

JOHN V. WOODHOUSE.

Improvement in Furnaces for Smelting Lead Ores.

No. 115,921.

Patented June 13, 1871.

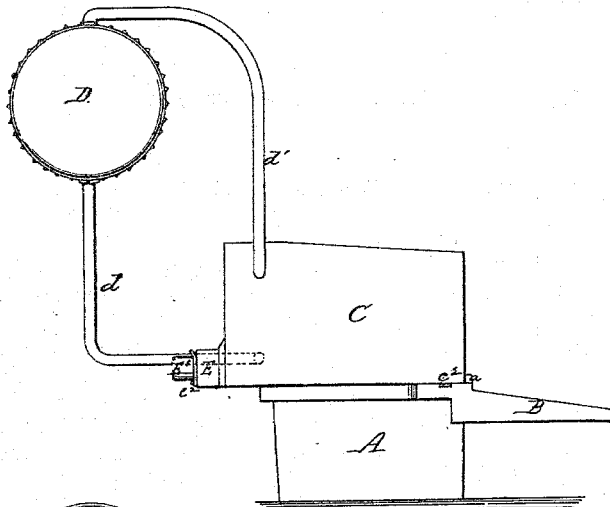


Figure 1.

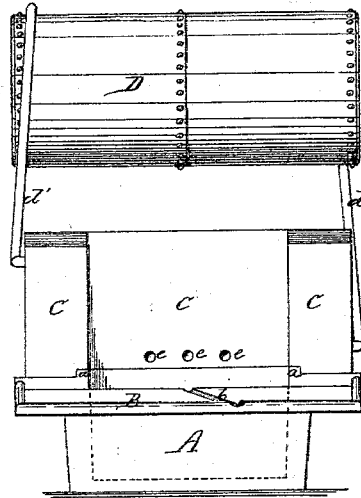


Figure 2.

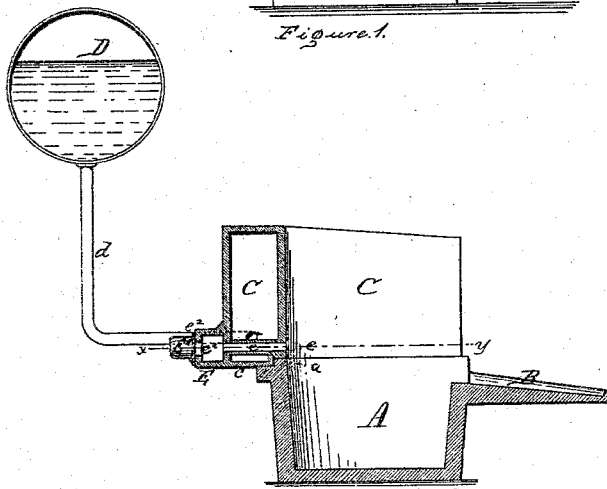


Figure 3.

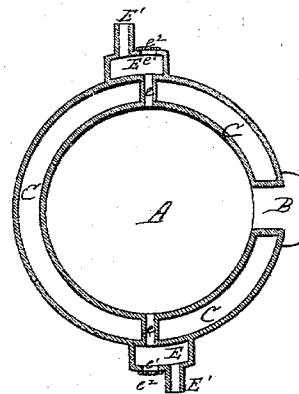


Figure 5.

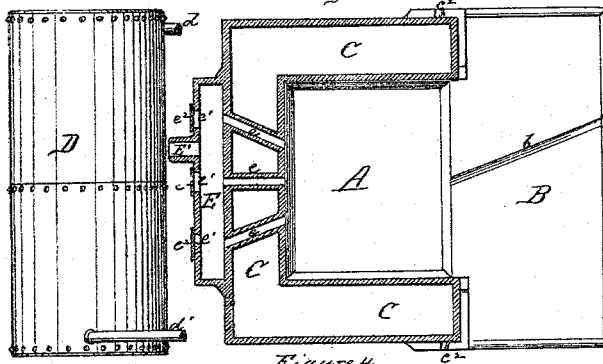


Figure 4.

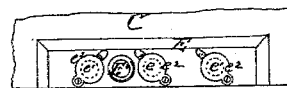


Figure 6.

Witnesses:

*J. W. Fisher*

*Robert Quinn*

Inventor:  
*John V. Woodhouse*  
by *His Attys*  
*Herschel & Co*

# UNITED STATES PATENT OFFICE.

JOHN V. WOODHOUSE, OF MINE LA MOTTE, MISSOURI, ASSIGNOR TO HIMSELF, RADCLIFFE B. LOCKWOOD, AND WILLIAM A. SCOTT, OF SAME PLACE.

## IMPROVEMENT IN FURNACES FOR SMELTING LEAD ORES.

Specification forming part of Letters Patent No. 115,921, dated June 13, 1871.

