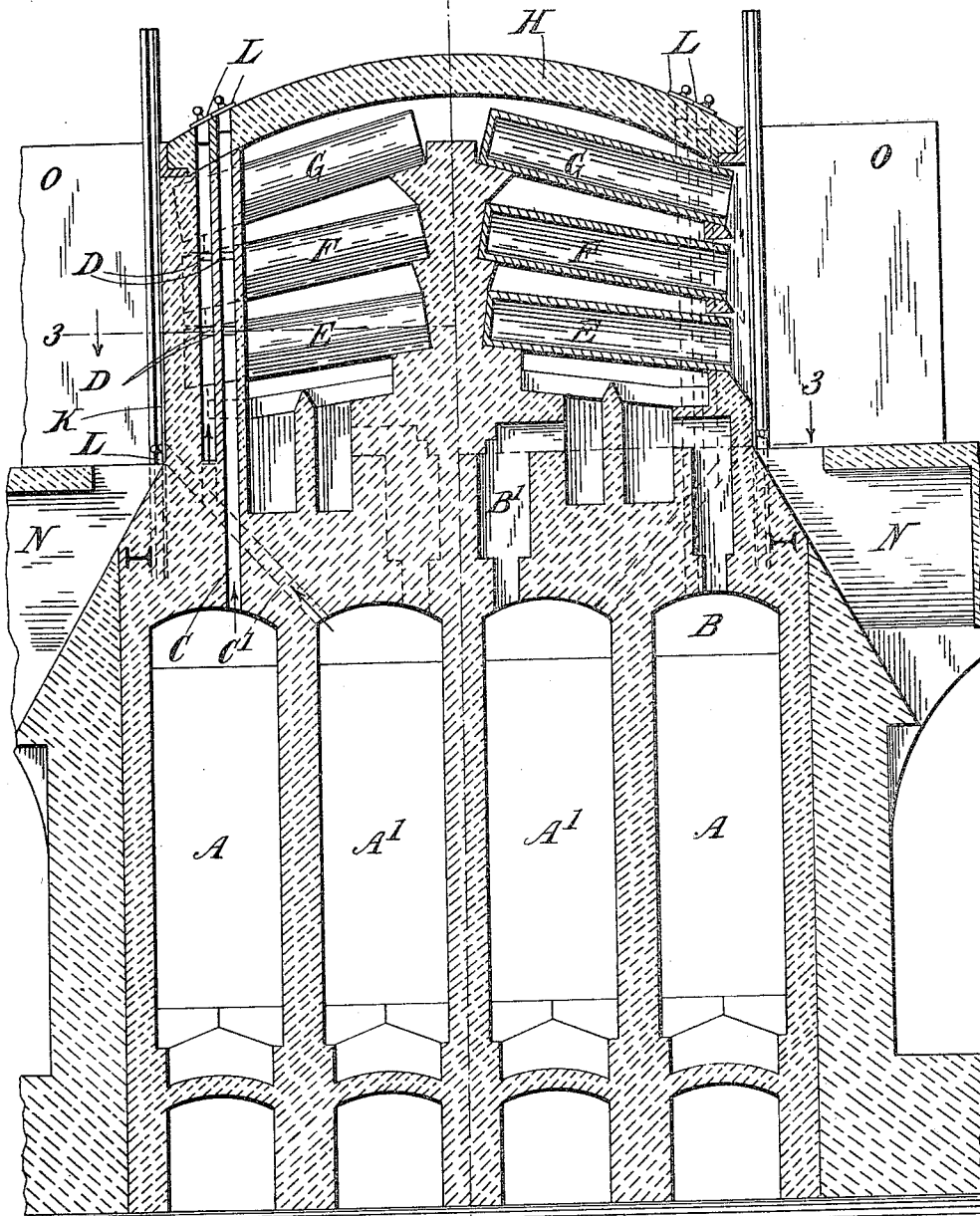


1,223,738.

E. RUCK.
SMELTING FURNACE.
APPLICATION FILED MAY 6, 1916.

Patented Apr. 24, 1917.
3 SHEETS—SHEET 1.

Fig. 1.



