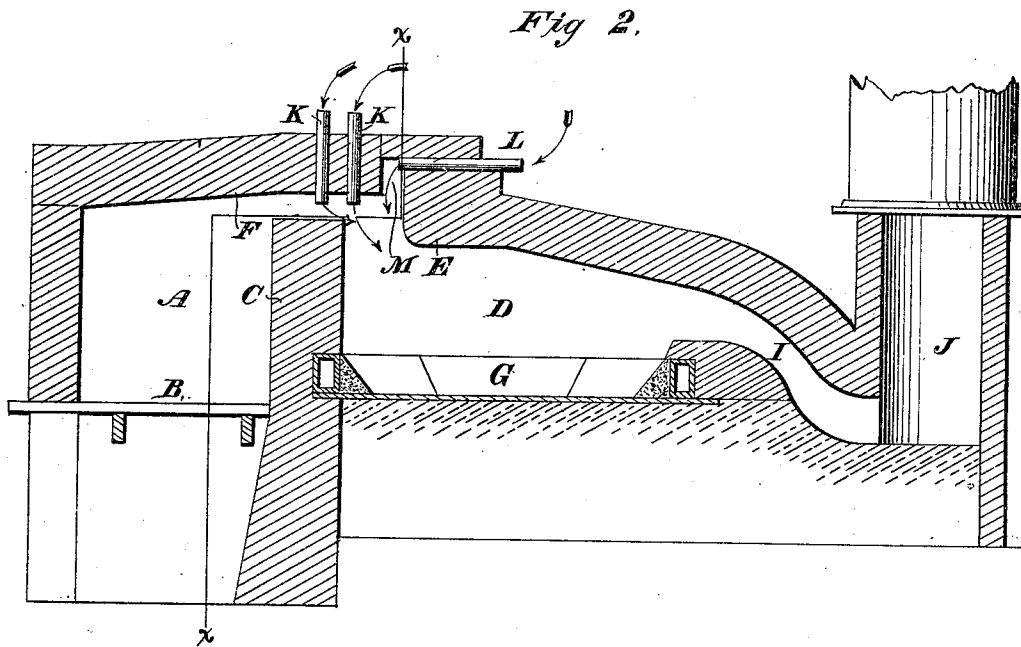
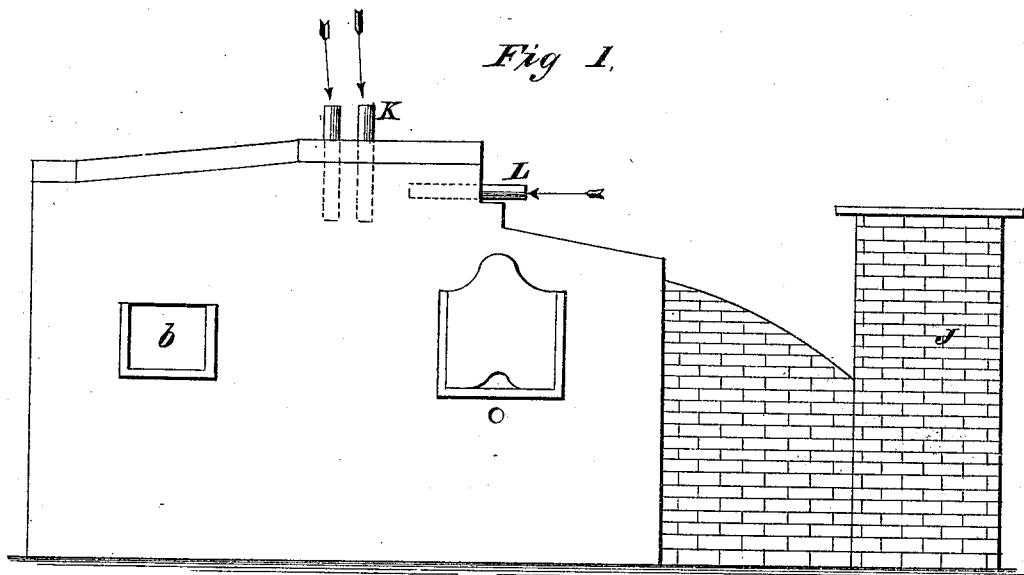


A. F. CASSEL.
METALLURGIC FURNACE.

No. 178,411.

