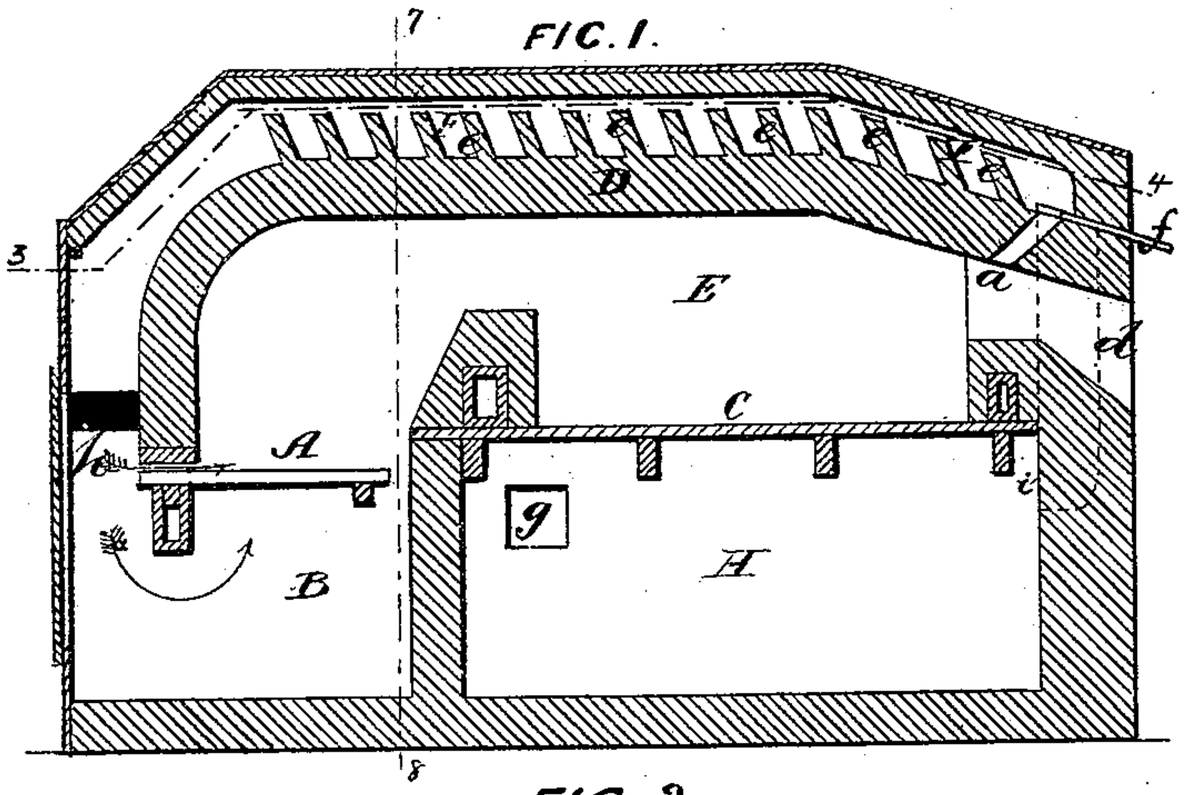
(No Model.)

G. FENWICK & B. COCHRANE.

REVERBERATORY FURNACE.

No. 271,442. Patented Jan. 30, 1883.

FIC. 1.



