A. W. HONSINGER.

FURNACE FOR DEOXIDIZING IRON ORE.

No. 98,496. Patented Jan. 4, 1870.

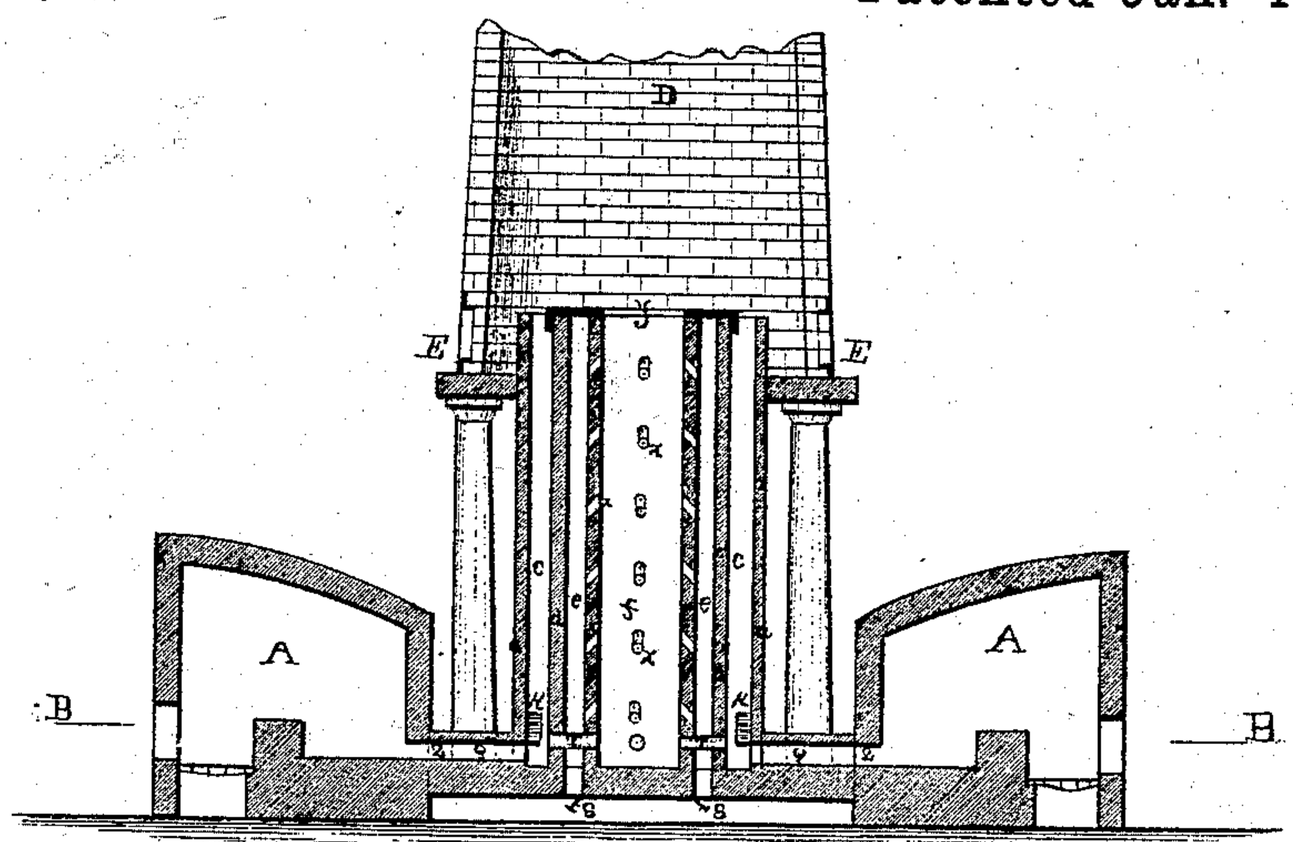

Fig 1.

