W. E. C. EUSTIS.

Furnace for Melting Metals.

No. 166,757. Patented Aug. 17, 1875.

Fig. 1.

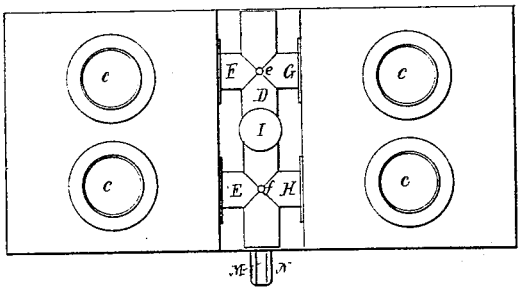


Fig. 6.

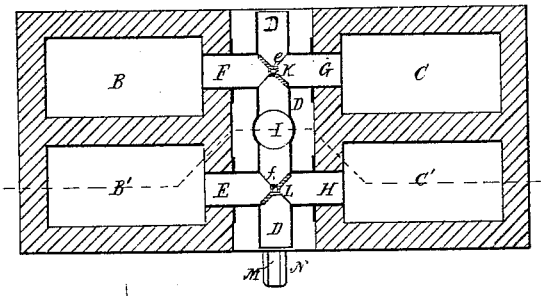


Fig. 2.

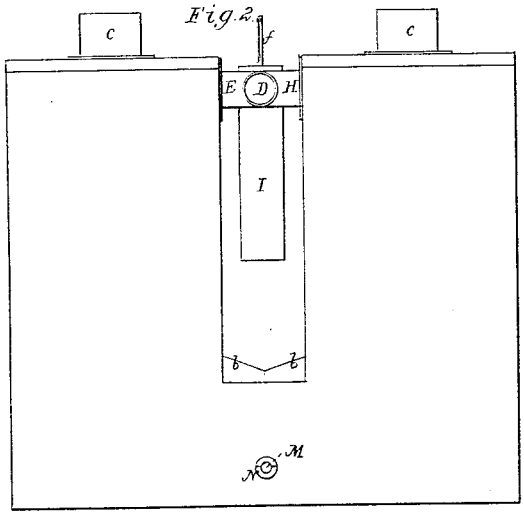


Fig. 3.

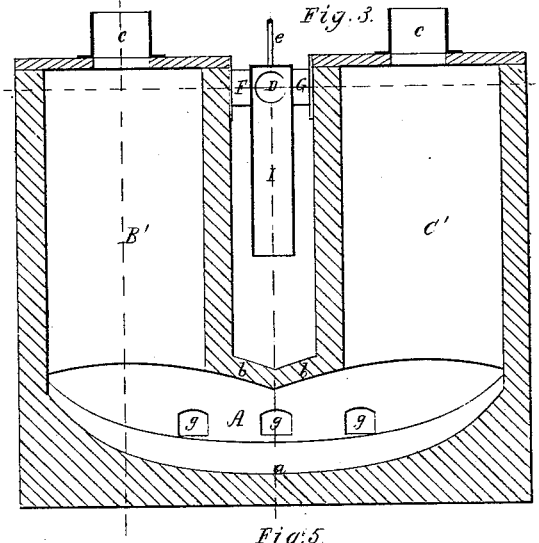


Fig. 4.

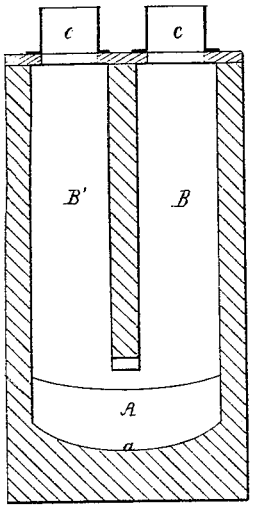
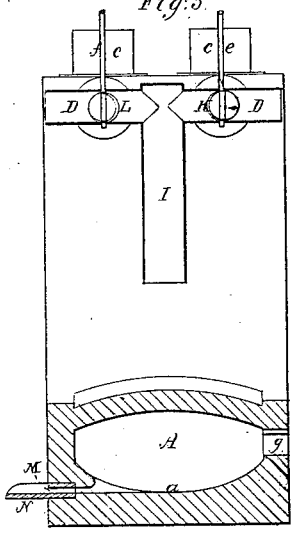


Fig. 5.



Witnesses.
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N. D. Edy

UNITED STATES PATENT OFFICE.

