

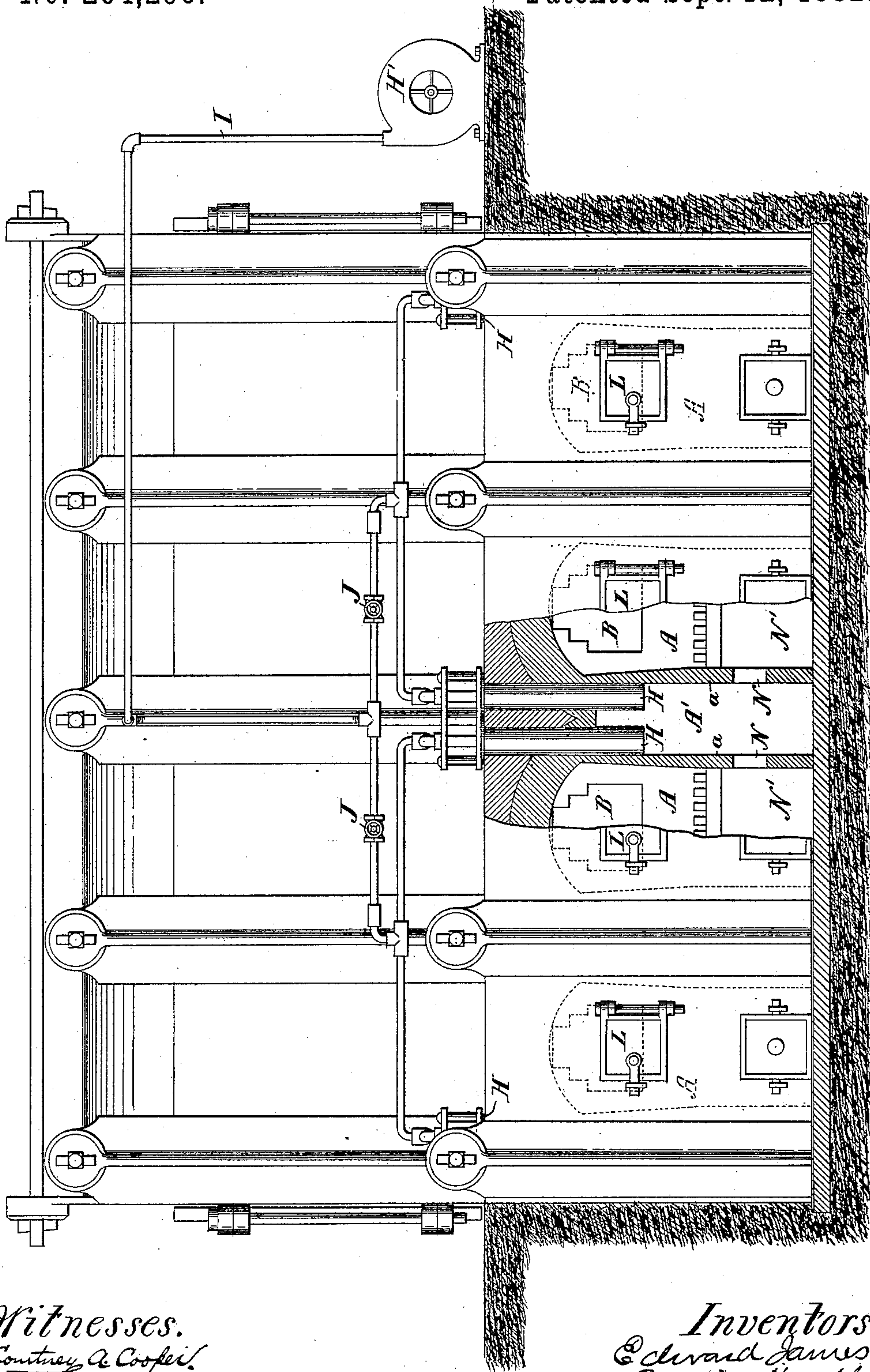
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4 Sheets—Sheet 1.

E. JAMES & E. HANDLEY.
ANNEALING FURNACE.

No. 264,296.

Patented Sept. 12, 1882.



