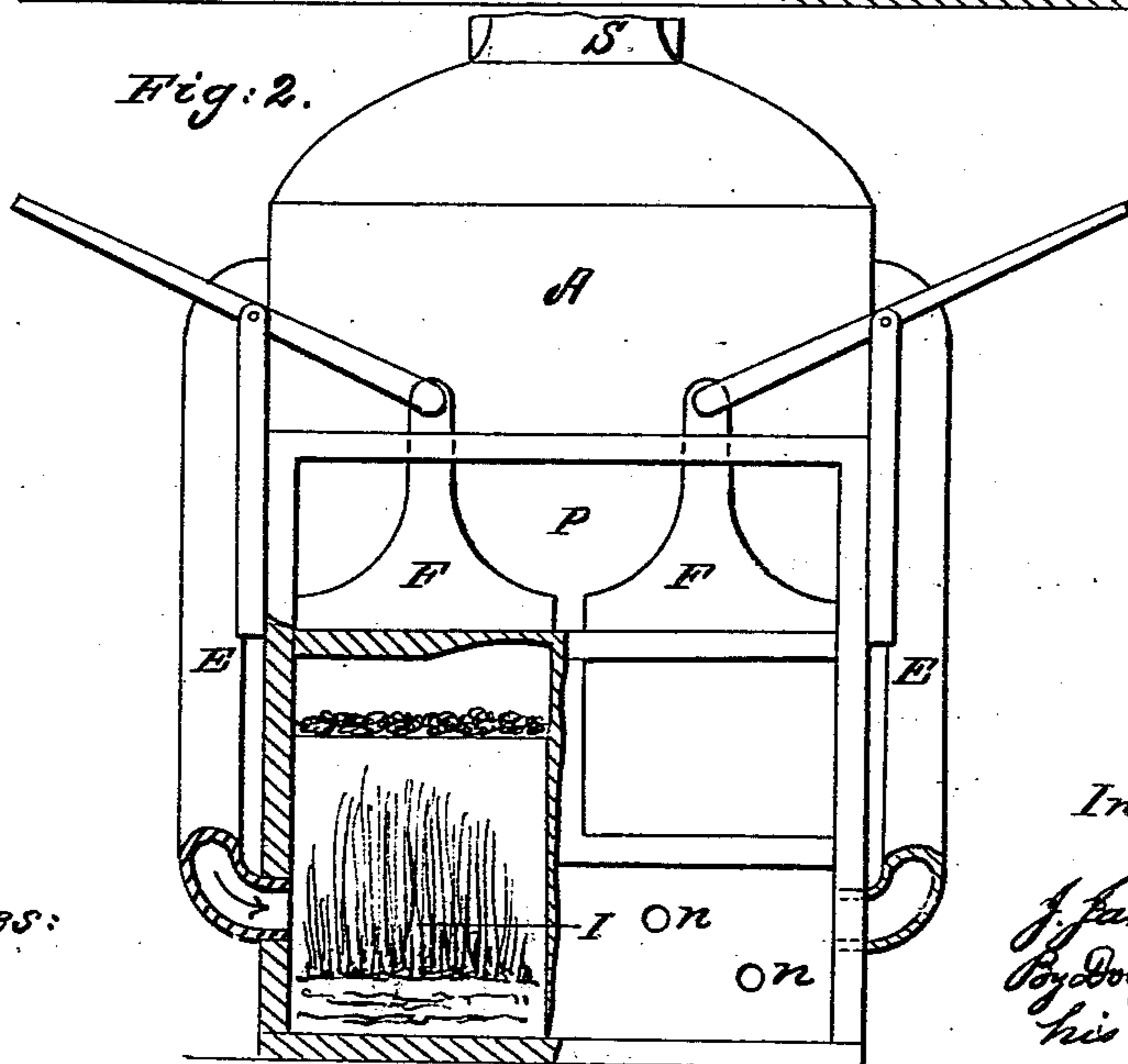