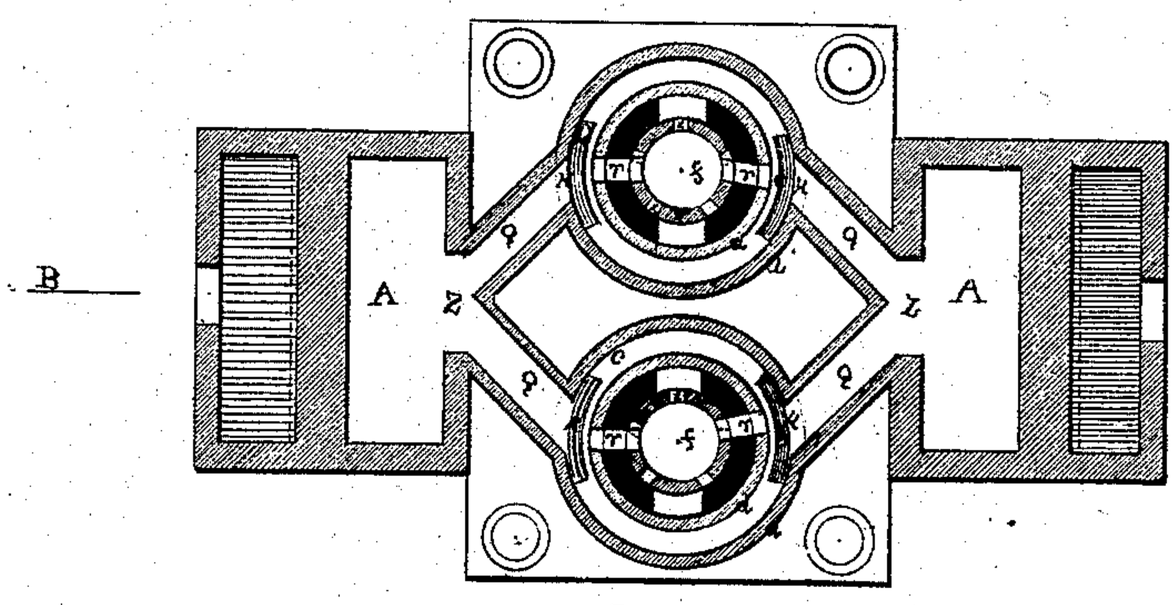

Fig 2

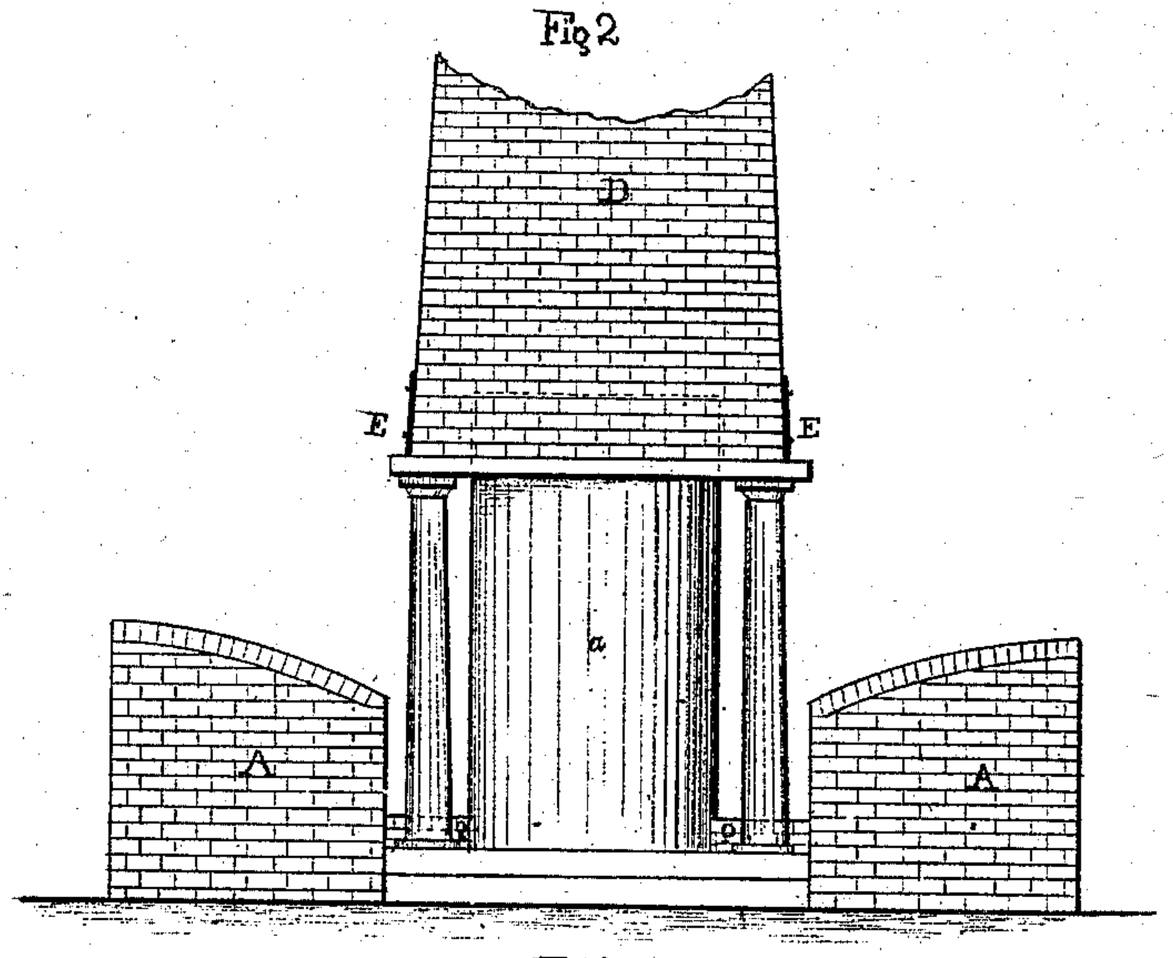

Fig 3.