WILLIAM E. C. EUSTIS, OF MILTON, MASSACHUSETTS.

IMPROVEMENT IN FURNACES FOR MELTING METALS.

Specification forming part of Letters Patent No. **166,757**, dated August 17, 1875; application filed July 3, 1875.

CASE B.

To all whom it may concern:

Be it known that I, WILLIAM E. C. EUSTIS, of Milton, of the county of Norfolk and State of Massachusetts, have invented a new and useful Furnace for Melting Metal; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a front elevation, Fig. 3 a longitudinal section, and Figs. 4 and 5 transverse sections, of such furnace. Fig. 6 is a horizontal section, taken through the pipes for supplying air and gas to the auxiliary or charge chambers.

This furnace is to effect the melting of the metal—as iron or steel, for instance—by means of the combustion of air and gas led into it in separate columns or currents, and heated in their passage through two of the charges, and serving afterward to heat the other two charges, preparatory to their reception of separate columns or currents of air and gas to be united and burned at the bases or lower parts of such last-mentioned charges.

In this furnace the charges of metal are used to heat the air and gas in the place of separate expensive chambers containing stacks or piles of bricks, and generally termed "regenerators," from which it will be seen that great advantages, both in construction, cost, and expense of working, are attained by my invention.

In carrying it out I employ, in connection with a long chamber, A, whose hearth is shown at *a*, and crown or double arch at *b b*, four hollow columns or auxiliary chambers, B B′ C C′, there being a pair of them over the chamber A at and near each end of it, and to open directly into it, and over its hearth. Each auxiliary chamber is to be closed at top, except in having a hopper or induct, *c*, for supplying it with the metal, which hopper or induct may be provided with proper means of closing it, in order to prevent escape of air or gas through and from the hopper or induct. Between the two pairs of charge-chambers, and at their tops, there is arranged a horizontal pipe, D, provided with four branch pipes, E F G H, leading out of it and into the four charge-chambers B B′ C C′, in manner as shown in Fig. 6. An educt or chimney, I, extends from the pipe D at its middle. Furthermore, at the junctions of the pipes D and its branches E F G H are two valves or dampers, K L, which are arranged diagonally across such junctions, in manner as represented. The stems *e f* of such valves may be connected by mechanism for moving or turning them, so as to turn both valves simultaneously, as occasion may require. One side of the main chamber A I usually provide with three or other suitable number of openings, *g g g*, to be furnished with doors, such openings being to enable the working of the metal on the hearth to be seen at any time, and also to facilitate the repairing of the main chamber of the furnace, which, with the charge-chambers, is to be properly lined or protected with fire-brick, ganister, or other suitable refractory material. A tap-hole and spout (shown at M N) serve to enable the molten metal to be drawn from the hearth as occasion may require.

In using the furnace, after its four charge-chambers may have been duly supplied with pig or other metal to be melted down, air is to be blown or forced into the pipe D at one end thereof, and combustible gas into such pipe at its opposite end, in which case the column of air will pass into and down through the charge of one chamber, and the column of gas will also pass down through the charge of the next adjacent chamber, the two currents uniting and being burned at the lower parts of the two charges. The heated volatile products of combustion will next be driven or pass through the main chamber A, and thence up through the two opposite charges or their charge-chambers, and after having imparted heat thereto, will escape therefrom through the branch pipes of said chambers, and into the pipe D, and thence into the chimney or educt. This operation having been allowed to go on for a sufficient time, the two dampers are next to be reversed or turned into positions at right angles to those previous ones, whereby the air and gas will be forced into and down through the charges of the two

chambers just previously heated by the spent gases. In passing through such changes, the separate currents of air and gas will absorb heat from them, and meeting together at the base of the partition between the two chambers will ignite, and aid in melting the metal, the spent gases resulting from their combustion being driven up through the other two charges so as to heat them. Thus each pair of next adjacent chambers with its metallic charges is used successively to intercept the heat from the spent gases, and transmit it to the columns of air and gas when next blown or forced through such charges.

I claim as my invention as follows, viz:

The compound furnace, substantially as described, composed of the main chamber A, the two pairs of auxiliary chambers B B′ C C′, and the pipe D, with its branches E F G H, and two valves K L, and educt I, all arranged essentially in manner and to operate as and for the purpose specified.

WILLIAM E. C. EUSTIS.

Witnesses:
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J. R. SNOW.