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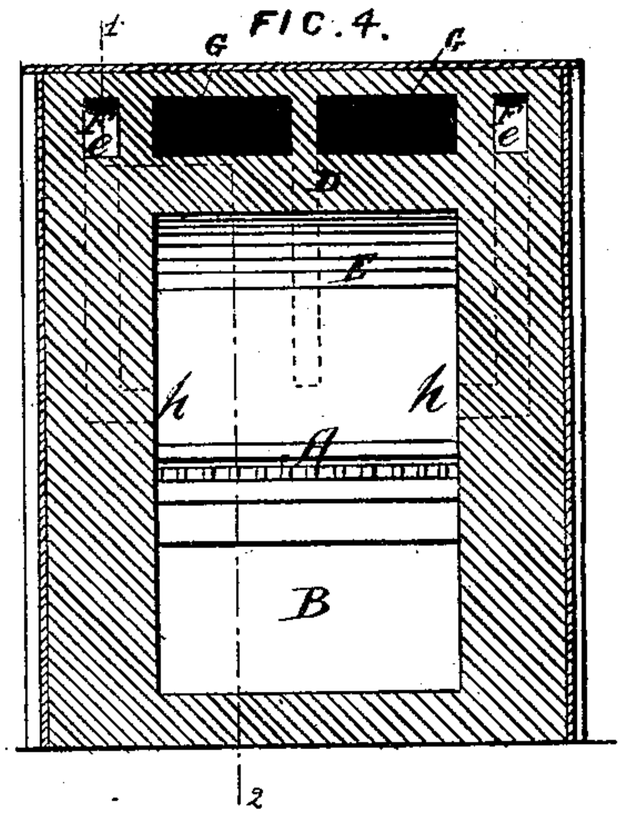
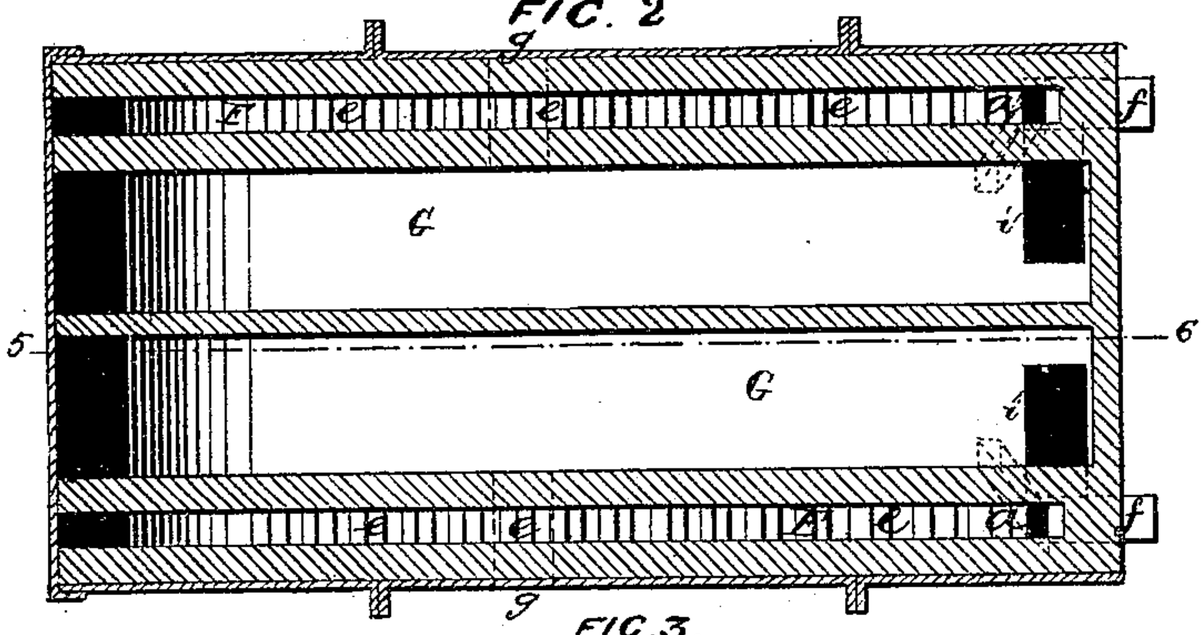