—FIG. 1.—

Witnesses.
Courtney & Cooper
J. J. Ammer

Inventors.
Edward James
Edwin Handley
Per C. E. Foster atty

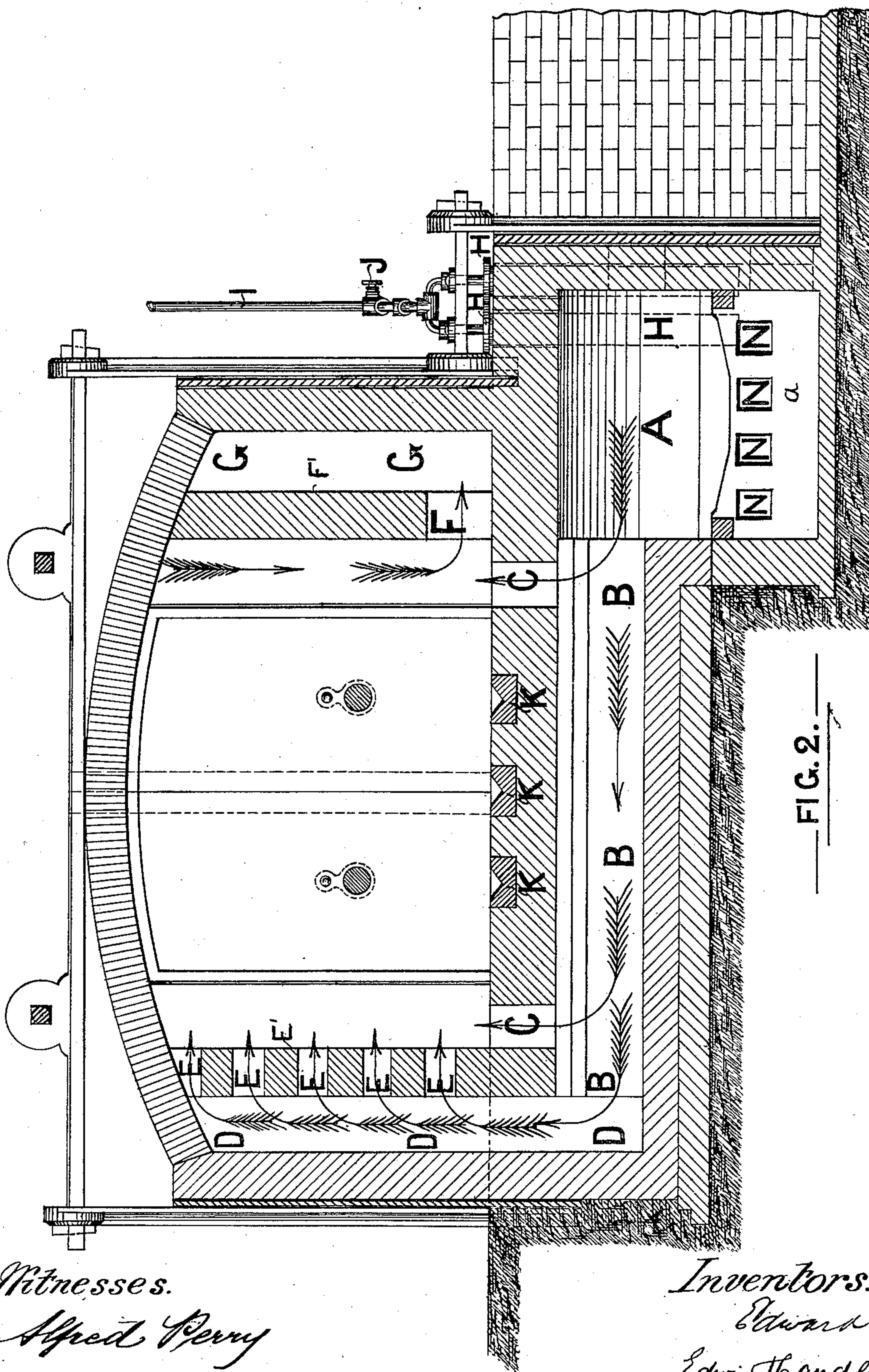
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4 Sheets—Sheet 2.

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Patented Sept. 12, 1882.



Witnesses.

Alfred Perry

James

Inventors.