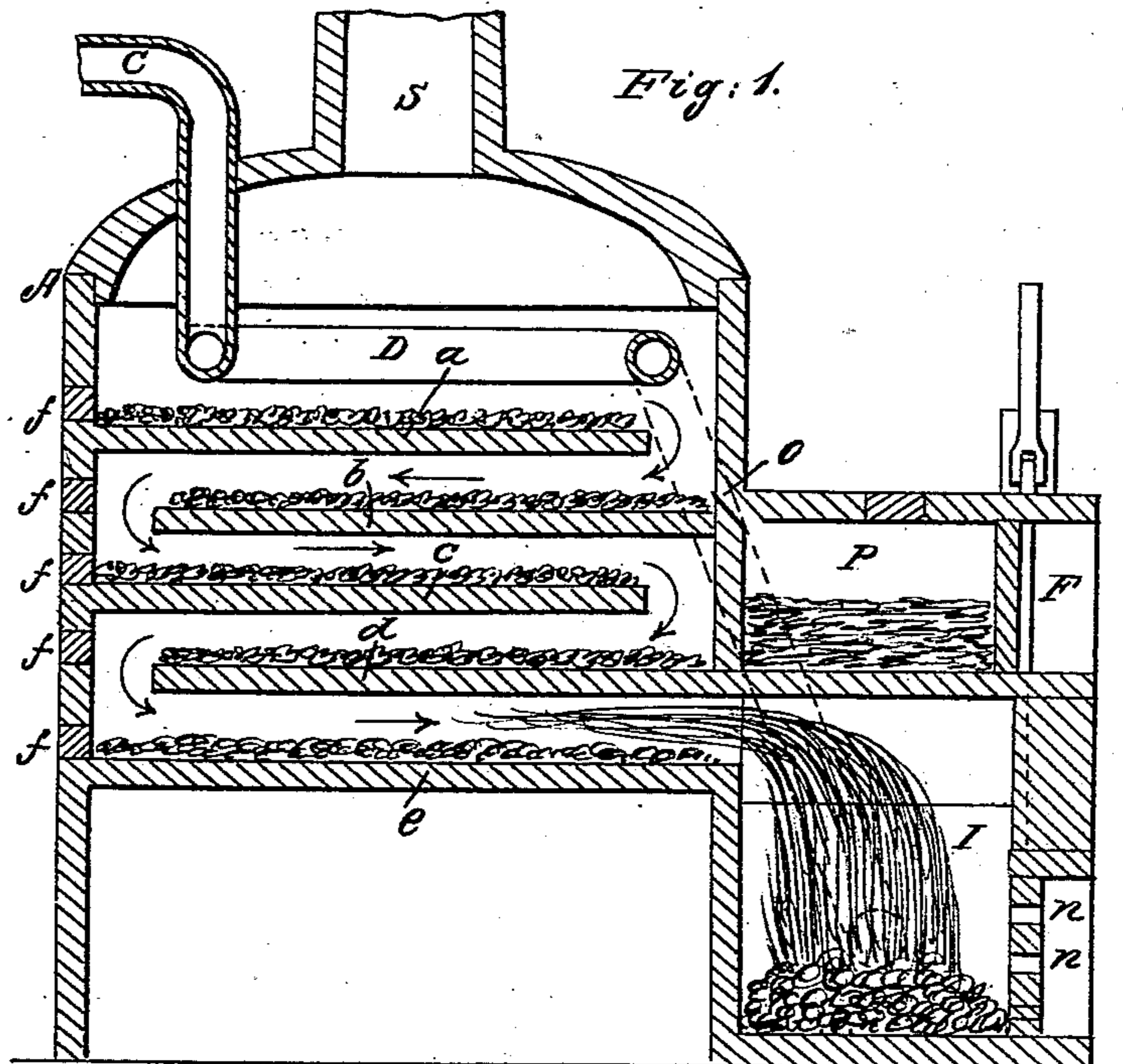