Witness
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J. B. Blumling

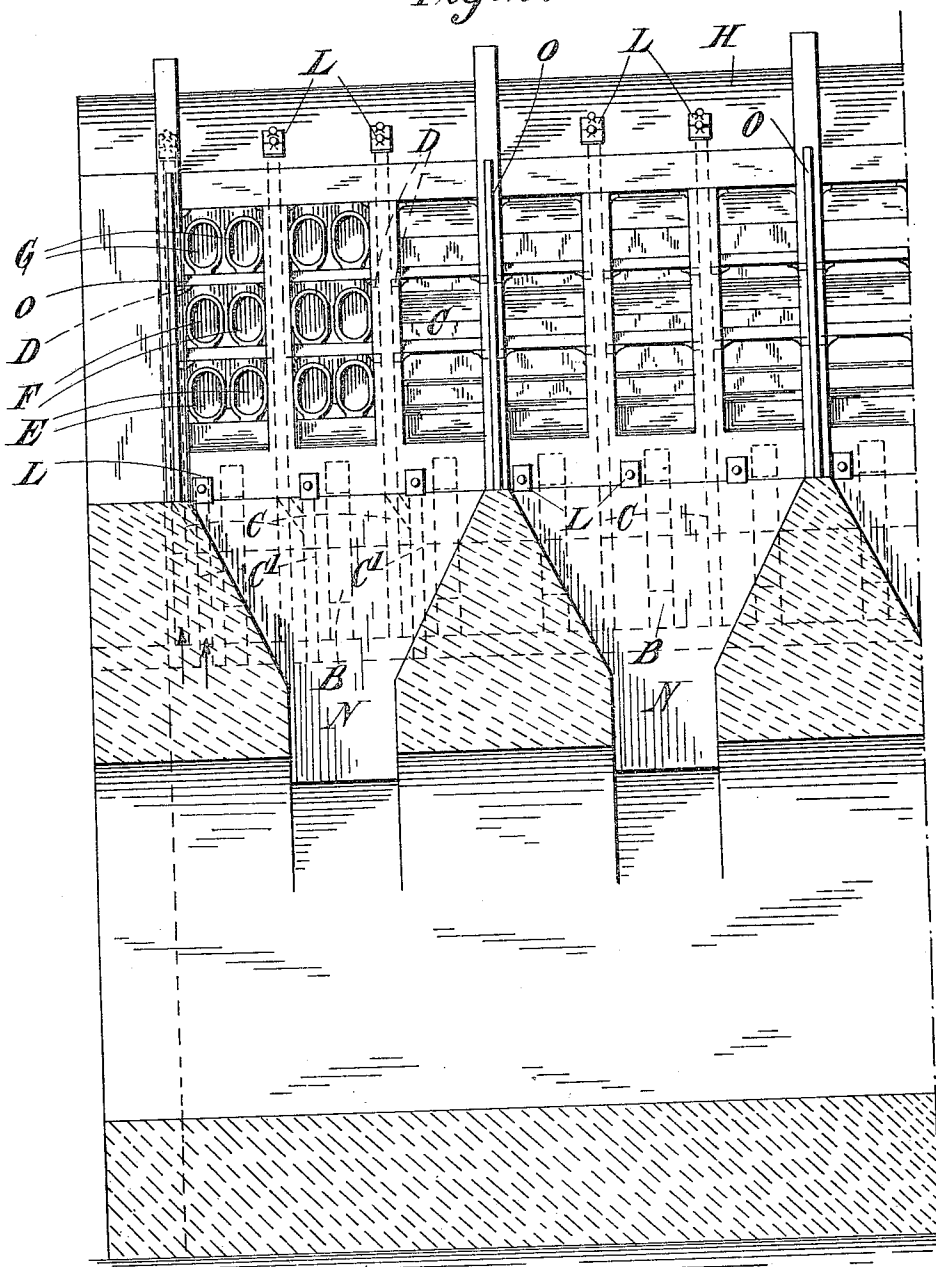
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3 SHEETS—SHEET 2.

