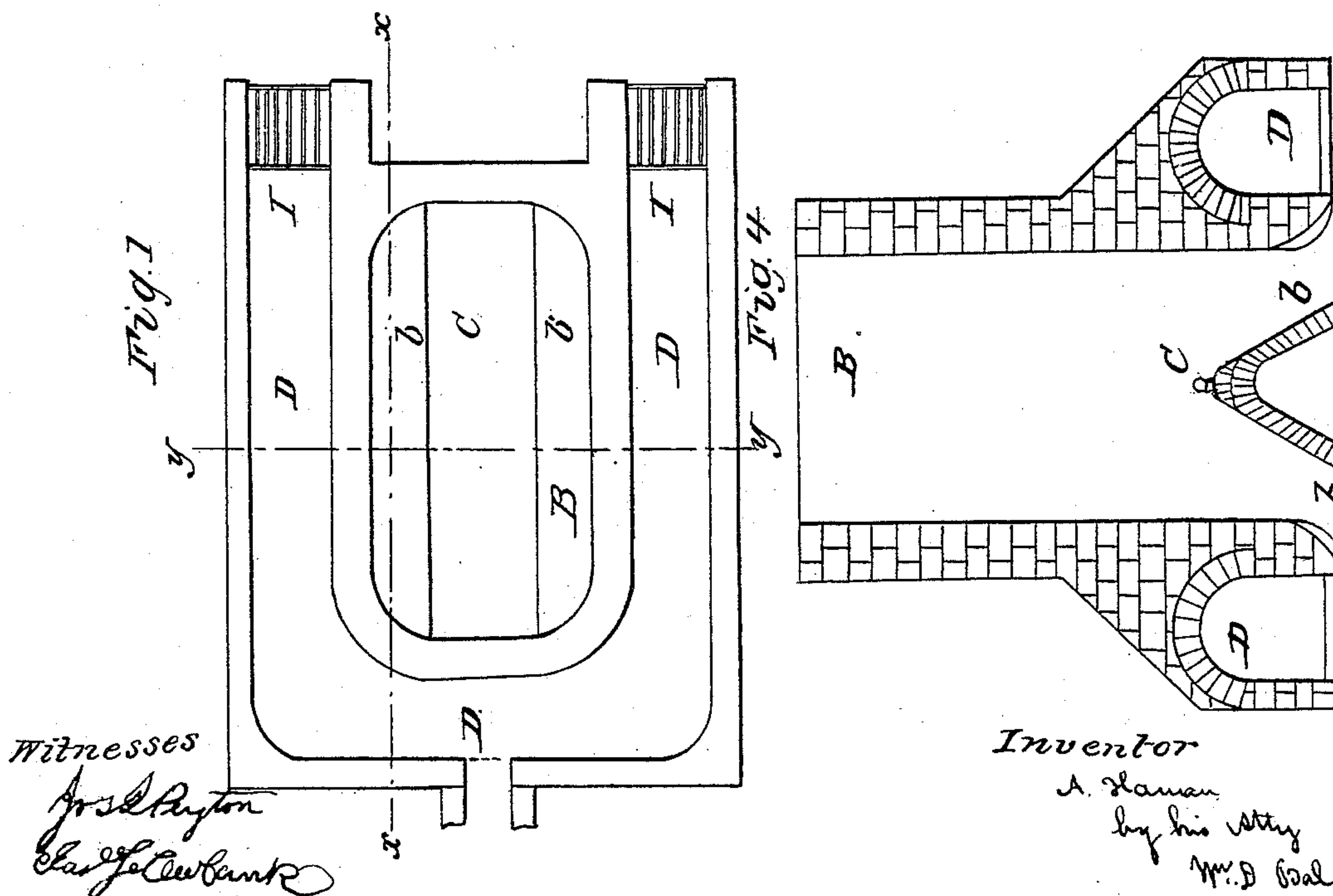
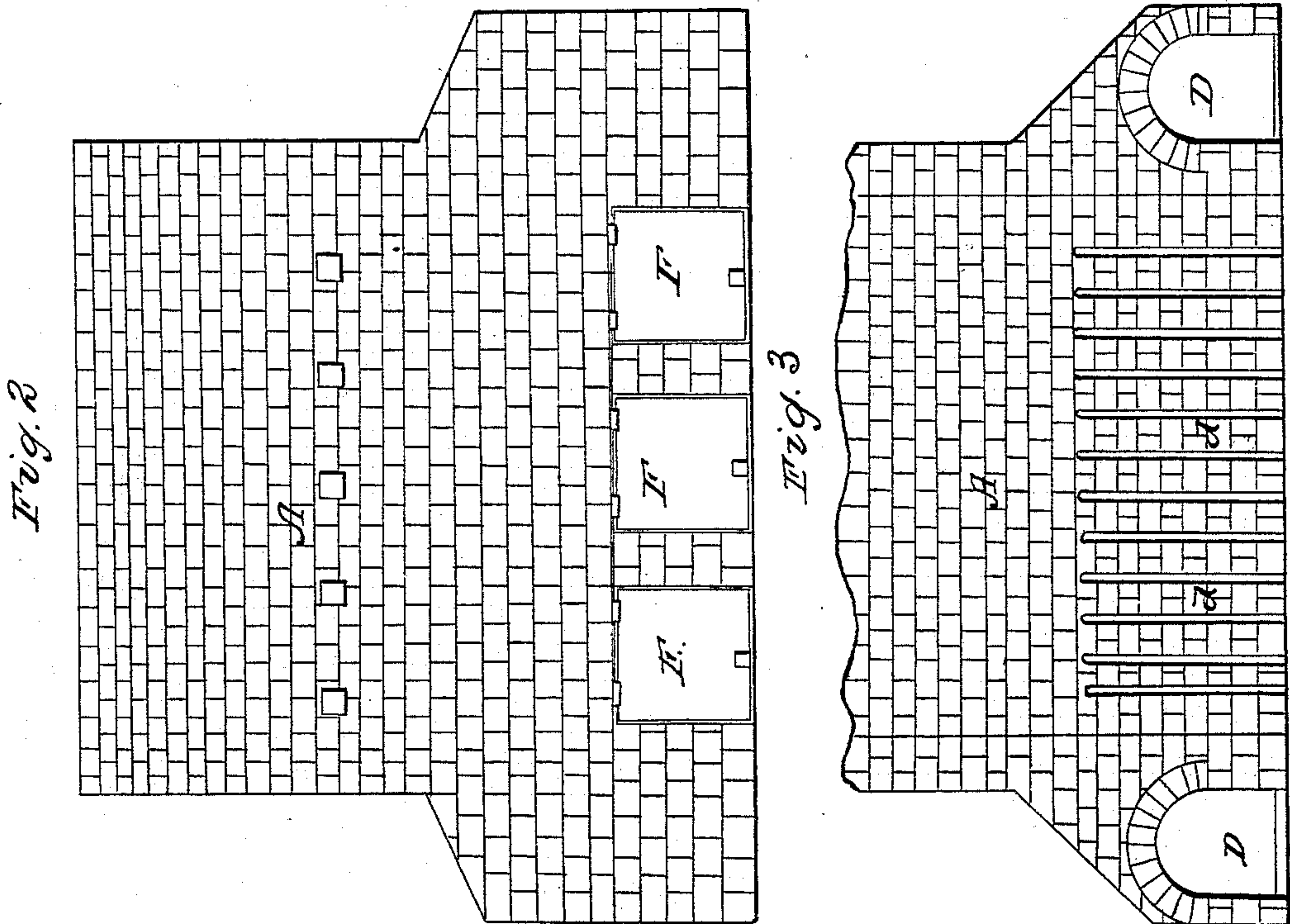


