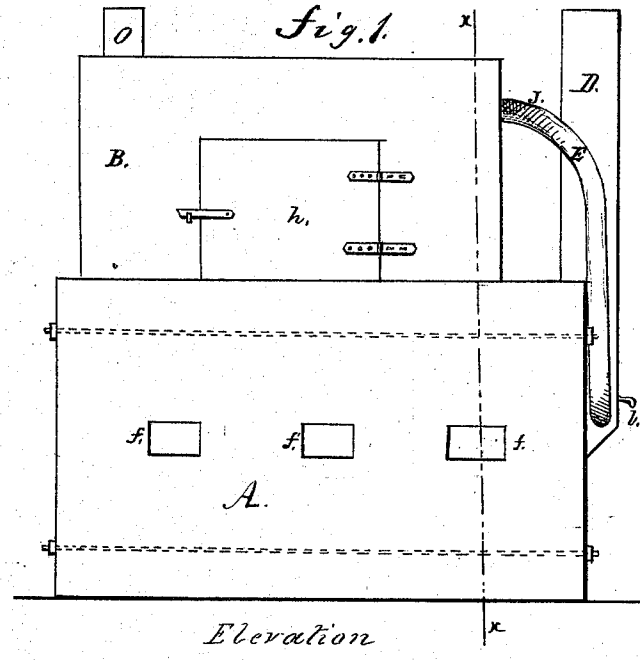
J. G. LANG.

Furnaces for the Manufacture of Oxide of Zinc.

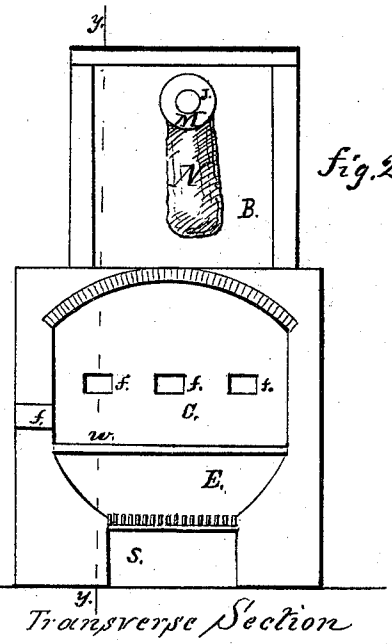
No. 142,571. Patented September 9, 1873.

Fig. 1.



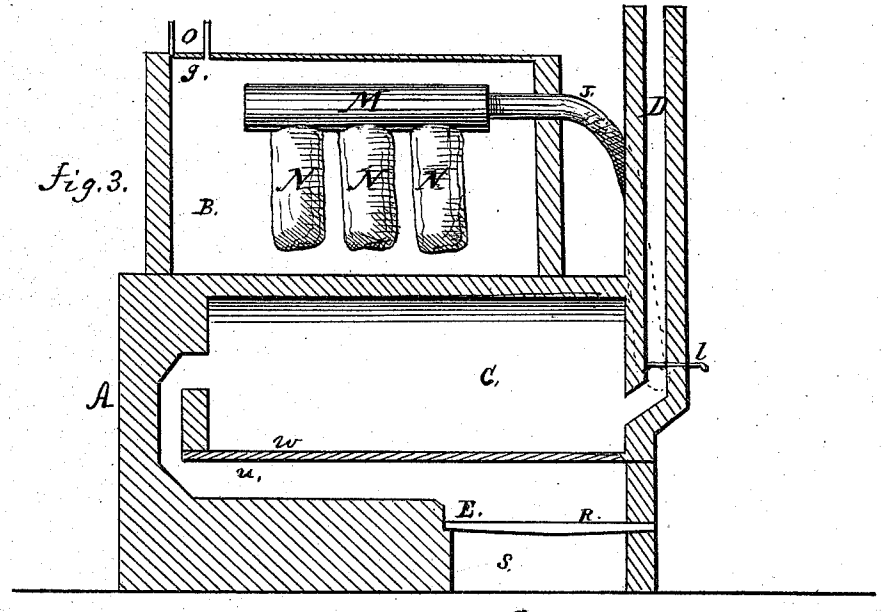
Elevation

Fig. 2.



Transverse Section

Fig. 3.



Longitudinal Section

Witnesses.
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Jno. D. Patten

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UNITED STATES PATENT OFFICE.

JOHN G. LANG, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN FURNACES FOR THE MANUFACTURE OF OXIDE OF ZINC.

Specification forming part of Letters Patent No. **142,571**, dated September 9, 1873; application filed August 16, 1873.