FIC. 2



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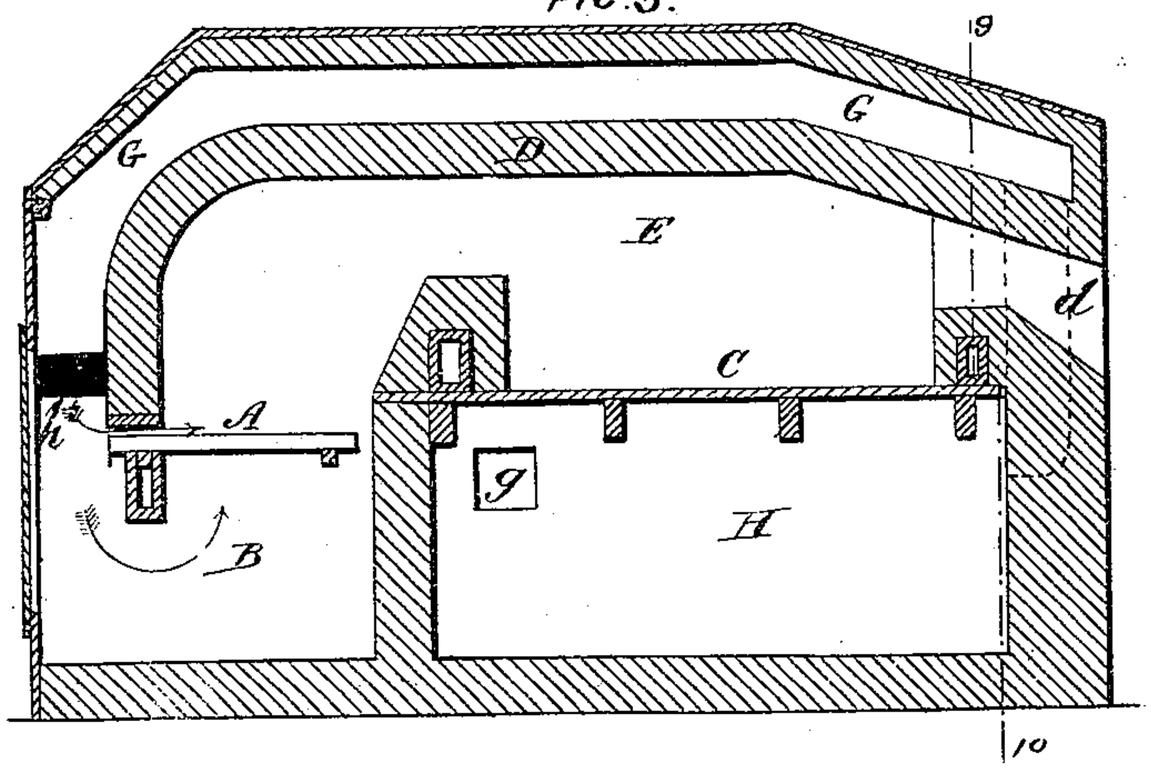

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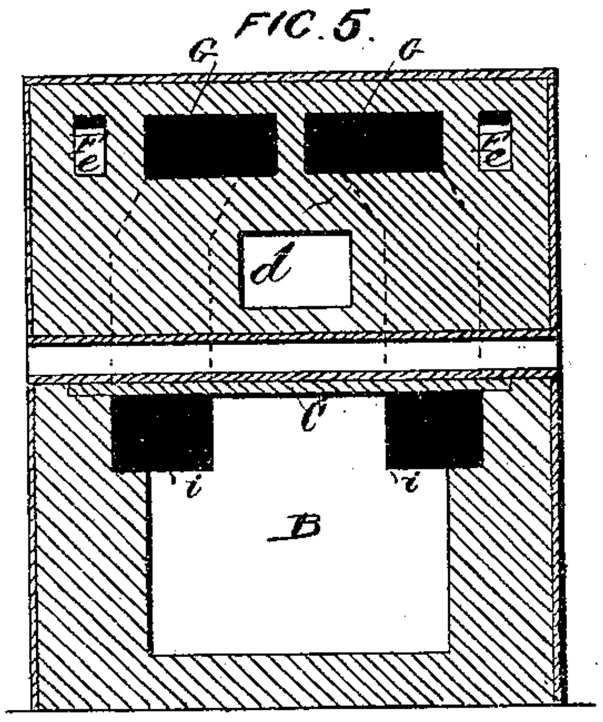

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UNITED STATES PATENT OFFICE.

GEORGE FENWICK, OF GATESHEAD, COUNTY OF DURHAM, AND BRODIE COCHRANE, OF DURHAM, COUNTY OF DURHAM, ENGLAND.