J. JAMESON.  
Manufacture of Iron.

No. 64,425.

Patented May 7, 1867.



Witnesses:  
P. J. Dodge.  
L. H. Townsend.

Inventor:  
J. Jameson.  
By Dodge & Mason.  
his Attorneys.

# UNITED STATES PATENT OFFICE

JACOB JAMESON, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF IRON.

Specification forming part of Letters Patent No. 64,425, dated May 7, 1867.

*To all whom it may concern:*

Be it known that I, JACOB JAMESON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Iron Direct from the Ore; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention consists in producing wrought-iron direct from the ore by deoxidizing the ore in the first place by passing it successively over a series of tables over which the blast from the finishing-furnace passes, and then melting and refining it finally in a finishing-furnace by subjecting it to a hot blast; and, also, in the novel construction of the apparatus provided with a double refining-furnace and a chamber for the production of gases to be used either in the deoxidizing of the ore or in the refining of the metal by the hot blast, as may be desired.

Figure 1 is a longitudinal vertical section of my improved furnace. Fig. 2 is a front elevation of the same.

I construct an oven, A, of the form shown in the drawings, with a smoke-stack at the top, and having a series of tables or transverse divisions, *a b c d e*, arranged therein, as shown in Fig. 1. These tables are so arranged as to leave an opening between them and the end walls of the oven, at each end alternately, so that the broken ore being placed on the upper table, *a*, can be shoved off at its front end and drop down onto table *b*, from whence it is raked off at the rear end and falls onto table *c*, then shoved off at the front end of *c* onto table *d*, from whence it is drawn off at the rear end, falling onto the lower table, *e*, from which it is shoved off at the front, where it drops into the furnace I, a series of small doors, *f*, being arranged in the rear wall of the oven A, opposite the spaces between the tables, to permit a scraper or tool to be inserted for the purpose of moving the ore as described.

In front of the oven A, I locate a double furnace, consisting of two chambers, I, placed side by side, and below the oven, so that the flame and heat arising therefrom will enter the space between the tables *c* and *d*, and, passing around the rear end of *d*, will pass onward and upward between the tables in a reverse direction to that of the ore as the latter descends to the furnace I, as previously described, the smoke and gases finding their exit finally through the chimney S, the course of the ascending current of heat being indicated by the red arrows, while the course of the descending ore is indicated by the black arrows in Fig. 1.

In the upper part of the oven A, I locate a series of pipes, D, connected by a cross-pipe at each end, into which a blast or current of air is forced by any suitable means through pipe C. The blast entering the pipes D is quickly heated, and from thence is conveyed through pipes E, on each side, down into the furnace-chambers I, one of the pipes E opening into each chamber I, as shown in Fig. 2.

Directly over the furnace I provide a gas chamber or retort, P, in which I place limestone and charcoal dust, which, being heated by the fire in the furnace, evolves a gas that escapes through the passage *o* into the upper part of the oven, as shown in Fig. 1, where it is brought into contact with the ore on the upper tables; or, by a suitable tube connecting the gas-chamber P with the tubes D or E, the gas may be mingled with the hot blast, and conveyed with it into the furnace-chambers I, where it is brought into contact with the ore at the instant of its being melted by the blast. The pipes leading from the gas-chamber P are to be provided with suitable valves for regulating the flow and direction of the gas as may be desired, in order to control its admixture with the ore or the blast, according to the nature and condition of the ore being operated upon.

To use my invention I proceed as follows: I first break up the ore in the usual manner, and place a quantity of it, with pulverized charcoal, upon the upper table, and then build a charcoal fire in the furnace I. The ore is then gradually worked along down over the series of tables, as described, during which op-

eration it is roasted and thoroughly deoxidized. As it descends and approaches the furnace it becomes constantly more and more heated, and, finally, as it falls from the lower table, *e*, into the furnace I, it is melted by the hot blast and settles in the bottom of the furnace-chamber. When a sufficient quantity has thus accumulated, and become partially solidified to form a bloom of suitable size, it is raised by means of rods thrust through openings or holes *n* in the front walls of the furnace, and the door *F* being raised the bloom is drawn out. The upper table, *a*, will be resupplied from time to time with fresh ore and charcoal, to take the place of that removed toward the furnace, and thus the roasting becomes a continuous process.

By having two chambers in the furnace, with an independent blast-pipe for each, one can be kept closed and continued in operation while the bloom is being removed from the other. By this arrangement, also, either furnace can be recharged or stopped entirely,

while the heat is kept up in the other, thereby keeping up the roasting and deoxidizing process without interruption.

By these means I am enabled to produce the very best of wrought-iron direct from the ore by a very simple and cheap process.

Having thus described my invention, what I claim is—

1. The production of wrought-iron direct from the ore by the process substantially as described.

2. In combination with the oven *A*, constructed as described, I claim the double furnace I, as set forth.

3. I claim the combination of the oven *A*, furnace I, and gas-chamber *P*, for the treatment of ores, when arranged for joint operation, substantially as described.

JACOB JAMESON.

Witnesses:

W. C. DODGE,  
A. M. STOUT, Jr.