

*Adam Weber. Furnaces for Reburning
Bone Black and Reducing Ores.*

Fig. 3.

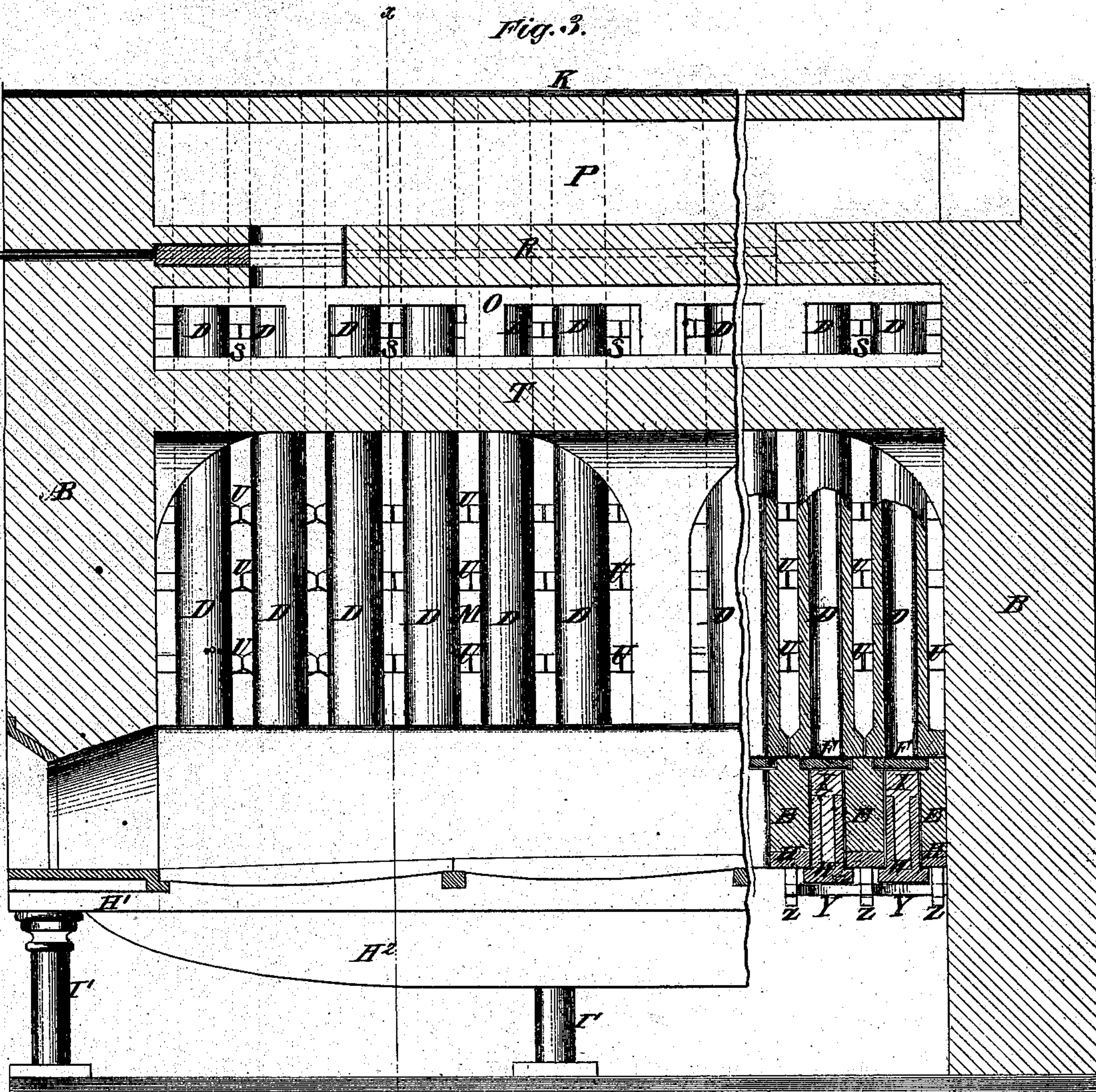
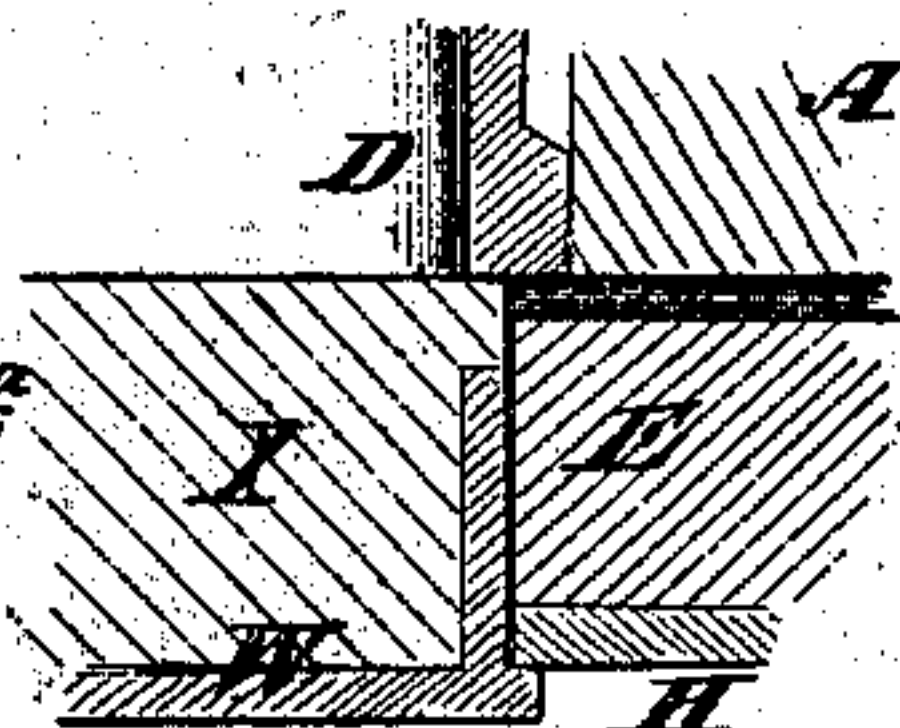


