

(No Model.)

O. W. DAVIS, Jr.
ORE ROASTING KILN.

No. 501,494.

Patented July 18, 1893.

Fig 1

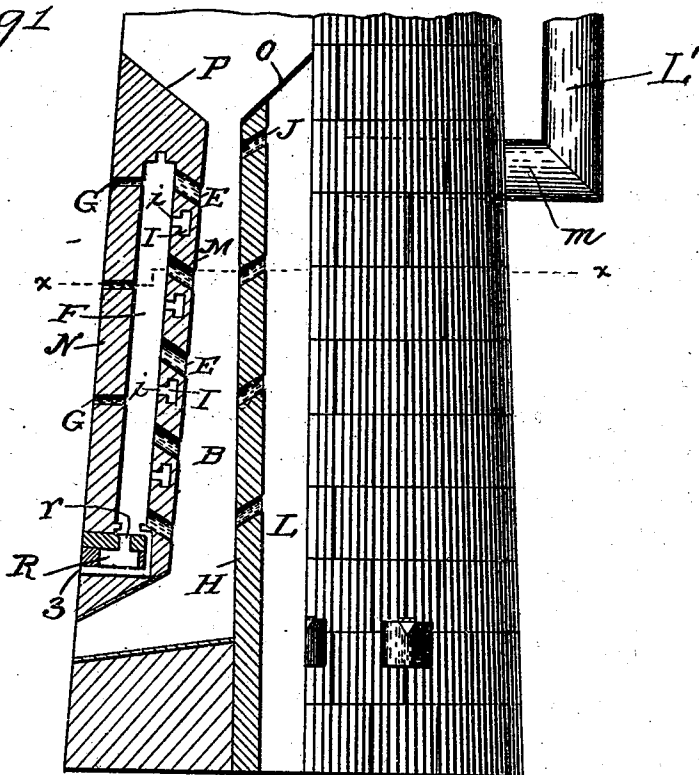


Fig 2

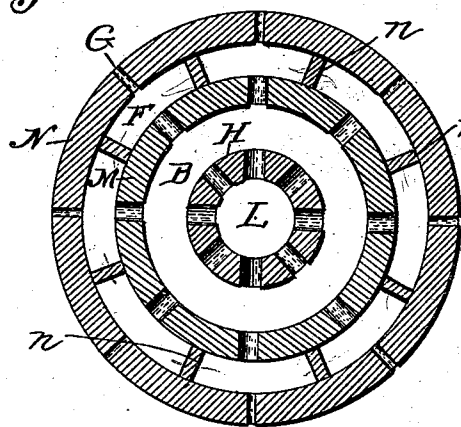
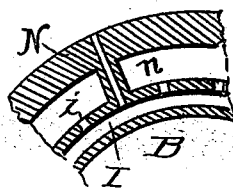


Fig. 3.



Attest
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ORE-ROASTING KILN.

SPECIFICATION forming part of Letters Patent No. 501,494, dated July 18, 1893.

Application filed July 5, 1892. Serial No. 438,991. (No model.)

To all whom it may concern:

Be it known that I, OWEN W. DAVIS, JR., a citizen of the United States of America, residing at Middlesborough, in the county of Bell and State of Kentucky, have invented certain new and useful Improvements in Ore-Roasting Kilns, of which the following is a specification.

My invention hereinafter described and the subject of the accompanying petition, relates to ore roasting furnaces, of that class in which an annular ore chamber or shaft surrounds a central shaft, and the products of combustion are drawn across and through a narrow body of ore, instead of being drawn up through an overlying mass; by reason of which transverse draft, the sulphur and other fumes are carried directly into the smoke stack, and are thus more effectually removed from the ore.

My said invention consists in certain details of construction in which I have improved the form of the kiln above referred to in general terms. These details are illustrated in the accompanying drawings, in which—

Figure 1, shows in side elevation one half of the kiln, the other half being in section. Fig. 2, represents a transverse section on line $x-x$ of Fig. 1. Fig. 3 is a detailed sectional view.

