

J. NEVILLE.

Furnaces for Smelting Ores.

No. 138,428. Patented April 29, 1373.

Fig. I

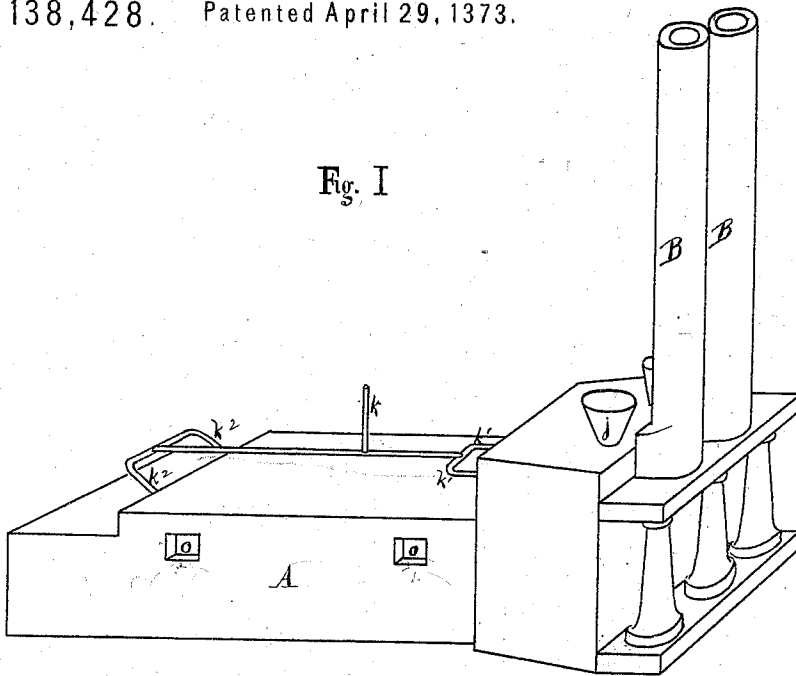
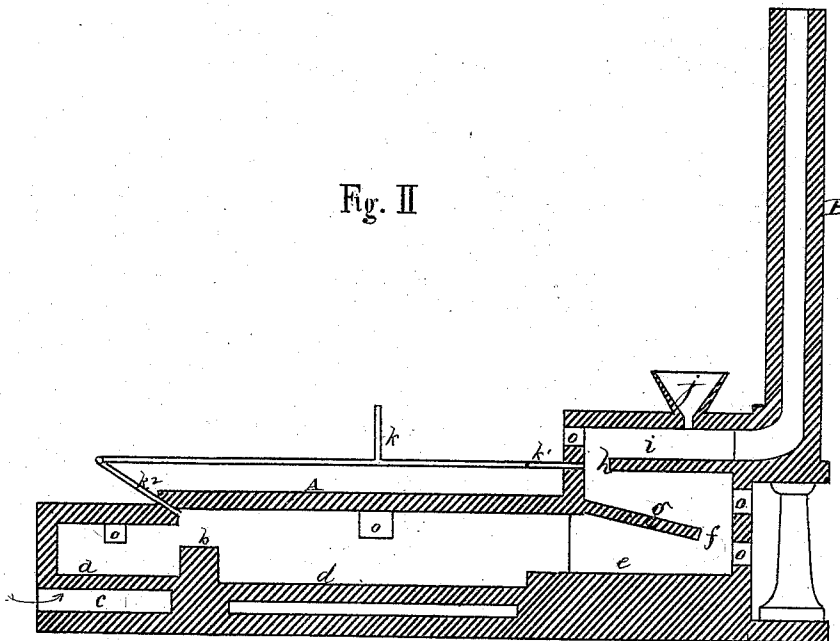


Fig. II



Attest

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UNITED STATES PATENT OFFICE.

JOHN NEVILLE, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF ONE-HALF HIS RIGHT TO THOMAS HOLIHAN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN FURNACES FOR SMELTING ORES.

Specification forming part of Letters Patent No. **138,428**, dated April 29, 1873; application filed March 28, 1873.

To all whom it may concern:

Be it known that I, JOHN NEVILLE, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Furnace for Smelting Ores; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon and being a part of this specification, in which—

Figure 1 is a perspective view, and Fig. 2 is a vertical longitudinal section through one side of the furnace and its stack.

Like letters refer to like parts in each figure.

The nature of this invention relates to a furnace for smelting silver, copper, lead, zinc, iron, or other ores in which sulphur is present and in which the desulphurizing, deoxidizing, and carbonizing processes proceed continuously, thereby effecting a rapid separation or reduction of the metal; and to this end it consists in the peculiar construction of a double furnace, each half of which is provided with three chambers for the several steps in the process, and the arrangement therewith of certain pipes for delivering steam and air to the deoxidizing and carbonizing chambers, as more fully hereinafter set forth.

In the drawing, A represents the walls of a reverberatory-furnace, divided into two by a longitudinal partition through the center, each furnace being provided with a separate stack, B. *a* is the fire-place. *b* is the bridge-wall. *c* is the ash-pit. *d* is the hearth of the reverberatory-chamber, back of which is a carbonizing-chamber, *e*, above which is a deoxidizing-chamber, *g*, separated from it by an incline diaphragm, *f*, above which is a desulphurizing-chamber, *i*, separated from the deoxidizing-chamber by a hearth, *h*, open over the highest end of the diaphragm *g*, the chamber *i* communicating with the stack of the furnace. *j* is a hopper, through which ore is fed to the chamber *i*. *k* is a steam-pipe,

branching at *k*¹ into each deoxidizing-chamber *g*, and at *k*² into the furnace, the jet impinging diagonally across the top of the bridge-wall, small apertures being made in the top of the furnace, through which air is drawn by the inflowing steam, which, mingling with the gases of combustion, ignite them and produce an intense heat in the chamber *d*. *o* are doors in the side and end walls, through which the respective chambers are worked.

The furnace being fired up and the chamber *i* charged with ore the latter is desulphurized by the heat, which would otherwise be wasted. When the roasting process is complete the ore is raked down or onto the diaphragm or apron *g*, where it is subjected to a still higher degree of heat. Into the mass steam is blown through the pipes *k*¹, which thus furnishes the hydrogen necessary to effect the deoxidization. The deoxidized ore falling onto the hearth of the chamber *e* is therein carbonized, being afterward raked into or onto the hearth of the reverberatory-chamber *d*, where, under the intense heat, it is speedily reduced.

The furnace being double each side is worked alternately by the smelters in charge with a great saving in fuel and labor, and greater product in the percentage of metal reduced.

This furnace will melt in a given time ten times the quantity of metal that can be melted in an ordinary reverberatory-furnace of the same size in the same time.

What I claim as my invention, and desire to secure by Letters Patent, is—

A reduction-furnace, having the chambers *a*, *d*, *e*, *g*, and *i*, and the stacks B B, constructed and arranged substantially as herein described and shown, and in combination therewith the steam-pipes *k* *k*¹ *k*², arranged to operate substantially as and for the purpose set forth.

Witnesses:

JOHN NEVILLE.

WM. H. LOTZ,

THOMAS HOLIHAN.