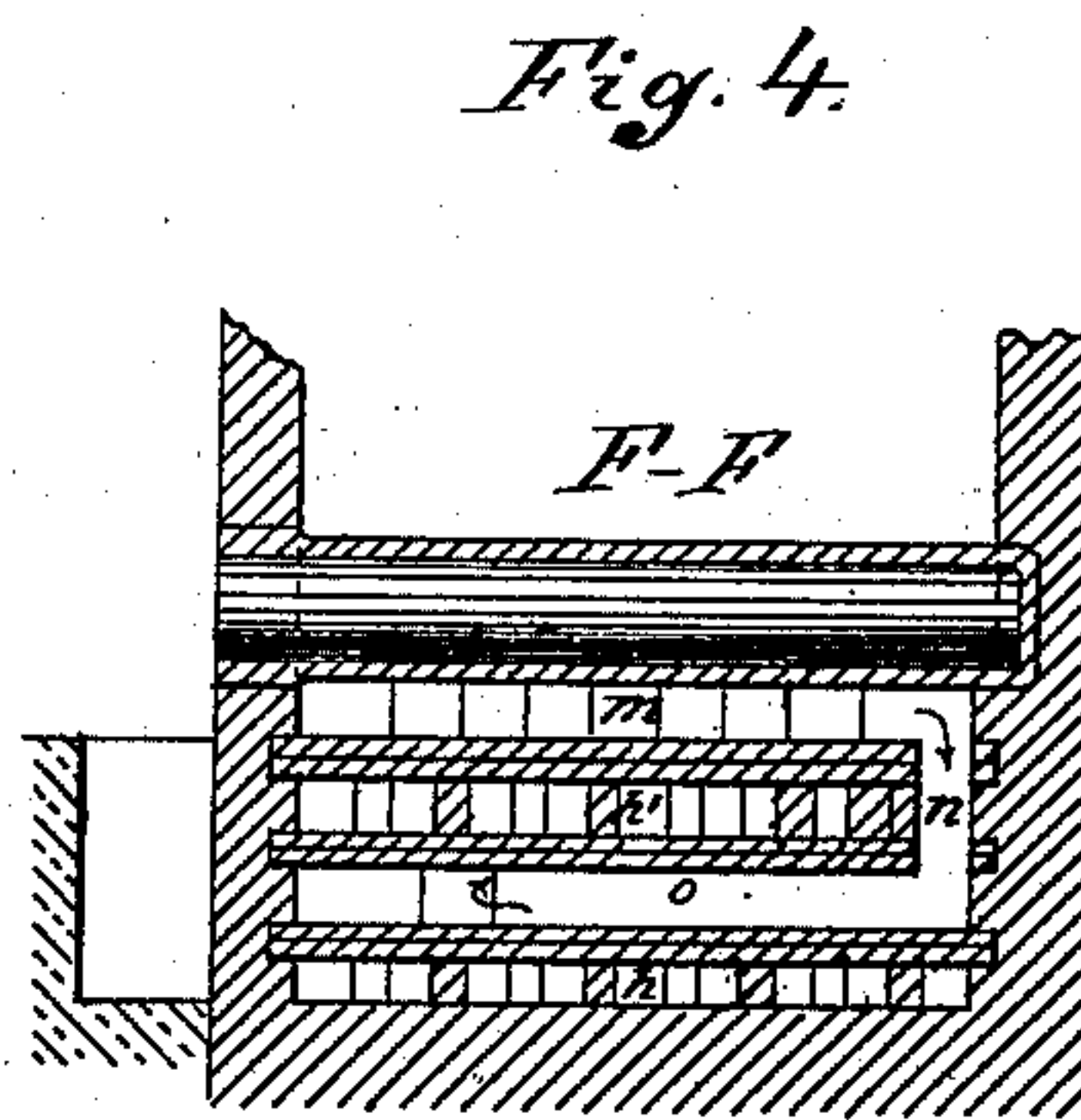