Fig. 3^a



Witnesses:

*Gustave Dieterich
Geo. W. Mabey*

Inventor:

Adam Weber
PER *Mumm & Co*
Attorneys.

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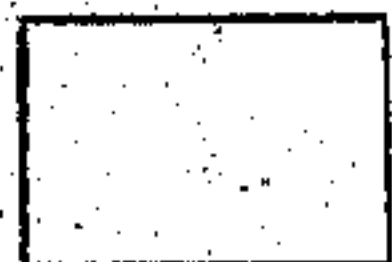
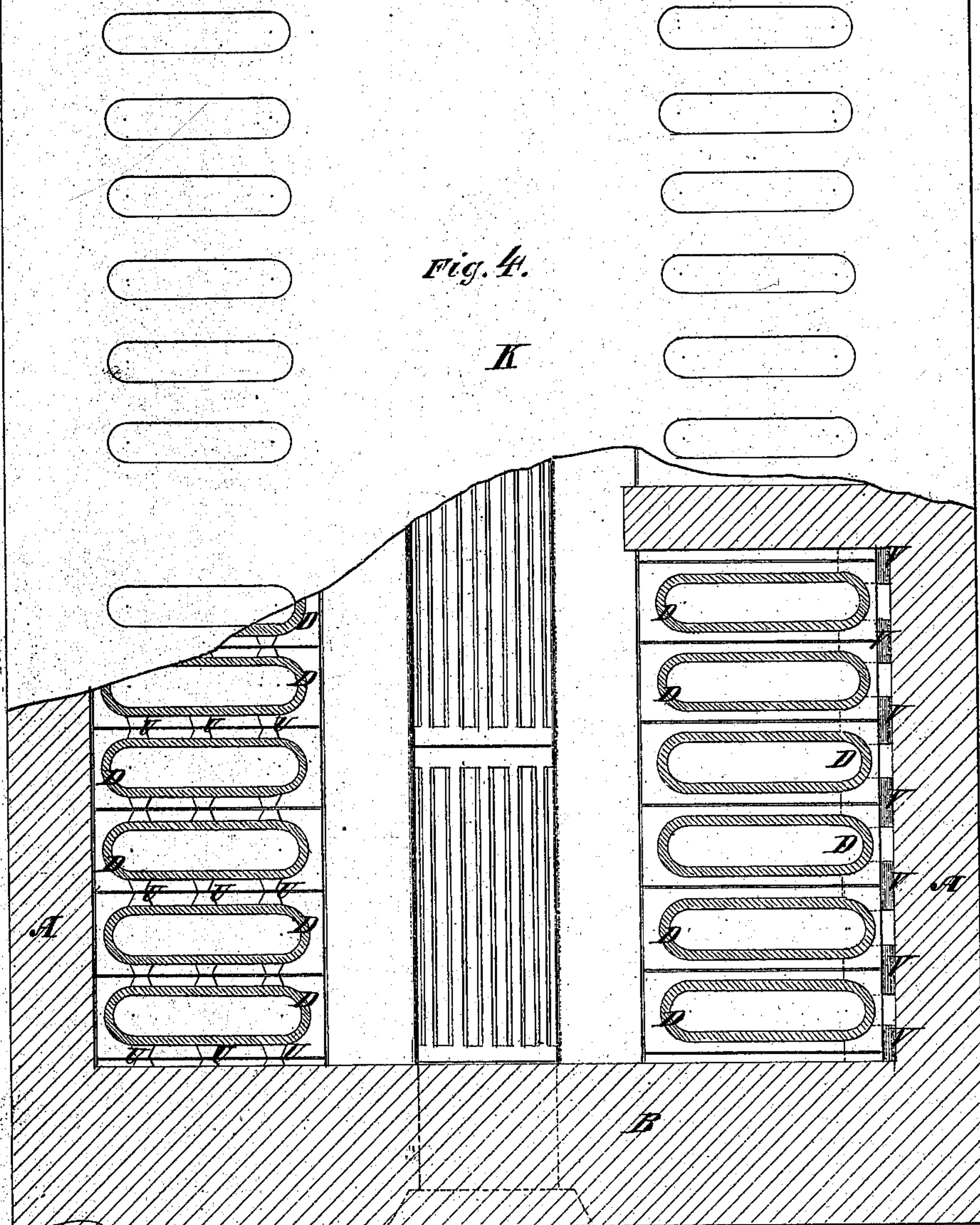


