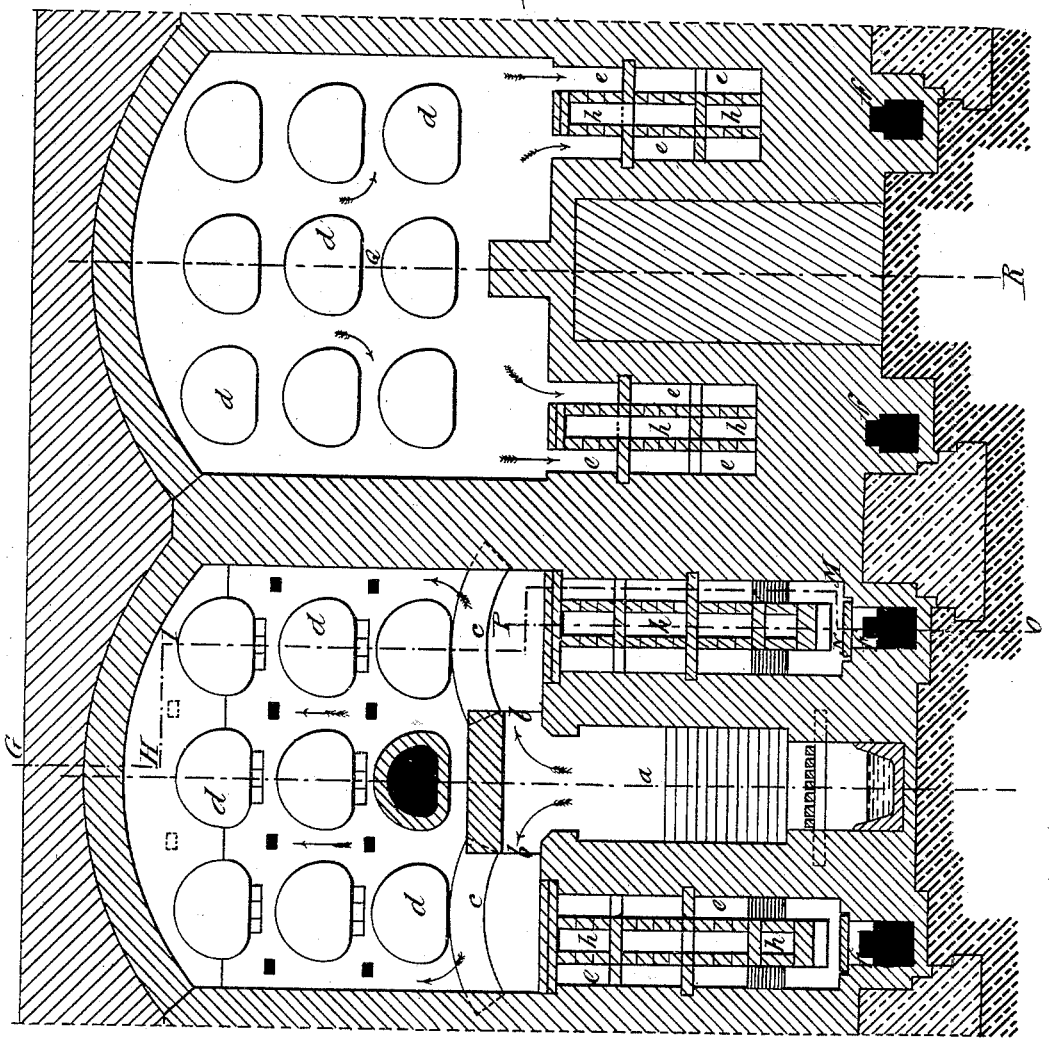
(No Model.) 3 Sheets—Sheet 1.

W. FOULIS.

REGENERATIVE GAS RETORT FURNACE.

No. 418,314. Patented Dec. 31, 1889.

Fig 1



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REGENERATIVE GAS RETORT FURNACE.