*To all whom it may concern:*

Be it known that I, JOHN V. WOODHOUSE, of Mine La Motte, in the county of Madison and State of Missouri, have made a certain new and useful Improved Furnace for Smelting Lead and other metals; and I do hereby declare that the following is a full and true description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

In the use of the "Scotch hearth" or the "American hearth" for smelting lead, it is found necessary to allow the sides or jambs of the hearth to cool off consequent upon said sides or jambs becoming superheated by the accumulation of heat from the process of reduction; also, in smelting iron, copper, or other metal in a cupola or stack furnace, the lining of the furnace becomes oxidized, or the furnace itself becomes clogged by an accumulation of slag upon the inner sides of the stack. To avoid such difficulties, (which incur a great loss of time and labor,) and in general to form an improved furnace, the nature of this invention relates, first, in surrounding the hearth or top with a reservoir or water-back, receiving its supply of water from a tank or boiler; secondly, in providing said water-back with an air-chamber and tuyere-pipes for distributing the blast; and, lastly, to certain detail construction of parts hereinafter to be more fully described.

To enable those herein skilled to make and use my said improvements, I will now more fully describe the same, referring to the accompanying Figure 1 as a side elevation; to Fig. 2 as a front elevation; to Fig. 3 as a sectional elevation; to Fig. 4 as a horizontal section at line *xy*; to Fig. 5 as a horizontal section of a stack-furnace; to Fig. 6 as a detail end view of the tuyere.

A is a cast-iron basin, in which the smelted metal or lead accumulates; B, its apron, having a gutter, *b*, in which the overrunning smelted lead is carried to a receiving pot or vessel. The top of the hearth A, facing its inside, is cast with flanges *a*. Resting upon said hearth A, and surrounding the same, I arrange a tank or reservoir, C, in manner clearly shown in Figs. 1, 2, and 3. The res-

ervoir C forms a water-back, to avoid the difficulties stated in the nature of this invention, and taking the place of the solid iron jambs used in the so-called Scotch hearths, as well as taking the place of the air-chamber of the American hearths. The reservoir C rests, by its own weight, upon the top of the hearth A. Its rear bottom flange *c* rests upon a corresponding base or in a groove, *c'*, of said hearth, in manner indicated in Fig. 3. Said reservoir can thus be tipped up by means of wedges entered into an opening, *c''*, of the side-projecting ledges. (See Fig. 1.) The water back or reservoir C receives its supply of cold water from a tank or boiler, D, by means of the supply-pipe *d*, the hot water returning to said tank through the hot-water or steam-pipe *d'*. A continued circulation is thus achieved, and the oxidation of the sides of the hearth, as well as all injury to the same by the fused slag, is thus obviated. In the rear and bottom of the water-back C I arrange the air-chamber E, communicating by means of the tuyere-pipes *e* to the hearth A, in manner clearly shown in Fig. 4. Said pipes *e* are fed by the blast-pipe E' from the blast source, as usual. Furthermore, I provide the air-chamber E with openings *e'*, arranged in communication with the tuyeres *e*, for the purpose of cleaning the same from any accumulation of slag. When not used said openings *e'* are closed by slides *e''*. (See Fig. 6.) As the water-back C can be raised or lowered the blast from the tuyere can be varied to strike at different points, as the necessities of the case demand, all liability of any molten lead entering between the hearth and said water-back being prevented by the flanges *a*.

It will be observed that the use of the said water-back C, receiving its supply of water from the tank as described, effectually prevents what is known among lead-smelters as "freezing" of the ore and metal to the sides or jambs; also, that the principle of construction involved is also applicable to smelting iron, lead, copper, or other metal in a cupola or stack furnace, as shown in Fig. 5.

Having thus fully described my said invention, what I claim is—

1. The arrangement of a reservoir or water

back, C, partially or wholly surrounding the top of a hearth, A, substantially as and for the purpose set forth.

2. The reservoir C, its bottom flange *c*, air-chamber E, tuyere-pipes *e*, openings *e*<sup>1</sup>, slides *e*<sup>2</sup>, in combination with a hearth, A, projecting openings *c*<sup>2</sup>, and flanges *a*, substantially as set forth.

3. The projecting ledges having openings *c*<sup>2</sup>, substantially as set forth.

4. The reservoir C, air-chamber E, tuyeres *e*, openings *e*<sup>1</sup>, tank or boiler D, supply-pipe *d*, return-pipe *d*<sup>1</sup>, arranged in combination with a hearth, A, substantially as set forth.

In testimony of said invention I hereunto set my hand.

J. V. WOODHOUSE.

Witnesses:

BEN. COLMAN,

R. V. TILLMAN.