Edward James

Edwin Handley

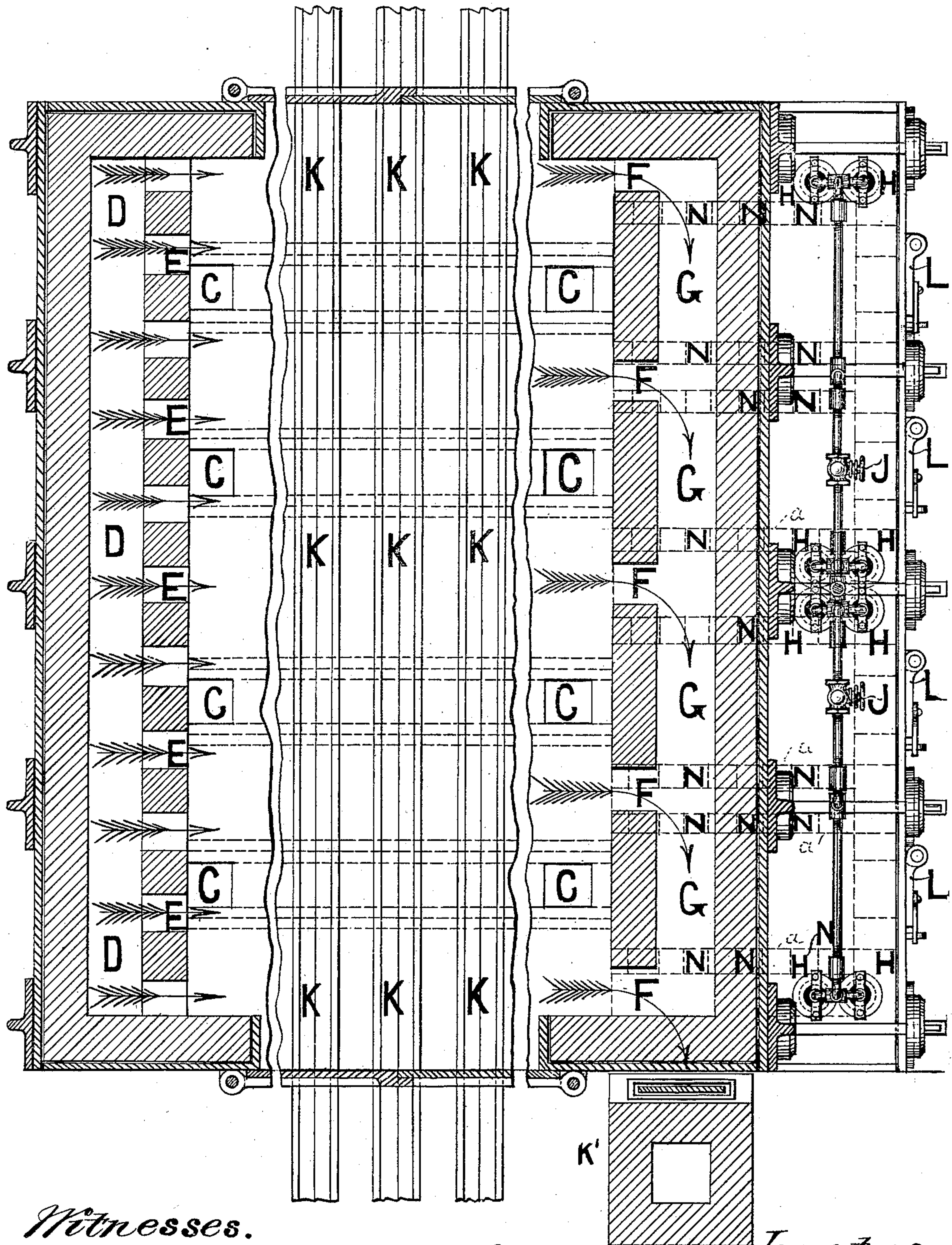
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Patented Sept. 12, 1882.



Witnesses.

Alfred Perry,

J. P. Smith

FIG. 3.

Inventors.