Patented June 6, 1876.



WITNESSES
Frank L. Curand
Wm A Skinkle By *his* Attorney

INVENTOR
Alfred F Cassel.
Wm. Baldwin

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Fig 3.

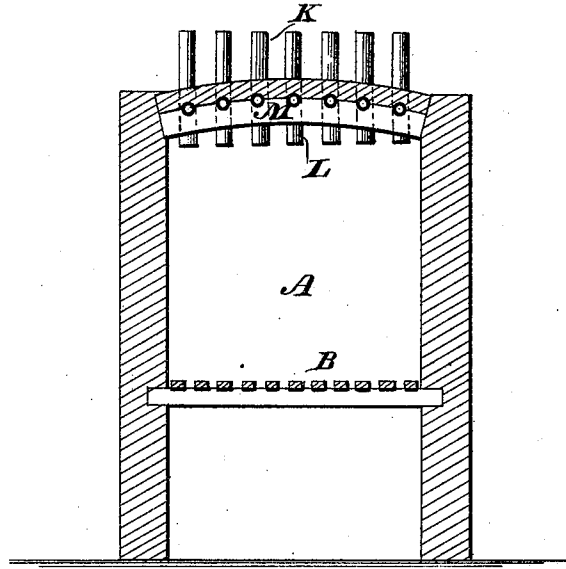
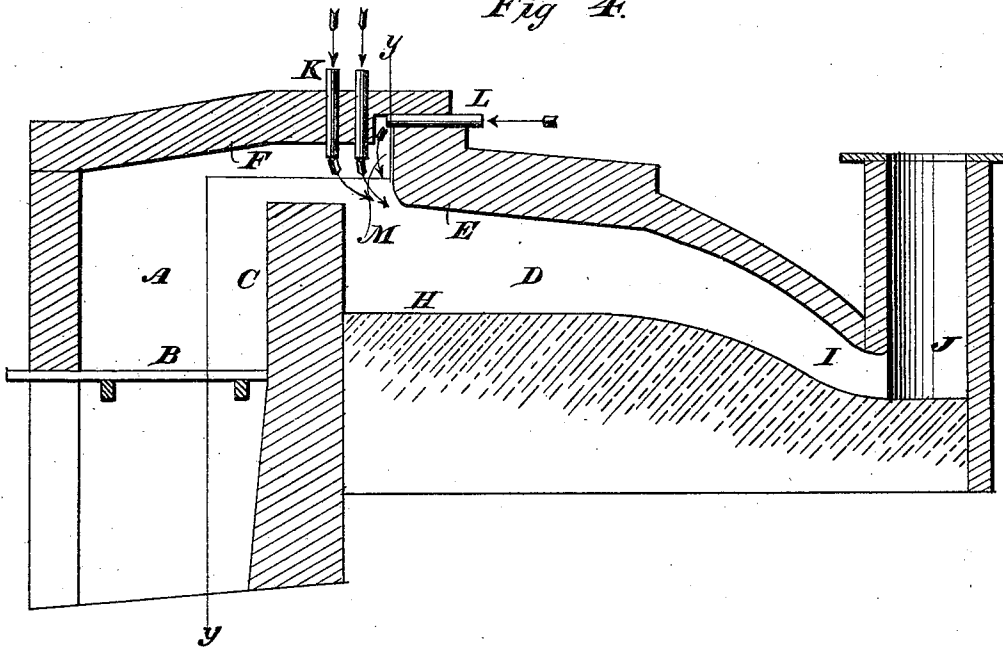


Fig 4.



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UNITED STATES PATENT OFFICE.

ALFRED F. CASSEL, OF ZANESVILLE, OHIO, ASSIGNOR OF ONE-FOURTH HIS RIGHT TO MENDAL CHURCHILL, OF SAME PLACE.

IMPROVEMENT IN METALLURGIC FURNACES.

Specification forming part of Letters Patent No. 178,411, dated June 6, 1876; application filed February 26, 1876.

To all whom it may concern:

Be it known that I, ALFRED F. CASSEL, of Zanesville, in the county of Muskingum and State of Ohio, have invented certain new and useful Improvements in Metallurgic Furnaces, of which the following is a specification:

My invention relates to furnaces for boiling, puddling, or heating iron, of the class in which air is admitted in such manner as to cause the ignition and consumption of the inflammable products of combustion arising from the fuel burned on the grate of the fire-chamber of the furnace while they are passing to the heating or working chamber of the furnace.