A. HAMAR.  
Roasting Ores.

No. 84,113.

Patented Nov. 17, 1868.



Witnesses  
J. S. Peyton  
Charles C. C. C.

Inventor  
A. Hamar  
by his atty  
W. D. Galamie



ALEXANDER HAMAR, OF NEW YORK, N. Y.

*Letters Patent No. 84,113, dated November 17, 1868.*

**IMPROVEMENT IN ROASTING IRON-ORES BY WASTE GASES.**

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, ALEXANDER HAMAR, of New York city, have invented a new and useful Improvement in Furnaces for Roasting Ores, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 is a ground plan;

Figure 2, a side elevation;

Figure 3, a vertical section, at the line *x x* of fig. 1; and

Figure 4, a similar section, at the line *y y* of fig. 1.

The object of my invention is to roast ores thoroughly and cheaply, by feeding them continuously through a kiln or furnace, to which ends my improvement consist in a novel method, hereinafter described, of constructing an apparatus for roasting the ores by utilizing the waste gases from a smelting-furnace.

A portion of the waste gases escaping from an ordinary blast-furnace is collected in any of the well-known ways, and forced, by a fan or pump, into the flue D. Under heavy pressure therein they escape through the slits *d* into the roasting-chamber, and percolate through the mass of raw ore contained therein, finally escaping at the top of the kiln. These gases being very highly heated, roast the ores thoroughly, without the use of other fuel, the economy of which arrangement must be obvious to every iron-master. The roasted ores fall through the opening *b* into a space below the cham-

ber, and may be raked out, at proper intervals, through the doors F. As the ore in the chamber sinks, fresh charges are supplied, and the operation thus rendered continuous.

I have deemed it necessary herein to show only the details of the roasting-kiln. The other devices described are so well known as to require no detailed description here.

I am aware that waste gases have been used to roast ores, in a manner different from that employed by me. I do not, therefore, under this application, broadly claim roasting ores by the waste gases escaping from a furnace; but having thus described the construction and operation of my improved apparatus for roasting ores,

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

The combination, as set forth, with the kiln, of the open top for charging the raw ore, the open bottom for discharging the roasted ores, the flue, encircling the roasting-chamber, and communicating with it by the slits *d*, and a fan, for forcing in the heated waste gases escaping from the blast-furnace.

In testimony whereof, I have hereunto subscribed my name.

A. HAMAR.

Witnesses:

TH. PRATT POTTS,  
WM. B. DAYTON.