In the drawings the annular ore chamber or shaft is shown at B. The inner wall H of the ore chamber separates it from the central stack L. The outer wall M of the ore chamber is provided with a series of apertures E, which lead from combustion chambers F, into the ore chamber. These combustion chambers are arranged in an annular space between the wall M, and the outer wall N. These combustion chambers are sections of the annular space between the walls M and N, this space being divided to form the chambers by cross walls n . I have shown in Fig. 1, a vertical section of one of these combustion chambers, with a flue for the admission of gas to said combustion chamber. This leads from a main below, but the gas may be admitted above, or from any other point. This gas flue is shown at R and has an opening 3 for the air beneath it, extending to the bottom of the combustion chamber, while an exit opening or openings are formed in the top of the flue R as at r opening into the combus-

tion chamber. In the wall N, are apertures G, for the admission of cold air. I have also provided in the wall M, air passages I, which have apertures i leading therefrom into the combustion chamber. The passages I have communication with any suitable source of air, and the air in its passage through the wall M is heated. By these apertures G or i , either hot or cold air may be admitted to the combustion chamber. The gas is thus consumed in the series of combustion chambers, in the presence of air either hot or cold, and the products of combustion pass through the apertures E, into the thin annular mass of ore. The apertures J in the inner wall are in series one above the other, one series opposite to the apertures E, of every combustion chamber and the products of combustion are therefore drawn across the thin mass of ore, and through the apertures I, into the central stack, and thence escape through the smoke flue L' upward, or downward through an indirect flue.

Over the central stack, is a conical roof O, the edges of which terminate at the inside of the annular ore chamber and rest on the inner wall, on which the cone is suitably braced. An annular counter slope P, over the combustion chamber terminates at the outer side of the annular ore chamber. The ore is dumped upon the cone, and is thereby distributed to all parts of the ore chamber. This chamber is made flaring downward, and as the space is thus constantly increasing downward, expansion by heat is compensated, the ore moves more freely, and all tendency to clinker or to adhere to the walls is overcome. Every part of the ore turns over, and is thoroughly exposed to the action of the air and heat, as the mass descends and is gradually heated in its progress.

The smoke flue for the upper draft, consists of a transverse pipe, m , taken through the main stack into the interior, and connecting on the outside with the stack L'.

Any suitable draft forcing means, may be used.

As to the thickness of the walls, the dimensions and proportions of the parts, these may be left to the skilled workman.

I claim—

1. An ore roasting furnace consisting of a central stack, an ore roasting chamber sur-

rounding the stack with openings to the same, a series of vertically arranged combustion chambers, encircling the roasting chamber and of substantially the same height as the roasting chamber, and a series of openings to the roasting chamber in its inner wall from the top to the bottom, said openings being in line with the openings in the opposite wall of the roasting chamber, substantially as described.

2. An ore roasting furnace consisting of a stack, a roasting chamber surrounding the same, a series of vertically extending combustion chambers surrounding the roasting chamber and in communication therewith at various points in its height from the top to the bottom thereof, a gas conduit at the bottom of said combustion chambers having an outlet therefrom and an air inlet leading into the combustion chamber above the gas flue, substantially as described.

3. In an ore roasting kiln, an annular ore

chamber, a series of combustion chambers arranged around said ore chamber and communicating therewith through a series of apertures in the intermediate wall, and air passages in said wall having apertures leading into the combustion chamber, all substantially as described.

4. In an ore roasting kiln, a central draft space, a stack in connection therewith an ore chamber encircling said space, with a series of openings at intervals in the dividing wall, a series of combustion chambers around the ore chamber and communicating therewith, and a cap covering the upper end of the draft space, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

OWEN W. DAVIS, JR.

Witnesses:

PAUL L. MCKENRICK,
W. W. CHILDS.