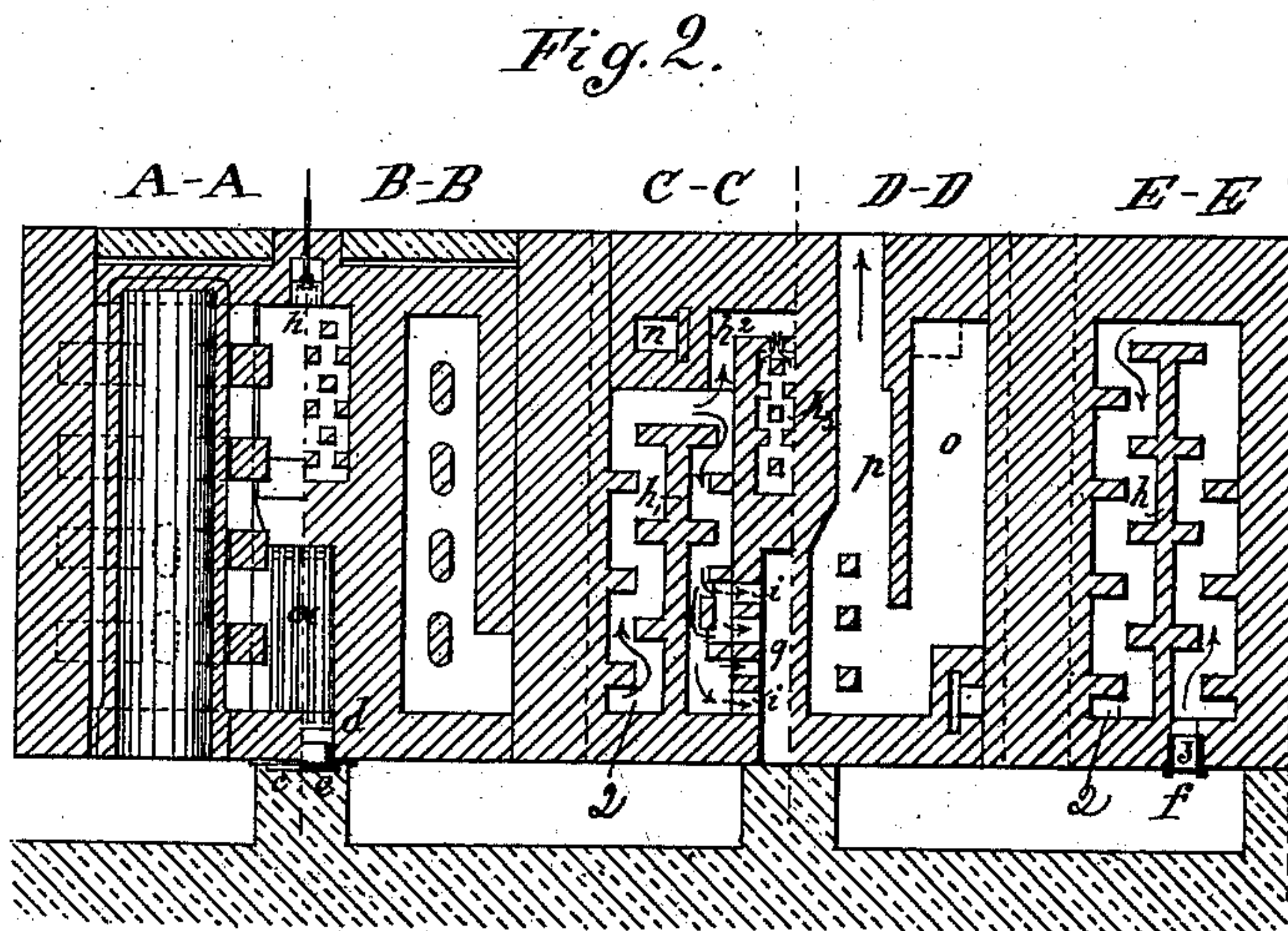
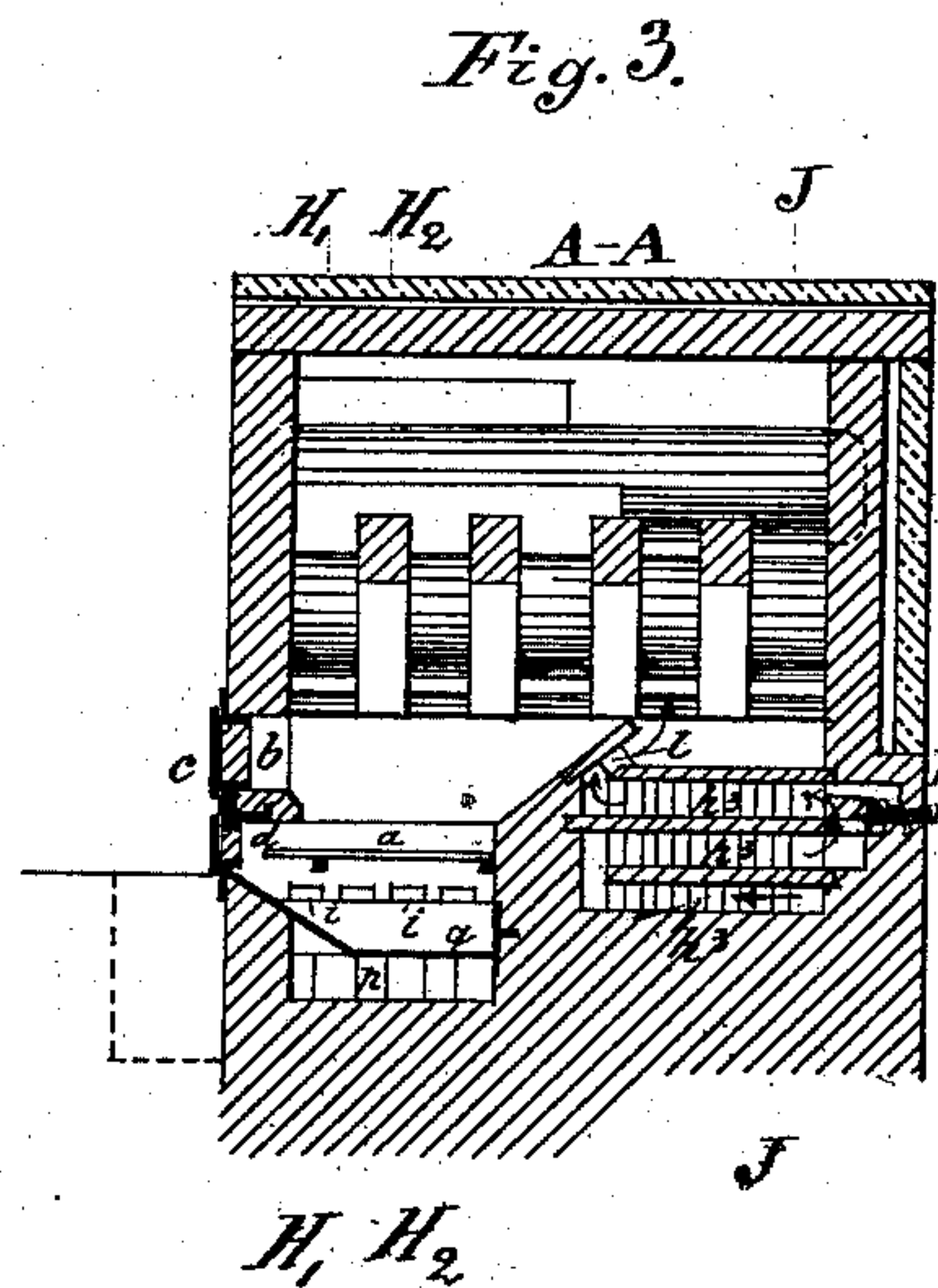