Witnesses.
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ABRAM W. HONSINGER, OF ROME, NEW YORK.

Letters Patent No. 98,496, *dated January* 4, 1870.

IMPROVED FURNACE FOR DEOXIDIZING IRON-ORE.

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, ABRAM W. HONSINGER, of the town of Rome, in the county of Oneida, in the State of New York, have invented a new and improved Furnace for the Deoxidation and Purification of Iron-Ore, to be converted directly by puddling-furnaces into wrought-iron; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a vertical section of invention through one cylinder.

Figure 2 is a ground plan of fig. 1 at B B.

Figure 3 is a side elevation.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my furnace of two upright cylinders, of fire-brick and cast-iron, of from seven to ten feet in height.

Each cylinder *a* consists of an outside shell of fire-brick, of about six feet nine inches in diameter, and of about six inches in thickness, strengthened by cast-iron on outside of the shell.

A second shell, *d*, of same height as before-mentioned cylinder, and measuring five feet nine inches in diameter, and four and a half inches in thickness, of fire-brick especially prepared for the purpose, stands within the first shell, but separated from it by a space, *c*, of about five inches.

A third shell, *v*, of fire-brick, measuring two feet in diameter, and four and a half inches in thickness, stands within the second shell, and separated from it by a space, *e*, of about twelve inches, said space to be varied according to necessity.

In this third shell, there are five perpendicular lines, at equal distances from each other, of escape-holes or passages *x*, at intervals, above each other, of about ten inches. These holes run in an upward direction, at an angle of about forty-five degrees toward the inner space.

A cap of iron, *y*, covers the space between the upper ends of the second and third cylinders, rendering the space between them air-tight, and shutting out all communication with the outside air.

At the bottom of each cylinder are two hemispheric doors, *s*, for dumping the ore.

Connected with the cylinders are two puddling-furnaces, A, made of fire-brick, to be used for puddling ore instead of iron.

From each puddling-furnace, there extends a flue of fire-brick, which, after leaving puddling-furnace, divides into two equal flues, Q, one of which leads into each outside cylinder.

Over the passage-way, there sits a bridge, K, nearly covering the five-inch space between the first and second cylinders.

The object of the bridge is to spread the flame.

There are several tubes or flues of fire-brick, *r*, near the bottom of the cylinder, passing from the outer surface of the second cylinder to the inner surface of the third or inmost cylinder. The object of these flues is to convey a portion of the flame and heat to the interior of the inmost cylinder. The number of these tubes is to be varied so as to have the same amount of heat and flame upon the outside surface of the second and the inside surface of the third or inmost cylinder.

The chimney D is located on a cast-iron platform, resting on four pillars of cast-iron or mason-work, and begins below the upper edge of the cylinders. It is bricked up to the cylinders, and the seam between it and them is air-tight.

In the chimney, we have four doors E, opening on to the platform above mentioned, to supply the cylinders with ore.

The advantages of my invention over all other furnaces and retorts are these:

First, it thoroughly deoxidizes the ore, and removes all of the rawness, and all foreign substances which are in the ore.

Secondly, it accomplishes this deoxidation and purification of the ore at a moderate heat.

The method of operation is as follows:

The space *e*, between the second and third cylinders, is filled with ore mixed with pulverized charcoal.

Heat supplied from the puddling-furnaces passes through the flues marked Q, and fills the space *c* between the first and second cylinders. A portion of this heat then passes through the tubes marked *r*, into the space *f*, enclosed by the inner cylinder.

The ascending heat surrounds the space *e* filled with ore. It thus deoxidizes the ore.

The sulphurous and other gases arising from the heated ore pass off through the small air-holes or passages *x*, and after passing through, ignite, and, by combustion, increase the general heat. The ore is thus purified in cylinders, in a new, and thorough, and expeditious manner, at the same time that other ore previously deoxidized is being converted into iron in the puddling-furnace, by the same heat.

Cylinders of the before-mentioned size will work at one time three tons of ore.

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

1. The combination and arrangement of these concentric vertical cylinders, for the deoxidation and purification of iron-ore.

2. The combination and arrangement of said cylinders with one or more furnace-fires, constructed and arranged substantially as described.

3. The application of said furnace-fires at the bottom instead of at the side of said cylinders, to furnish heat, in the manner and for the purpose already mentioned.

ABRAM W. HONSINGER.

Witnesses:

WILLIAM H. FISHER,

PIERREPONT BARTOW.