Fig. 4.

K



Witnesses:

Jos. H. Dietrich
Geo. H. Mabey

Inventor:

Adam Weber
PER *Wm. L. O.*
Attorneys.

United States Patent Office.

ADAM WEBER, OF NEW YORK, N. Y.

Letters Patent No. 105,747, dated July 26, 1870.

IMPROVEMENT IN FURNACES FOR REBURNING BONE-BLACK AND REDUCING ORES.

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, ADAM WEBER, of the city of New York, in the county and State of New York, have invented new and useful Improvements in Furnaces for Reburning Bone-Black and Reducing Ores; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in furnaces for reburning bone-black and reducing ores, such as patented to me the 4th day of June, 1867, No. 65,470.

The invention consists in certain improvements in the construction and arrangement of the same, as hereinafter described.

Figure 1 is a transverse sectional elevation of my improved furnace, taken on the line *xx*, fig. 3.

Figure 2 is a plan of a part of the bottom.

Figure 3 is a horizontal section on the line *yy* of fig. 1.

Figure 3^a is a detail section showing the arrangement of the retorts at the bottom and the plugs for stopping the same.

Figure 4 is a view, partly in plan and partly in horizontal section.

Similar letters of reference indicate corresponding parts.

In this improved furnace vertical retorts of fire-clay or other substance, with openings at the top for feeding of the substance to be acted upon, and at the bottom for discharging, are used, the said retorts being arranged within the inclosing walls of the combustion-chamber so as to be surrounded by the fire, and the whole being supported on pillars above the ground for the admission of workmen and trucks below for removing the substances treated from time to time.

A represents the side walls;

B, the end walls; and

C, the top, inclosing the retorts and fire-space above the grate.

D represents the vertical fire-clay or other retorts which rest on the fire-brick or other heat-resisting tiles E, having holes through them vertically coinciding with the vertical chambers of the retorts; they also have grooves or channels in their upper faces extending from the outer surfaces of the side walls to the inner sides of the chambers of the said retort for the cut-off slides F.

These tiles E are supported by resting on the bottom metal plates H, which are placed on the tops of the posts I, the said tile being introduced above

the said plate H to prevent the heat from escaping in the downward direction as much as possible.

H¹ represents girders, which are introduced between the tops of the posts I and the plate H, and extending from front to rear in place of intermediate posts for supporting the structure; between the ends they have stiffening flanges, H².