Edward James

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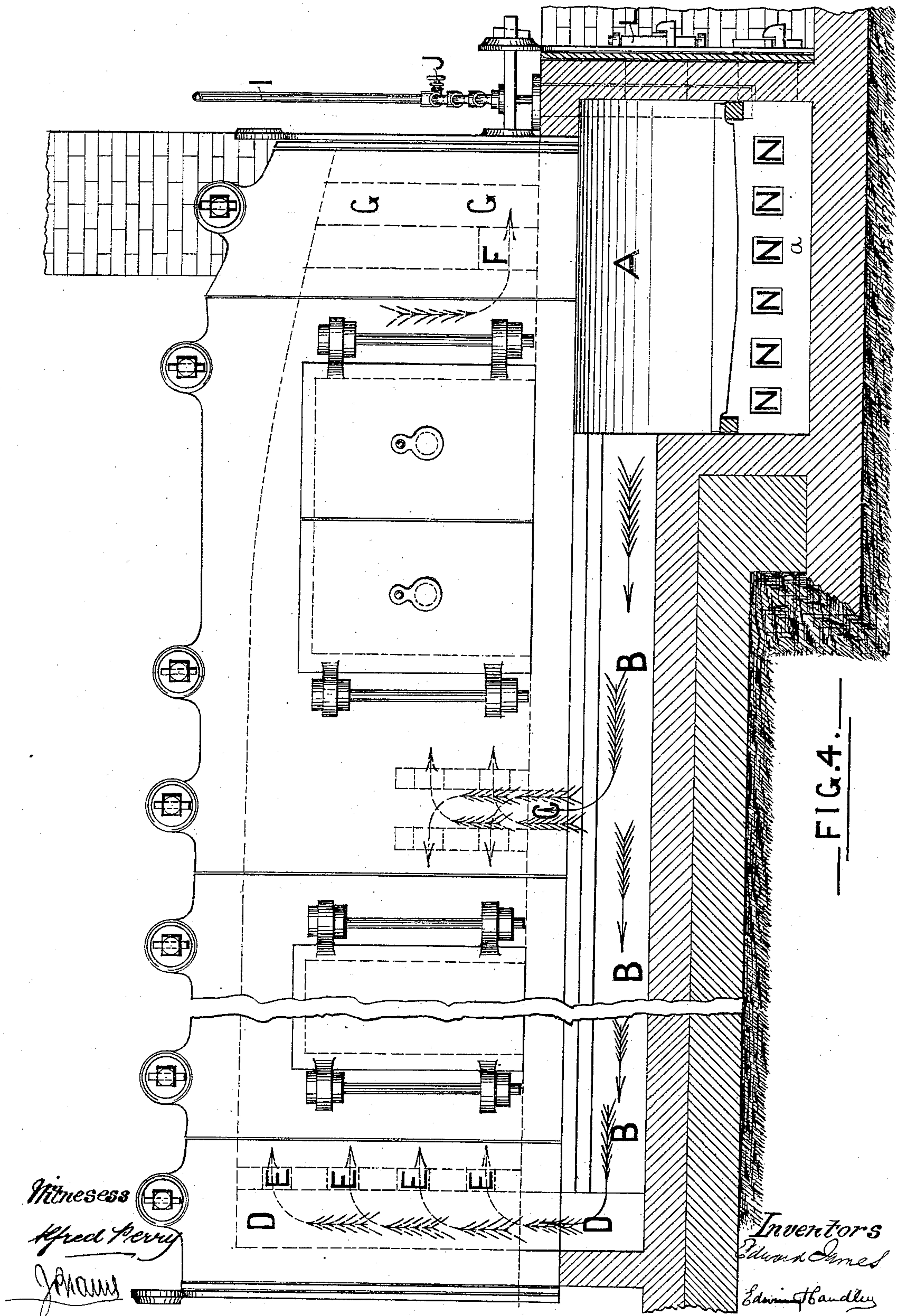
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4 Sheets—Sheet 4.

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Patented Sept. 12, 1882.



UNITED STATES PATENT OFFICE.

EDWARD JAMES, OF TIPTON, (NEAR BIRMINGHAM,) COUNTY OF STAFFORD, AND EDWIN HANDLEY, OF BIRMINGHAM, COUNTY OF WARWICK, ENGLAND.

ANNEALING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 264,296, dated September 12, 1882.

Application filed January 10, 1882. (No model.) Patented in England May 24, 1881, No. 2,252.

To all whom it may concern:

Be it known that we, EDWARD JAMES, tinplate-works manager, of Tipton, (near Birmingham,) in the county of Stafford, and EDWIN HANDLEY, metal merchant, of Birmingham, in the county of Warwick, England, have invented Improvements in the Construction of Annealing-Furnaces, (for which we have obtained a patent in Great Britain, No. 2,252, bearing date the 24th May, 1881,) of which the following is a specification.

In furnaces for open or close annealing we use a series of grate-rooms for the better equalization and diffusion of heat in the furnace and rendering combustion more complete, each grate being supplied by suitable means with superheated hydrogen, so as to rapidly increase the temperature of the furnace when required, the supply of such being regulated in any ordinary way.