REVERBERATORY FURNACE.

SPECIFICATION forming part of Letters Patent No. 271,442, dated January 30, 1883.

Application filed January 24, 1882. (No model.) Patented in England June 28, 1881, No. 2,834.

To all whom it may concern:

Be it known that we, GEORGE FENWICK and BRODIE COCHRANE, subjects of the Queen of Great Britain and Ireland, and residing respectively at Gateshead and Durham, both in the county of Durham, England, have invented certain Improvements in Reverberatory Furnaces, for which we have obtained British Letters Patent No. 2,834, dated June 28, 1881, of which the following is a specification.

The object of our invention is to so construct a reverberatory or similar furnace as to utilize the heat under the most advantageous circumstances, in order to effect economy in the consumption of the fuel; and this object we attain by constructing in the roof of the furnace air-chambers and gas-flues, both communicating at one end with the ash-pit, and the gas-flues communicating at the other end with the combustion-chamber, while the said air-chambers communicate with an air-chamber below the hearth, as more fully described hereinafter.

In the accompanying drawings, Figure 1 represents a longitudinal section of our improved furnace on the line 1 2, Fig. 4. Fig. 2 is a horizontal section of the same, taken along the line 3 4, Fig. 1. Fig. 3 is a longitudinal section taken along the line 5 6, Fig. 2. Fig. 4 is a transverse section taken along the line 7 8, Fig. 1; and Fig. 5 is a similar section taken along the line 9 10, Fig. 3.

A are the fire-bars, situated over a closed ash-pit B. C is the working-hearth, and D is the crown of the furnace, E being the chamber in which combustion takes place, and the heat and flame are reverberated upon the materials contained therein.

Over the top of the chamber E are formed two flues, F, which in the present example are arranged one at each side of the furnace. These flues communicate at the rear end with the combustion or reverberatory chamber E by a small opening or openings, *a*, capable of being regulated by a valve or valves, *f*, and terminate at the front end in the closed ash-pit B. By suitably adjusting, by the aid of the valve or valves *f*, the degree of opening at *a* a portion of the flame from the chamber E is diverted from escaping to the chimney at *d*, and is drawn into the flues F, along which it passes into the closed ash-pit B. It then passes over and between the fire-bars A, as indicated by the arrows, and intensifies the heat in the chamber, this process being continued, so as to maintain a circulation from the chamber E, through the flues F, over and between the fire-bars A, and back to the chamber E. The gas-flues F are provided with a series of baffles, *e e*, which are composed of brick-work placed at an angle, and are so arranged that while they admit of a portion of the flame drawn in from the chamber E, as before mentioned, passing freely along the flues F, the said baffles will at the same time form an obstruction to the return of any gaseous products under the draft of the chimney.

As a means of supplying air to mix with the gases to support combustion, we employ an air chamber or chambers, G, arranged over the top of the furnace, and which may be conveniently constructed between the two chambers, F, as shown. Cold air is admitted at *g* into a chamber, H, beneath the hearth of the furnace, and from this chamber H the air, partially heated, is conducted by passages *i* into the air chamber or chambers G. The air then becomes highly heated by passing along the said chambers, and is mixed at *h* with the flame-gases from the flues F, the mixture thence passing over and between the fire-bars, and further intensifying the heat. The air-chambers G may be provided with perforated brick partitions, if required.

By cutting off the communication with the chimney by means of a damper the products of combustion may be caused to circulate continuously from the chamber E, along the gas-flues F, through the chamber E again to the said flues, and so on in succession as long as required.

We are aware that it is not new to arrange gas and air flues in the roofs of furnaces. This we do not desire to claim, broadly; but

We claim as our invention—

The combination of the combustion-cham-

ber and ash-pit of a furnace with the furnace top or crown D, having a passage, *a*, gas-flues F F, leading to the ash-pit, and adjoining air-chambers G, also communicating with the ash-pit, the walls of the furnace having an air-inlet, *g*, and passages *i*, and a chamber, H, all substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE FENWICK.
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Witnesses:
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