These plates H also have vertical holes corresponding with the chambers in the retorts and the holes in the tiles E.

The top covering C also has holes coinciding with the chambers of the retorts, and above it is a metal plate, K, with holes coinciding with the holes in C, and having the flanges L projecting down into them for the protection of the covering C.

The fire-grate is arranged in one end between two series of these retorts at the bottom of the space M, the same as shown in the patent above referred to, and the flue-spaces N O P, and the dividing walls Q R, are the same, causing the product of combustion to pass back between the retorts, under the walls Q, to the walls A, then up around the upper parts of said retorts, through passages S, to the longitudinal flues O P above the arches T.

I propose, however, to arrange fire-grates and doors in both ends in some cases, when it is desired to make furnaces of great capacity, in which case I would place the passage through the top for the final escape of the product of combustion, at or about the center, between the ends.

For strengthening the retorts laterally, at the sides and edges, as may be required, when they are to be used for reducing ores, I provide the studs or projections V on the sides which meet together, as shown in figs. 3 and 4, and brace the said sides very firmly.

For closing the retorts at the bottom to hold the substance while being acted on, I now propose to use plugs or stoppers composed of the flanged metal cups W, and the fire-brick or other suitable non-conducting and heat-resisting lining X, shaped so as to fit snugly in the holes through the plates H and the brick-tile E, and against the bottom of the retorts, which are designed to overhang the holes in the tile E, the said holes being made larger for the purpose, as shown in fig. 3^a, the said blocks being held in position by bars *y* pivoted to them, and engaging with the catch-stud Z, projecting downward from the bottom plates, or the said plugs may be supported in any other approved or suitable way.

The object of having the ends of the plugs fit snugly against the ends of the retorts is to make tight joints thereat, when the plugs, which are first luted on the ends with fire-clay, are first put in. I propose to

make holes, X', through these blocks for drawing off the slag from time to time, as is sometimes required, to prevent an accumulation around the bottom of the retorts, where it sometimes congeals and obstructs the removal of the plug and the iron.

The slag fuses at a low heat, and is liable to act in this way.

These holes are to be stopped by luting them up in the way common in stopping the taps of blast furnaces or cupolas.

Y' is a water-holding trough or tank placed below the fire-grate, to receive the droppings and quench them, so that they will not interfere with the operations of the workmen below.

The bone-black, ore, and other substance to be heated are placed in the retorts, filling them to the top, and exposed therein to the action of the heat surrounding them, which, in the case of the bone-black, expels the vegetable matter collecting upon it when used for filtering or purifying sugar or molasses.

The purified bone-black is then discharged through the bottom into proper receptacles or carts, trucks, or other vehicles placed under the retorts.

The said retorts are filled at the top as fast as reduction takes place, or they are discharged at the bottom, and the operation goes on continually.

The stoppers are removed or let fall from time to time, for discharging the ore or other substances.

When iron, copper, lead, and other like ore is reduced in this way, the heat is such as will reduce it to a pasty condition, in which it will not flow; it therefore settles down, upon a platform or other device on the truck, which can be removed in a mass, of about the form in cross-section of the interior spaces of the retorts from which it issues, and is separated from that remaining in the space above by the slides F, or by knives or cutters of any kind; then it is further let

down for the top to escape from the plate H, and is conveyed away to the forge-hammers or other machine for working it, to expel the slag and other matters.

The stoppers are replaced again after the discharge, being first luted with fire-clay or other substance, around the top, to close the joint thereat, and prevent leakage.

The said stoppers will of course be quite heavy and difficult to handle, and I propose to provide a truck with apparatus for receiving and letting them down and raising them again, the said apparatus to be worked by hand or any other convenient means.

The trucks, after receiving the stoppers, are removed out of the way of the trucks for receiving the ore, which are then run under to receive it.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The combination, with the retorts D, of the tiles E, provided with the holes and the grooves, as described, and arranged on the plate H, all substantially as specified.

2. The combinations, with the retorts, of the cut-off slides I and the stoppers W X, substantially as specified.

3. The retorts provided with the projections V, substantially as specified.

4. The arrangement of the plugs W X with the retorts and the tiles E, substantially as shown and represented in fig. 3'.

5. The plugs W X, provided with the handles X', substantially as specified.

ADAM WEBER.

Witnesses:

GEORGE W. MABEE,
I. S. MABEE.