To all whom it may concern:

Be it known that I, JOHN G. LANG, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnace for the Manufacture of Oxide of Zinc; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in furnace, hereinafter described, for the manufacture of the oxide of zinc, the operation of which is adapted to the nature of spelter, which, when heated to a bright red heat with air present, boils, burns, and volatilizes, thereby generating the oxide of zinc.

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

In the accompanying drawings which form part of my specification, Figure 1 is a side elevation of my improvement in furnace for the manufacture of the oxide of zinc. Fig. 2 is a vertical and transverse section of the same at line *x* of Fig. 1. Fig. 3 is a vertical and longitudinal section of the same at line *y* of Fig. 2.

In the drawings, A represents the furnace, which for compactness, economy of room, and efficiency in its operation, is divided into three compartments, viz., fire-chamber, working-chamber, and condensing-chamber, all arranged consecutively over each other in the order named, so that the arch or roof *w* of the fire-chamber E forms the floor of the working-chamber C, and the arch or roof of the working-chamber C forms the floor of the condensing-chamber B. The fire-chamber E is provided with an ash-pit, S, grate R, and communicates with the working-chamber C through the medium of flue *u*. The working-chamber C is furnished with a flue, D, having a sliding damper, *l*, and in the sides and rear end of the chamber are arranged a series of working and air holes, *f*, furnished with doors for closing them. By this arrangement of the working and air holes in the working-chamber the operator can admit air into it at different points, and he is enabled to reach all parts of the chamber with ease, for the purpose of manipulating the spelter placed in it. The operator is also enabled, through the medium of the working and air holes *f*, to control the boiling, burning, and volatilizing of the spelter, which often boils, burns, and volatilizes more in one part than in other parts of the working-chamber; for if he finds that the boiling, burning, and volatilizing process is greater in one part than in another part of the chamber he can close the openings *f* in the part of the chamber where the generating process is too rapid, and open the holes *f* at or near the point where more air and work are needed, and thus cause a uniform operation in the boiling, burning, and volatilizing of the spelter in all parts of the working-chamber C. The condensing-chamber B is provided with a door, *h*, and flue *o* having a damper, *g*, for controlling the draft. The flue *o* is used for the purpose of carrying off the uncondensed gases from chamber B, and also for the purpose of facilitating the cooling of the chamber when the door *h* is opened for the removal of the oxide of zinc from the bags N attached to the under side of the condensing-cylinder M suspended in the chamber B. The cylinder M communicates with the working-chamber C through the medium of the pipe J, the lower end of which enters the side of the flue D below the damper *l* and near the bottom of the working-chamber C, whereby the volatilized products of the spelter readily enter the pipe J, and are carried up through it into the cylinder M by the current of air, which, entering the openings *f* and rushing over the burning spelter, enters the pipe J, carrying with it the volatilized products into the cylinder M, where they are condensed, and fall into the bags N in the form of oxide of zinc.

The operation of the furnace is briefly stated, as follows: The fire is made on the grate R. The damper *l* of the flue D is drawn out to give a free draft. The spelter is placed through openings *f* on the floor *w* of the working-chamber. The fire acting on the under side of the floor *w* heats it, and passing along through the flue *u* enters the working-chamber C, passing over and acting upon the spelter, which soon melts, which will then begin to boil, and by opening one or more of the openings *f*, whereby air is admitted, it will cause the

highly-heated and boiling spelter to burn, which thereby volatilizes and generates the oxide, which is carried into the pipe J, and from it into the cylinder M, in the manner and by the means hereinbefore described. The heat of the fire acting against the under side of the floor *w*, and then passing into the working-chamber, and again acting on the spelter, will greatly increase the efficiency of the furnace and economize fuel. The operator must take care to close the damper *l* and cut off the draft of the flue D as soon as the boiling and burning zinc begins to volatilize, otherwise the desired products will pass off through the flue D.

The advantages of my improvement consist in the compactness of the furnace, thereby economizing room, and in its efficiency in generating the oxide of zinc from the spelter by applying the heat below and above the spelter, and in the means described for carrying off the volatilized products as fast as generated to the condensing-chamber, and also in the economy of fuel, which, through the peculiar construction of the furnace, is so utilized as to gain its best results on the spelter, for the purpose stated—to wit, the manufacture of the oxide of zinc from the spelter.

Having thus described the nature, construction, and operation of my improvement, what I claim as of my invention, is—

The furnace, hereinbefore described, consisting of the fire-chamber E, the working-chamber C provided with work-holes *f* and flue D, and the condensing-chamber B having a collecting and condensing cylinder, M, the several parts being combined and relatively arranged as and for the purpose specified.

JOHN G. LANG.

Witnesses:

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