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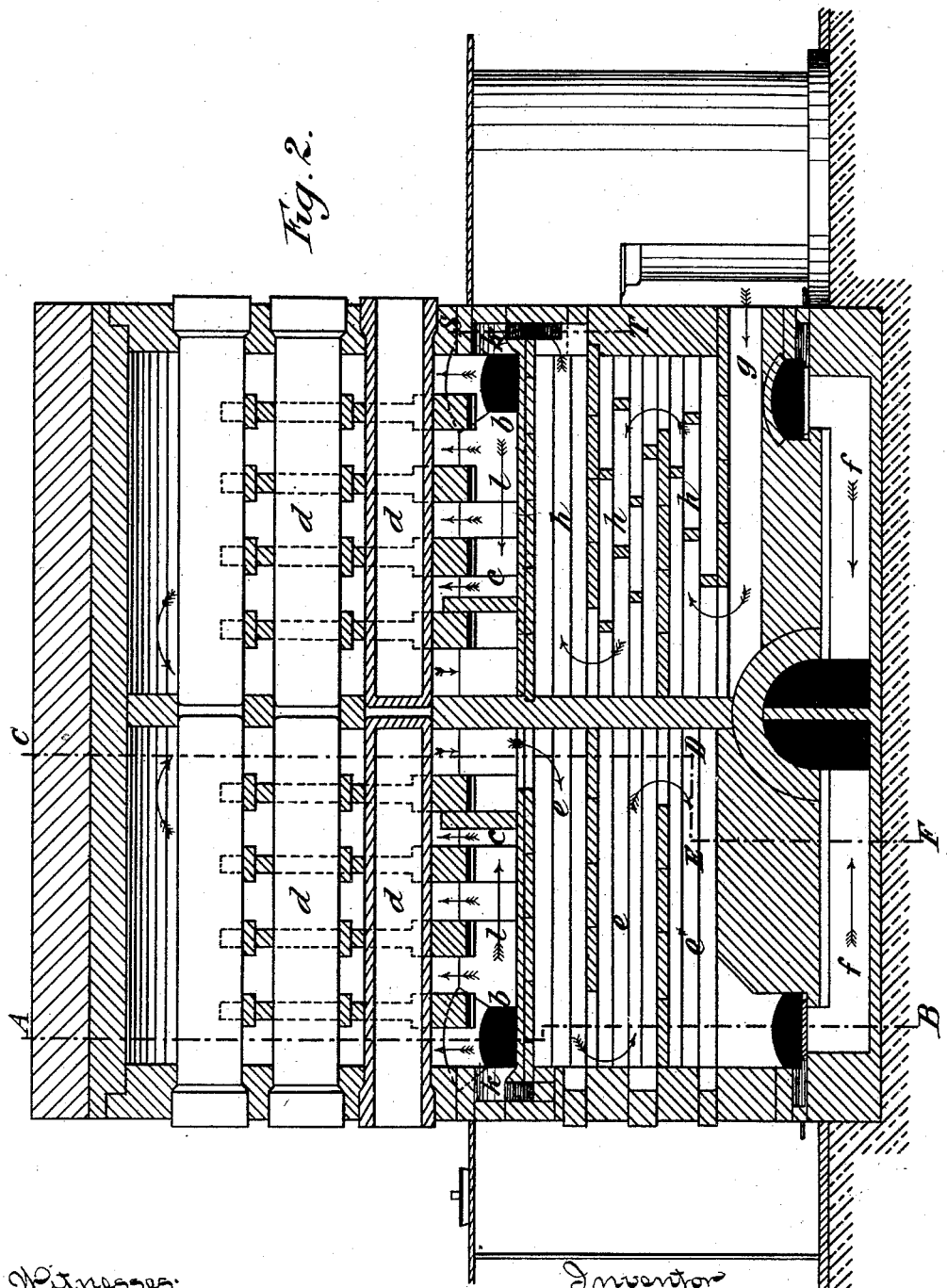
Fig. 2.



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REGENERATIVE GAS RETORT FURNACE.

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Fig. 4.

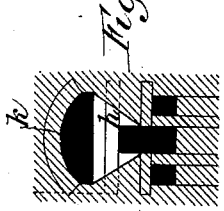
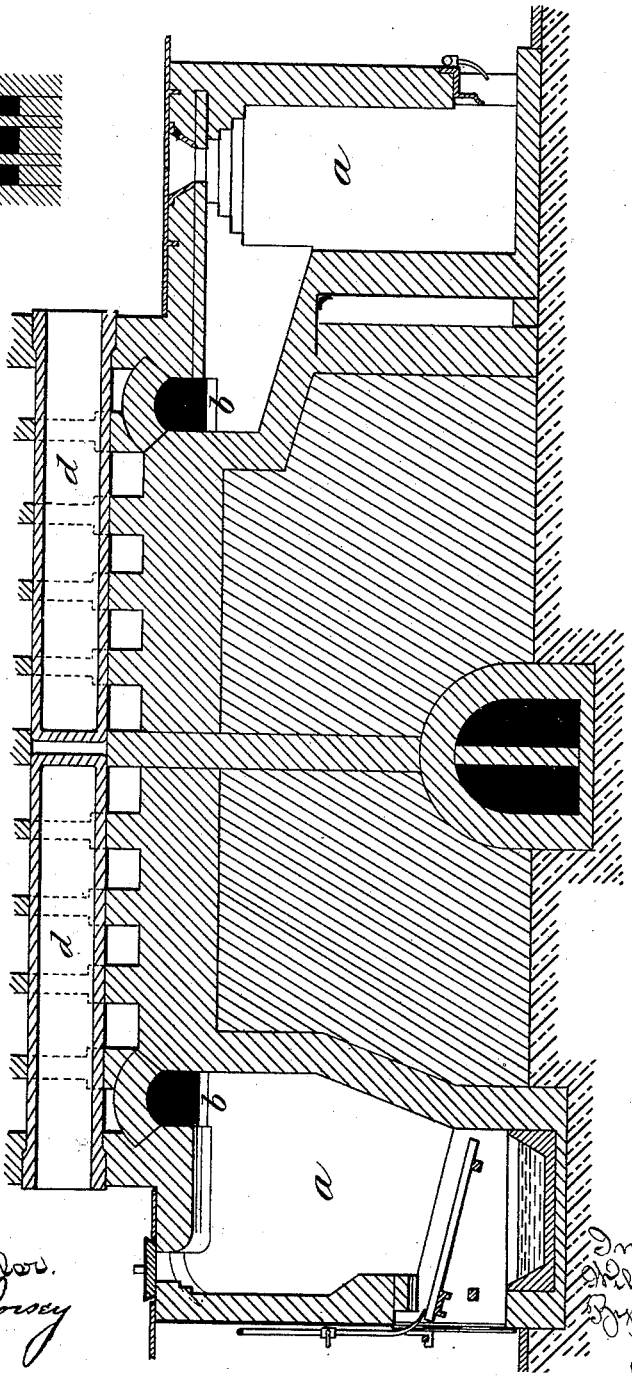