Our invention consists, further, in the general arrangement of the horizontal and vertical or upcast flues for causing and imparting to the boxes containing the articles requiring annealing a more equal distribution of heat.

In the drawings, Figure 1 is a front elevation of our improved furnace, showing in section the arrangement of combustion and hot-air chambers through the broken-away portion. Fig. 2 is a transverse sectional elevation. Fig. 3 is a sectional plan view, and Fig. 4 is a side elevation, partly in section.

A is one of the series of rooms or combustion-chambers, which are separated by the walls *a a*, (shown in section in Fig. 1 and in dotted lines, Fig. 3,) the space between said walls forming heating-chambers *A'*, which communicate with the air-chambers *N'* below the grate-bars by way of the apertures *N*, provided for that purpose in the dividing-walls *a a*. The pipes *H* are built into the front wall of the furnace and terminate in the heating-chambers *A'*, and are for the purpose of conveying hydrogen to the heating-chambers *A'*, from which it passes in a highly-heated condition through the apertures *N* and up between the grate-bars to the burning fuel. The said pipes *H* are preferably composed of conductive metal, so as to

partially heat the hydrogen before reaching the chambers *A'*.

B B are horizontal flues. (Seen in Figs. 2 and 4, and indicated by dotted lines in Fig. 3.) These said flues may be of any suitable size and shape, and run underneath the bed or siege of the furnace. In connection with these flues are several upcast flues or openings, (marked *C*,) which are seen in Figs. 2, 3, and 4. The purpose and utility of these flues or openings is to facilitate the proper combustion of, and their tendency is to destroy, all noxious gases and smoke by the action of the heated air and flame which pass through them from the horizontal flues *B B*. The passage of such heated air and flame is indicated by the arrows seen in Figs. 2 and 4. In connection with the horizontal flues before mentioned is a flue, *D*, at the back of the furnace, which runs the whole length and height of the furnace, and which is shown in Figs. 2, 3, and 4, into which the flues *B* all open. Up this flue (marked *D*) a portion of the heated air and flames rise and then escape through the airways and openings *E*, formed in the back wall, *E'*, the passage of the flame being indicated by the arrows. The flame and heated air, having escaped from the flue *D* and through the openings *E*, pass equally over the siege or bottom, and consequently over the whole of the interior of the furnace. The heat being thus equally distributed, the products of combustion then pass through the openings or airways *F* in the wall *F'*, at the opposite side of the furnace, the bottom of the said openings being level with the bottom or siege of the furnace, the object being to pull the heated air and flame down toward and over the boxes containing the articles to be annealed. The spent flame then enters the out-cast flue *G*, Figs. 2 and 3, the arrows indicating its passage from the flue *G* to the chimney *K'*, Fig. 3, erected on either side of the furnace, the draft of the stack being regulated in the ordinary way.

A blower, *H'*, is used to force hydrogen through the pipes *I* from any suitable source of supply, and its passage to the heating-pipes *H* and chambers *A'* is regulated by the cocks *J*.

In passing through the said pipes and heating-chamber the hydrogen becomes highly heated, and in that condition passes through the apertures N into the air-chambers N' and upward through the burning fuel, and by promoting the better combustion thereof very rapidly increasing the temperature of the furnace, which may of course be as rapidly diminished by stopping or decreasing the supply of hydrogen, thus providing very efficient means for controlling the temperature of the furnace.

The rails K are for the purpose of receiving the wheels of the boxes containing the articles to be annealed.

The furnace is fed with its supply of ordinary fuel through the doors L.

The particular construction and arrangement of the annealing-furnace itself is not herein claimed, as it will form the subject of a separate application for Letters Patent.

What we claim, and desire to secure by Letters Patent, is—

1. In an annealing-furnace, the combination of a series of combustion-chambers having hori-

zontal flues leading therefrom, under the bottom of the said furnace, and gas heating-chambers, alternating therewith, with the gas heating-pipes H, conducting-pipes I, and the blower H', substantially as shown and described.

2. The series of heating-chambers having inlet-pipes terminating therein located between and extending below the combustion-chambers, and communicating with the air-chambers, as shown and described.

3. In a furnace, the combination and arrangement of combustion-chambers A, heating-chambers A', having apertures N, the air-chambers N', and horizontal flues B, as shown and described.

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

EDWARD JAMES.
EDWIN HANDLEY.

Witnesses:

ALFRED PERRY,
J. F. BRAME.