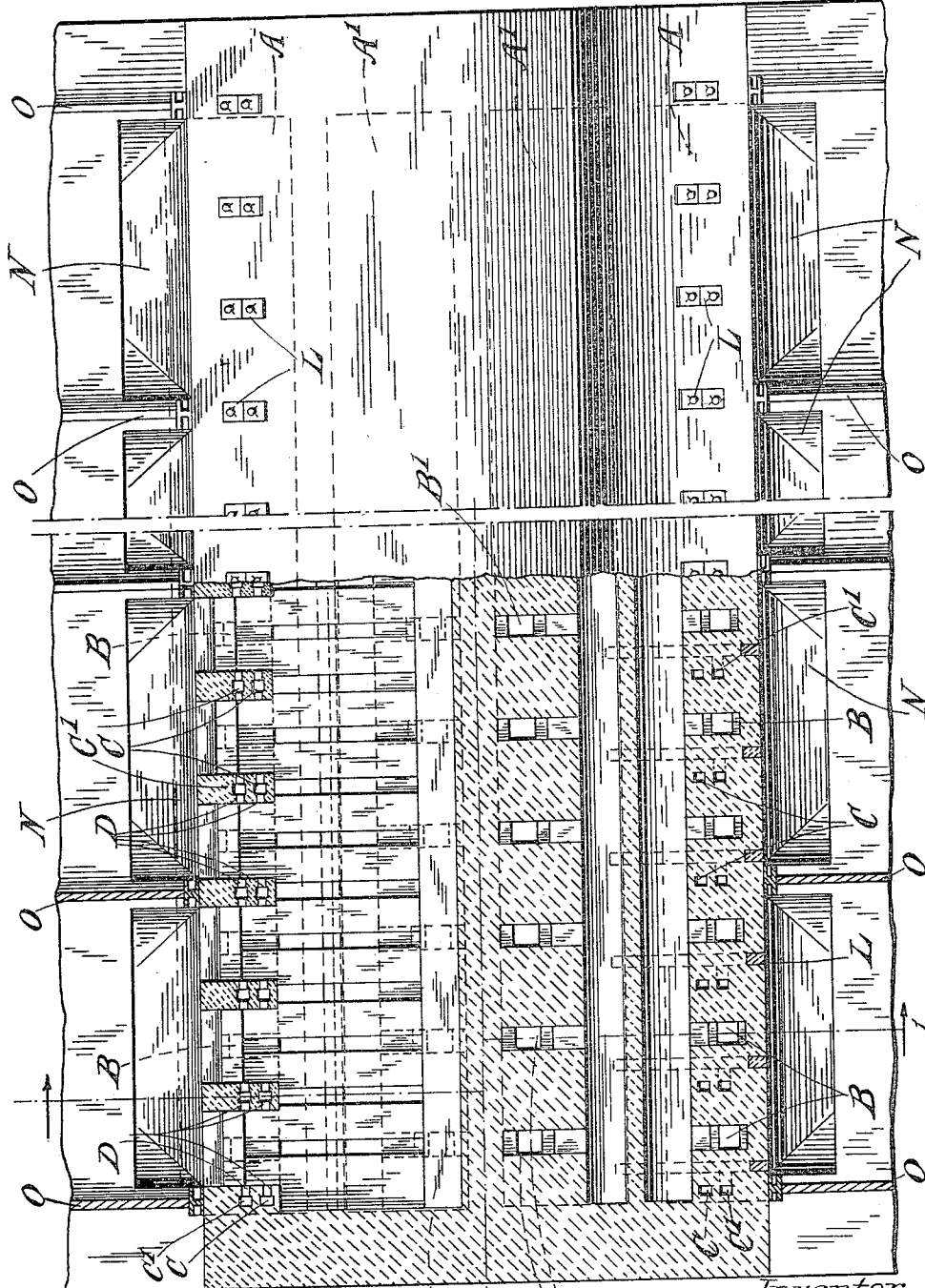
Fig. 2.



Witnesses
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Fig. 3.

Inventor
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UNITED STATES PATENT OFFICE.

EDWIN RUCK, OF SWANSEA, WALES.

SMELTING-FURNACE.

1,223,738.

Specification of Letters Patent.

Patented Apr. 24, 1917.

Application filed May 6, 1916. Serial No. 95,866.

To all whom it may concern:

Be it known that I, EDWIN RUCK, a subject of the King of England, residing at Swansea, in Wales, have invented certain new and useful Improvements in Smelting-Furnaces, of which the following is a specification.

This invention relates to an improvement in smelting furnaces, and more particularly to gas heated furnaces of the regenerative type for smelting zinc ores.

In furnaces of this character, the gas and ore are heated by passing through the checkerwork of the regenerator, and are thence conducted through flues into a mixing chamber; from the mixing chamber the burning gases ascend into one-half of the heating chamber in which superposed retorts are fixed. The gases pass up to the roof of the furnace and during their passage therethrough heat the retorts and then descend to the other half of the heating chamber, which also contains tiers of retorts and finally passes out through the checkerwork and from there to the stack.