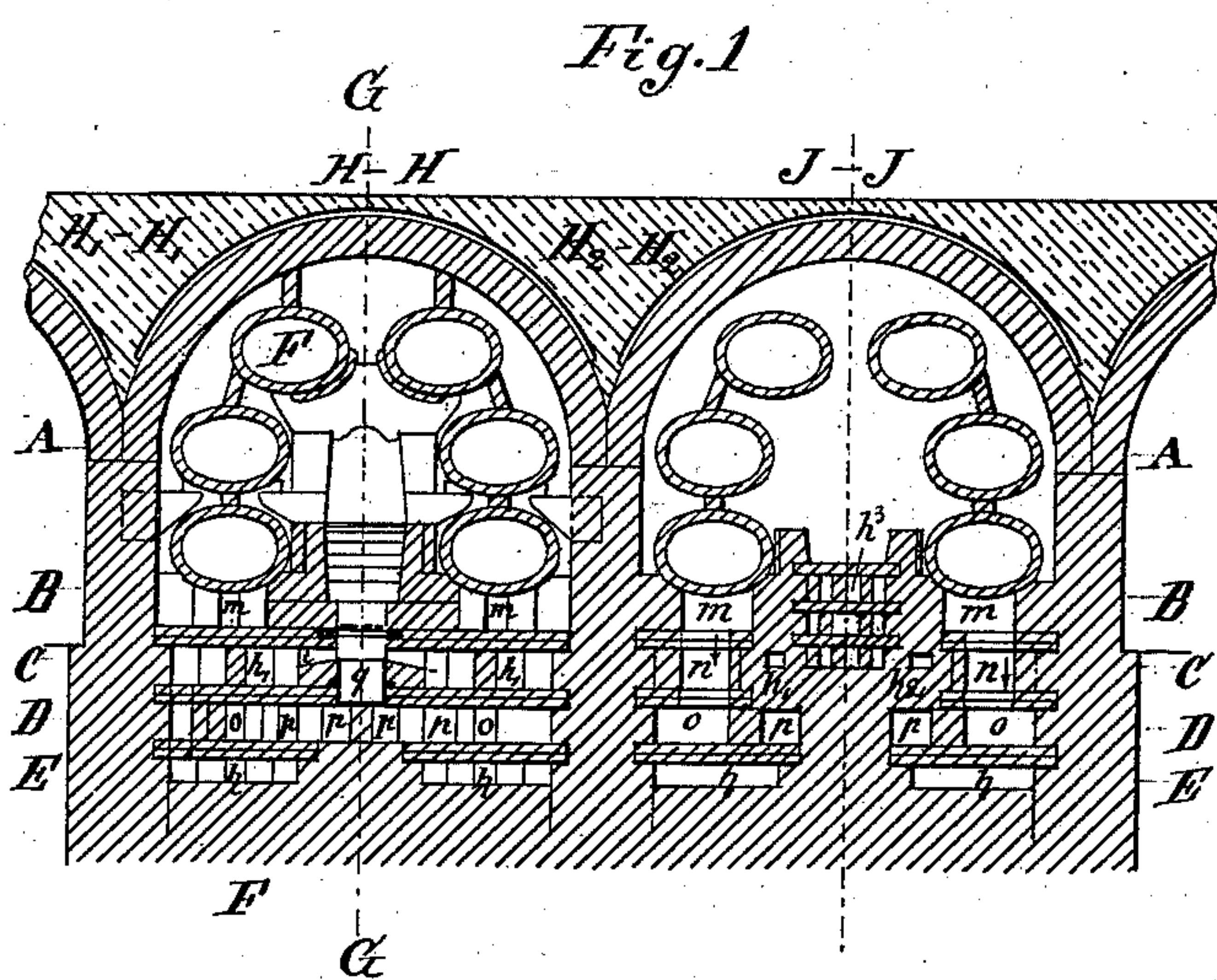


