J. V. WOODHOUSE.

Furnace for Smelting Lead.

No. 168,440. Patented Oct. 5, 1875.

Fig. 1.

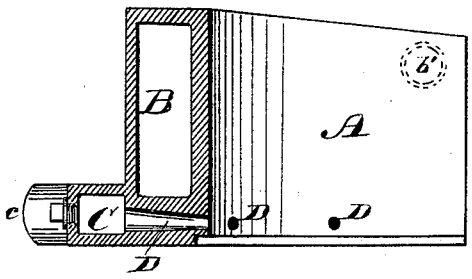
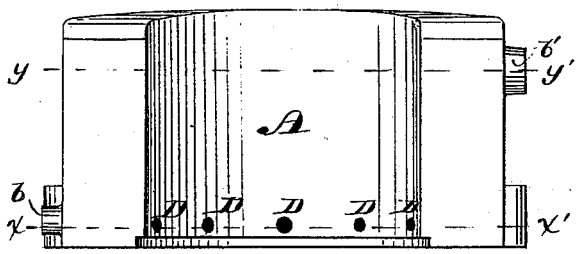


Fig. 2.



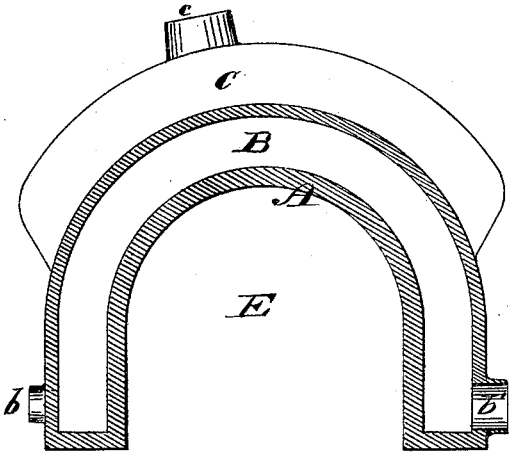


Fig. 3.

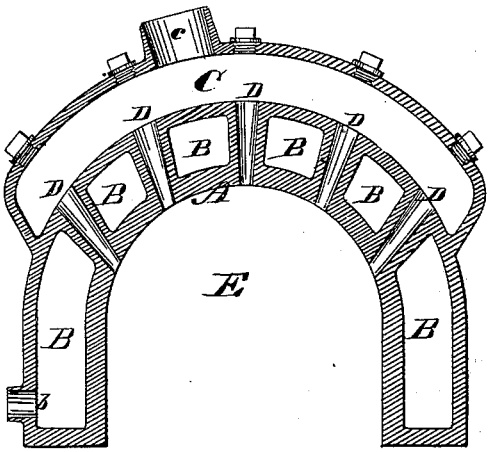


Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN V. WOODHOUSE, OF BUNKER HILL, ILLINOIS.

IMPROVEMENT IN FURNACES FOR SMELTING LEAD.

Specification forming part of Letters Patent No. **168,440**, dated October 5, 1875; application filed June 7, 1875.

To all whom it may concern:

Be it known that I, JOHN V. WOODHOUSE, late of Mine La Motte, Missouri, but now of Bunker Hill, Illinois, have invented new and useful Improvements in Furnaces for Smelting Lead, of which the following is a full, clear, and exact description, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 is a central cross-sectional elevation; Fig. 2, a front elevation; Fig. 3, a horizontal section on the line *y y'* of Fig. 2, and Fig. 4 a horizontal section on the line *x x'* of Fig. 2.

Like letters indicate like parts.

In smelting lead ores in the ordinary Scotch or American hearth the walls thereof soon heat to such an extent as to cause the metal to "freeze" (a smelter's term) thereto.

To obviate this it has been customary to cease smelting until the walls have cooled.

To provide for continuous smelting I have previously made an improvement wherein the hearth-walls are made hollow, and a circulation of water caused therein. By this means the walls can be cooled, but an incrustation (especially where limy water is used) is apt to form, which occasions cracks, terminating the usefulness of the construction.

It is the aim of the present invention to provide for maintaining the proper temperature in a lead-smelting furnace, and in such manner as to avoid injury thereto. The invention also relates to the shape of the furnace and the arrangement of its tuyeres.

Referring to the accompanying drawing, A represents the furnace-wall. As shown at B, Figs. 1, 3, and 4, it is made hollow to form an air-chamber, to which is an inlet, *b*, and an outlet, *b'*. This air-chamber extends throughout the wall, and is entirely distinct from another air-chamber, C, which is arranged in the rear and at the bottom of the wall. To this last-named chamber is an inlet, *c*. D D D D D represent a series of tuyeres leading from the chamber C to the hearth E. The wall A of the furnace is made semicircular, as shown, and the tuyeres are distributed not only at the back of the furnace, but around at either side.

In the construction described it will be seen that two distinct air-circulating systems are provided for—one to furnish means for the free circulation of cool air throughout the furnace-wall, and the other to provide a blast to feed the combustion inside the furnace. If preferred, both these blasts can be supplied by a common blower, the proper diversion being made so that the air can enter partly at the inlet *b* and partly at the inlet *c*.

In operation, an air-blast is sent through the chamber B, cooling the furnace-wall to the desired point, and without causing any injury thereto. Another blast is directed through the chamber C into the fire. It is desirable that this last-named blast be not heated before entering the furnace, as in the smelting of lead there is a continual liability to overheating.

It will be seen that by the construction described the cooling air-blast can be utilized in keeping down the temperature of the tuyeres through which the other blast is entering. It will also be noticed that the wall of the present furnace is made in a horseshoe form. Hitherto this wall has been built in a rectangular form, from which construction there have been corners in the furnaces in which the ores were cooler than in the more central parts of the furnace. In consequence the smelting proceeded irregularly.

To obviate this difficulty I construct the walls as described, and also distribute the tuyeres, as shown, and so as to secure an even heating. By this means the smelting proceeds evenly throughout the furnace.

I am aware that, in smelting lead in a blast-furnace, the blast used in maintaining combustion has been heated previously to its admission to the fire. I am also aware that in a reverberatory furnace an air-current has been drawn through its hearth, (which is hollow,) and thence into the furnace. As the result of such methods is the increasing of the temperature of the furnace to such a degree as to prevent continuous smelting, they, even if new with me, would not answer my present purpose, and I disclaim them; but

Having described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The semicircular wall A, provided with the air-chamber B, the chamber C, tuyeres D D D D D, arranged as described, and hearth E, substantially as described.

2. The hearth E, provided with the semicircular wall A, as and for the purpose set forth.

3. The hearth E, provided with the semicircular wall and the tuyeres D D D D D, arranged as described, as and for the purpose set forth.

JOHN V. WOODHOUSE.

Witnesses:
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