Fig. 3.



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UNITED STATES PATENT OFFICE.

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REGENERATIVE GAS-RETORT FURNACE.

SPECIFICATION forming part of Letters Patent No. 418,314, dated December 31, 1889.

Application filed February 3, 1888. Serial No. 262,948. (No model.) Patented in England June 19, 1886, No. 8,157.

To all whom it may concern:

Be it known that I, WILLIAM FOULIS, engineer, of 42 Virginia Street, Glasgow, in the county of Lanark, Scotland, have invented an Improvement in Regenerative Gas-Retort Furnaces, (for which Letters Patent have been granted in Great Britain, No. 8,157, and dated June 19, 1886,) of which the following is a specification.

In regenerative gas-retort furnaces as they are at present arranged combustible gas produced by partial combustion of fuel in a gas-producer enters the combustion-chamber, where it meets and burns with air heated by its passage through flues arranged side by side with those which carry off the waste products of combustion.

Usually the gas enters the combustion-chamber in a horizontal direction and the hot air rises vertically to meet it, so that the main heat of the combustion is directed immediately upon the structure above, causing rapid deterioration of the structure and producing deposits and incrustations which seriously interfere with the free passage of the gases and render necessary frequent stoppage and repairs.

The object of the present invention is to remedy this evil in such furnaces, which is effected in the following manner: The hot-air flues, instead of opening vertically into the combustion-chamber, are continued beyond the point where the gas enters it. They are then directed upward to about the level of the combustion-chamber and open with widened mouths into the flame-chamber, where the air meets the gas and enters into combustion with it. The gas and hot air being thus made to meet on the same level as they are moving horizontally, the flame, instead of being directed upward, impinging on the structure above, and causing intense local heat, sweeps freely along the flame-chamber, delivering its heat uniformly over the furnace without such local intensity as can damage the structure. It is found, moreover, that by thus permitting the flame to take a free course, impinging as little as possible on any solid obstacle, more perfect combustion and complete evolution of heat are secured.

The accompanying drawings are vertical sections showing this invention applied to a regenerative gas-retort furnace, these sections being taken on different planes, as follows:

Figure 1, in its left half, is a section on A B, and in its right half on C D E F, of Fig 2, which on its left half is a section on G H I K L M N O and on its right G H I K P O of Fig. 1. Fig. 3 is a section on Q R of Fig. 1, and Fig. 4 is a section on S T of Fig. 2.

The gas generated in the producer *a* passes by the flues *b* into the combustion-chamber *c*, where it meets with the supply of heated air and burns. As indicated by the arrows, the flame, which is mainly developed in the chamber *c*, and the products of combustion circulate between and around the retorts *d*, and then the products descend along the zigzag channels *e* to the flues *f*, whence they pass to the chimney-shaft. The air entering at *g'* ascends the zigzag channels *h*, which are arranged between the channels *e*, and separated from them by thin partitions, so that the air in its ascent along the channels *h* becomes heated. The uppermost channel *h* is extended beyond the mouth of the gas-flue *b*, and an uptake from its end expands, as shown in Fig. 4, to a wide mouth *k*, opening into the combustion-chamber *c* at or about the same level with the gas-flue *b*. Thus the heated air directed across the stream of gas mingles with it, supporting combustion and producing a gentle flow of flame along the chamber *c*, (indicated by the arrows *l*,) the flame and products thence diffusing themselves among the retorts.

Instead of a single mouth to the gas-flue *b* and to the air-supply *k*, there may obviously be several mouths, so as to subdivide the gas and air into several streams directed either obliquely across or parallel to one another, so as to produce a flame traveling horizontally along the combustion-chamber *c*.

I claim—

In a regenerative gas-furnace, a combustion-chamber, the walls thereof provided with

horizontal air-passages and horizontal gas-passages opening into the said chamber in the same horizontal plane, near the bottom thereof, whereby the resultant flame is caused to travel horizontally near the bottom of the chamber before rising, as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM FOULIS.

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