(No Model.)

J. T. HASSE & H. M. VACHEROT.
RETORT AND MUFFLE FURNACE.

No. 406,732.

Patented July 9, 1889.



Witnesses:

Hamilton D. Turner.

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Inventors:

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and

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by their Attorneys

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UNITED STATES PATENT OFFICE.

JULIUS THEODOR HASSE AND HERRMANN MORITZ VACHEROT, OF DRESDEN, SAXONY, ASSIGNORS TO THE STETTINER CHAMOTTEFABRIK ACTIEN-GESELLSCHAFT, OF STETTIN, PRUSSIA, GERMANY.

RETORT AND MUFFLE FURNACE.

SPECIFICATION forming part of Letters Patent No. 406,732, dated July 9, 1889.

Application filed October 10, 1885. Serial No. 179,499. (No model.) Patented in Germany May 26, 1883, No. 29,323; in England May 23, 1884, No. 8,144; in Belgium June 16, 1884, No. 65,234; in Sweden July 26, 1884; in Norway August 8, 1884; in Denmark October 20, 1884, No. 944, and in Spain November 20, 1884, No. 6,428.

To all whom it may concern:

Be it known that we, JULIUS THEODOR HASSE, a subject of the Emperor of Germany, and a resident of Dresden, Saxony, Germany, and HERRMANN MORITZ VACHEROT, a subject of the King of Saxony, and a resident of said Dresden, have invented certain Improvements in Retort and Muffle Furnaces, (for which we have obtained German patent, No. 29,323, dated May 26, 1883; Danish patent, No. 944, dated October 20, 1884; Belgian patent, No. 65,234, dated June 16, 1884; British patent, No. 8,144, dated May 23, 1884; Spanish patent, No. 6,428, dated November 20, 1884; Swedish patent, dated July 26, 1884, and Norwegian patent, dated August 8, 1884,) of which the following is a specification.