My object is to construct the furnace in such manner that the gases produced by the burning fuel shall be compelled to pass in contact with jets of air, which are drawn into the furnace by the draft created by the passage of the products of combustion through the furnace; to which end my improvements consist in a novel formation of the furnace-roof, to adapt it for supplying air to the furnace, and in the combination and relative arrangement of a fire-chamber, a furnace-chamber, a bridge separating them, and air-supply pipes, as will hereinafter more fully be set forth.

In the accompanying drawings, Figure 1 represents a side elevation of my improved furnace, and Fig. 2 a vertical longitudinal section thereof adapted for puddling; Fig. 3, a transverse section on the lines *x x* and *y y*, Figs. 2 and 4; and Fig. 4, a vertical longitudinal central section of a furnace having a heating-bottom instead of a puddling-chamber.

A fire-chamber, A, having a roof higher than usual, is provided with a grate, B, to support the fuel, and a door, *b*, as usual. The bridge-wall C, between the fire-chamber and furnace-chamber D or furnace proper, extends higher than usual, as shown by the drawings, its top extending fully to a level with, and, preferably, above, the under side of the roof or crown E of the furnace, while the roof F of the fire-chamber is raised above that of the furnace-chamber, its under or inner surface being, by preference, about on a level with the top or outside of the roof of the furnace. A low passage-way, for the gases and other products of combustion, communicating between the two

chambers, is thus formed between the top of the elevated bridge-wall and the bottom or under side of the fire-chamber roof, above the level of the bottom or under side of the roof of the furnace-chamber, thus confining the products of combustion within narrow limits on their way from the fire-chamber to the furnace-chamber, and insuring the thorough commingling with them of the air passing in by the pipes. The furnace may be provided either with a puddling-chamber, G, or a bottom, H, for heating the iron for working, or it may be constructed as a smelting or boiling furnace. The chamber terminates, as usual, by a neck, I, in a stack, J. To insure the complete combustion of its gases and other unconsumed inflammable products which ascend from the fuel to the top of the elevated bridge-wall C, air-pipes K are inserted through the roof of the fire-chamber over the bridge, or in front of it, (the front referring to that side next the furnace-chamber,) or both over and in front of it, as shown, while horizontal pipes L enter through the roof of the furnace into a space or chamber, M.

Instead of pipes perforated tiles or channels formed in the roof would answer.

The air-supply pipes are shown as arranged at right angles to each other; but it is obvious that, instead of being so arranged, and entering vertically and horizontally, they may be inclined somewhat, and their angle to one another varied from that shown in the drawings.

From the foregoing description it will be seen that as the gases and other products of combustion pass from the fire-chamber and over the bridge they are forced to take a downward course on their way to the stack to escape, and draw in air to support and complete combustion with the beneficial effects which are well known in furnaces of this class. By the construction and relative arrangement of the bridge, the fire-chamber roof, and the furnace-roof, with the air-chamber formed between the two roofs, the air is forcibly drawn in through the pipes or openings for its admission and carried downward with the draft, to thoroughly mingle with the inflammable gases, &c.

Should the heat become too intense, caps, placed over some or all of the pipes, shut off the air, and reduce the heat in the furnace-chamber, the heat of which may thus be regulated at will. Valves might also be used for this purpose.

I do not, broadly, claim the admission of air at the throat or bridge of a metallurgic furnace, this being old; but I am not aware of any furnace embodying the construction, combination, or arrangement hereinafter claimed.

I claim as of my own invention—

1. The combination, with induct-pipes, of the transverse air-chamber, into which they discharge, situated above and in front of the fire-bridge, and at the juncture of the fire and furnace chamber roofs, substantially as set forth.

2. The metallurgic furnace, constructed as hereinbefore described, with short vertical pipes entering through the fire-chamber roof to the narrow draft-passage above the fire-bridge, a transverse air-chamber in front of said bridge, above and communicating directly with said draft-passage, and short horizontal pipes entering through the furnace-chamber roof to said air-chamber.

In testimony whereof I have hereunto subscribed my name.

ALFRED F. CASSEL.

Witnesses:

FRANK H. SOUTHARD,
W. E. BOZMAN.