In furnaces of this character known to me when more than two tiers of retorts were used, it was very difficult to properly heat the front parts of the retorts contained in the upper tiers. The object of my invention is to provide a furnace in which this difficulty is overcome and in which I provide a plurality of auxiliary gas and air passages in the front wall of the structure, through which fuel is fed to the furnace above the main feed.

In the accompanying drawings, I have shown one form of furnace embodying my invention, in which:

Figure 1 is a vertical section on the line 1—1 of Fig. 3. Fig. 2 is an elevation partially in section, and Fig. 3 is a plan view partially in section on the line 3—3 of Fig. 1.

In the drawings, the reference characters A—A designate the air chambers in the regenerators and A'—A' the gas regenerators. E, F and G are retorts in the combustion chambers above the air and gas chambers, there being a plurality of sets of said retorts on each side of the central division wall, or there being a plurality of sets of retorts above each half of the checkerwork, as clearly indicated in Fig. 1.

Each of the air chambers A is connected with the lower portion of the combustion chamber by means of a port B, while each

of the gas chambers A is connected with the bottom of its respective combustion chamber by a port B'. Located in each of the front walls of the structure and on each side of the different sets of retorts, is an auxiliary air port C which communicates with its respective air chamber A. C' are similar ports adjacent to the ports C which are in communication with their respective gas chambers A'. These various ports C and C' are provided with laterally extending openings D which communicate with the combustion chambers adjacent to the outer ends of the retorts, so that air and gas are supplied to said combustion chambers for heating the front ends of the retorts at a point above the entrance of the main supply of gas and air. L, L are bricks which inclose the upper ends of the ports C, C' which are supported by the roof H, and similar bricks are used for closing the ends of the ports C' at the sides of the furnace. The sets of retorts on each side of the structure are arranged with their mouths near the front outer walls of the furnace above the pockets N for the reception of the residue from the retorts. O are removable screens which, if desired, can be placed in front of the openings of the retorts to protect the condensers or retorts from drafts.

The advantages of my invention result from the provision of a furnace of this character having supply ports for the gas and air in the lower end thereof, together with means for supplying gas and air at the front of the furnace above the main supply.

I claim:

1. A smelting furnace having a combustion chamber, a plurality of retorts at different levels in said combustion chamber, there being a port extending through the bottom of the combustion chamber, means for supplying heated air to said port, there being a second port extending through the bottom of the combustion chamber adjacent to the other port, means for supplying heated gas to said port, said combustion chamber having a front wall, a plurality of auxiliary air ports in said wall, means for supplying heated air to said ports, openings extending through the front wall at different levels communicating with said auxiliary air ports and the combustion chamber, there being an auxiliary gas port adjacent to each air port within the front wall, means

for supplying heated gas to said auxiliary ports, and an opening extending from said auxiliary gas port into the combustion chamber adjacent to each of the openings extending from the auxiliary air ports to the combustion chamber, substantially as described.

2. A smelting furnace having a combustion chamber on each side thereof, a plurality of retorts at different levels in each combustion chamber, there being an air chamber and a gas chamber on each side of the structure having checkerwork therein, the air and gas passing through said chambers to be heated when moving in one direction and the products of combustion passing out through the other gas and air chamber to heat up the checkerwork, a gas inlet port on each side of the structure communicating with its gas chamber and the lower end of the combustion chamber, said ports extending through the bottom of the combustion chamber, an air port on each side of the structure extending through the bottom of the combustion chamber each communicating with its combustion chamber and its air chamber below the combustion chamber, said gas and air ports on each side of the structure being adjacent to each other, a plurality

of auxiliary gas ports on each side of the structure extending through the side walls adjacent to the front ends of the retorts, said auxiliary gas ports communicating with their respective gas chambers below the combustion chambers, laterally extending openings through said walls at different levels communicating with the auxiliary gas ports and the combustion chambers, there being an auxiliary air port adjacent to each auxiliary gas port communicating with its air chamber below the combustion chamber, each of said auxiliary air ports having a plurality of laterally extending openings adjacent to the laterally extending openings communicating with the gas ports for feeding air to the combustion chamber at different levels to commingle with the gas fed through the auxiliary gas ports, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN RUCK.

Witnesses:

NORA STEPHENS,
HAYDN WILCOX.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."