Our invention consists of improvements in the construction of furnace, more particularly retort or muffle furnaces; and the main object of our invention is to so construct the flues and other parts of the furnace as to obtain the most effective combustion and efficient heating.

In the accompanying drawings we have illustrated our improvements as applied to a series of furnaces each containing a set of six retorts.

Figure 1 is a vertical section on the lines H' H' and J J of Fig. 3. Fig. 2 is a sectional plan on the lines A A, B B, C C, D D, and E E of Fig. 1. Fig. 3 is a vertical section on the line G G of Fig. 1, and Fig. 4 is a vertical section on the line F F of Fig. 1.

Referring to Figs. 1, 2, and 3, *a* is the grate supplied with fuel through an opening *b* in the front wall, which opening can be closed air-tight by a door *c*, Figs. 2 and 3. Ashes, &c., are removed through an opening *d*, which can also be closed air-tight by a door *e*, Figs. 2 and 3. When these two doors are closed, after supplying fuel to the grate, no outside air can enter except through the series of air-heating passages, which I will now describe.

Each furnace is provided with air-inlets *j* (see right-hand side of Fig. 2) at the front,

one on each side, and the amount of air admitted can be regulated by slides *f*. The air entering first passes through the lowermost circuitous channels or conduits *h*, thence up through the openings 2 into the circuitous conduits *h'* above the intermediate smoke-flues, hereinafter described. As shown at the sections C C, Fig. 3, and H H, Fig. 1, these conduits *h'* *h'* communicate through openings *i i* with the fire-place immediately below the grate-bars. (See also Fig. 3.) The conduits *h'* *h'* are also in communication with a series of air-heating channels *h³*, Fig. 3, and section J J in Fig. 1, through the medium of passages *h²*. (See section C C, Fig. 2.) These channels *h³* communicate with each other alternately at opposite ends, as shown by the arrows in Fig. 3, and the uppermost has outlet-openings *l* into the combustion-chamber just behind the bridge-wall. A slide *k*, Fig. 3, controls the amount of air admitted through the channels *h³*, and by this means the relative quantities of air admitted directly to the fire through the openings *i* below the grate-bars and to the combustion-chambers through the openings *l* at the bridge-wall can be regulated at will, according to the demands of the furnace.

The products of combustion after exerting their effective heating action upon the retorts or muffles first pass down to the spaces *m* below the lowermost retorts, Figs. 1 and 4, and thence through the openings *n* at the rear, Figs. 1 and 4, and section C C, Fig. 2, into the smoke-flues *o*, Figs. 1 and 4, and section D D, Fig. 2, which lie between the air-heating conduits *h'* and *h*. The products of combustion pass through the flues *o* from rear to front of the furnaces, and thence turn into the return-flues *p*, (D D, Fig. 2,) leading to the chimney at the rear.

In each ash-pit space below the grate-bars is a pan to contain a supply of water, and the flues *p* in each furnace are extended below the pan in order to heat the water, so that the vapor rising from the pan may mingle with

the already heated air entering the fire-place through the openings i' , to assist in the effective combustion of the gases.

It will be observed that the smoke and air
5 flues in the lower part of the furnace alternate with each other, and the streams of air and of the products of combustion flow in opposite directions in their respective channels or flues, so as to get the most effective
10 heating action of the products of combustion in their flues upon the air in the adjoining conduits or channels.

We claim as our invention—

The fire-place having air-inlets i below the
15 grate, and the combustion-chamber, also having an air-inlet l behind the bridge-wall, in

combination with a series of air-heating channels h^3 below the combustion-chamber and leading to the inlet l , air-flues h h' , communicating with both the air-inlets to the fire-place 20 and with the air-flues h^3 , and the air-inlet l to the combustion-chamber, and smoke-flues intermediate of these flues h h' , all substantially as described.

In testimony whereof we have signed our 25 names to this specification in the presence of two subscribing witnesses.

JULIUS THEODOR HASSE.

HERRMANN MORITZ VACHEROT.

Witnesses:

PAUL DRUCKMÜLLER,
RICHARD SIMON.