S. BOYDEN.

Making Spelter.

No. 6,180. Patented Mar. 13, 1849.

Fig. 2.

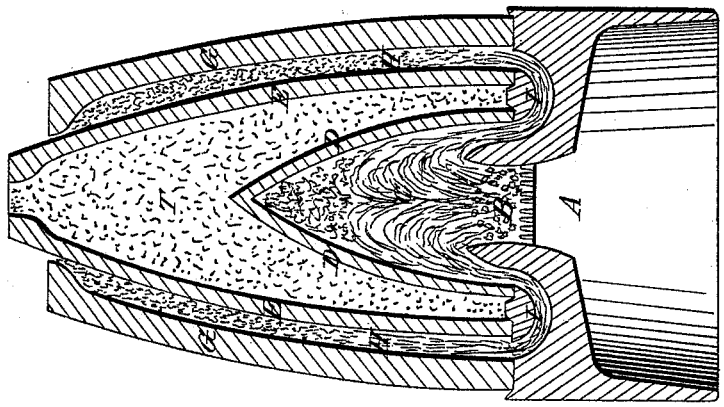
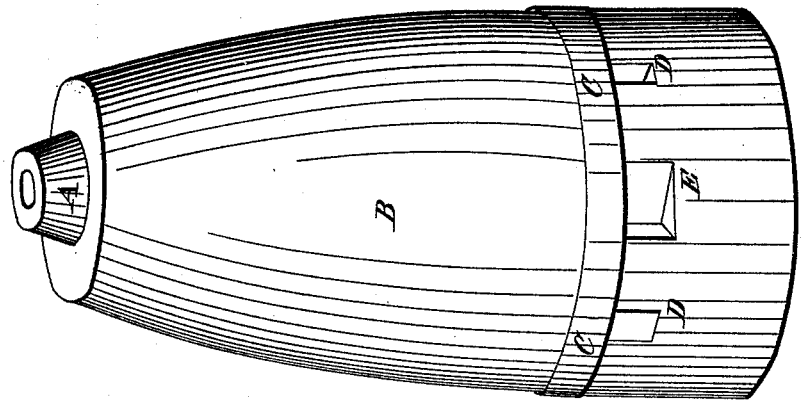


Fig. 1.



UNITED STATES PATENT OFFICE.

SETH BOYDEN, OF NEWARK, NEW JERSEY.

IMPROVED FURNACE FOR SMELTING ZINC.

Specification forming part of Letters Patent No. **6,180**, dated March 13, 1849.

To all whom it may concern:

Be it known that I, SETH BOYDEN, of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Mode of Constructing Furnaces and Retorts for Smelting Zinc Ore; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in a double retort surrounding the fire with the ore, so that the heat has but little chance to escape, except through the ore or object to be heated.

To enable others skilled in the art of reducing zinc ore to fully understand the nature of my invention, I will proceed to describe its construction and operation.

The retorts or furnace may be made of fire-clay, like glass-furnace pots, or laid up with fire-bricks or any of the known fire materials, and of any dimensions desired. A convenient form for the inner retort is a cone proportioned thus: the base-line two and elevation three, the sides somewhat arched or inclined to a hemisphere. This retort is placed on brick-work, its open broad end down. The fire-grates are placed in the center just below the base, with an ascending passage on opposite sides to supply the fuel; also, a flue on each side of the grates for the smoke and blast to pass off under the edge of the retort. The second retort is larger, and its proportion is—the base one and elevation two, arched on the side like the first, with the apex removed, and a hole through the top. This is placed over the former retort, resting on the same line of brick-work, closing the bottom and forming the ore-chamber between the outside of the inner retort and inside of the outer retort. This compound or double retort is inclosed (except the top) in a case or brick-work, forming a hot-air chamber between the outside retort and case. The flues from the fire conduct the hot air to this chamber. It then passes away from the furnace through four flues at the bottom. These flues also lead to four holes in the bottom of the ore-chamber to discharge the remains after sublimation.

The annexed drawings are representations of the model accompanying this specification.

Figure 1 is a statue or external view of the furnace. The outside retort, projecting out of the case, is represented at A. The outside case of the furnace is represented at B. The base or bottom on which the retorts are placed is represented at C C. Two of the four flues through which the smoke and blast leave the furnace, and the remains after distillation, are represented at D D. One of the ascending passages to the fire-chamber through which the fuel is supplied is represented at E. Fig. 2 is a transverse section across the fire-grates.

The ash-pit is represented at A. The grates are represented at B. The fire-chamber is represented at C. The inner retort is represented at D D. The outside retort is represented at E E. The ore-chamber is represented at F. The outside case surrounding the retorts is represented at G G. The hot-air chamber is represented at H H. The flues leading from the fire-chamber to the hot-air chamber are represented at I I.

The ore for distillation is prepared with its fluxes in the usual manner and introduced through the aperture at the top into the ore-chamber. The condenser is then attached to the aperture and the heat raised to the degree required by lighting a fire in the chamber and directing a current of air under the grates, and continued until the metallic zinc has sublimed and passed into the condenser.

I do not claim to be the inventor of retorts, or muffles, or pots, or cylinders, or chambers, in furnaces to receive them, for distilling or volatilizing zinc, or any of the modes now in use where the heat is generated in the chamber with the retorts or muffles, or generated in a fire-place and pass into a chamber containing pots, cylinders, muffles, or retorts heating the sides of the furnace and flues and walls of the chamber, which serve only to confine the heat round the retorts. These heated walls allow much caloric to pass away without coming in contact with the ore, and require from ten to twenty tons of coal to produce a ton of metallic zinc.

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

A combination or double retort or furnace generating the heat within the vessel or cham-

ber containing the ore to be heated, surrounding the fire-chamber or place of combustion with the ore, so that the caloric going off in any direction from the fire (except down through the grates) must pass through the ore. With this arrangement merchantable metallic zinc is obtained from the ore in the proportion of one ton of zinc by four and one-fourth tons of coal.

SETH BOYDEN.

Witnesses:
F. HOLDEN,
WILLIAM LEE.