(No Model.)

O. B. PECK.

SMELTING FURNACE.

No. 385,424. Patented July 3, 1888.

Fig. 1.

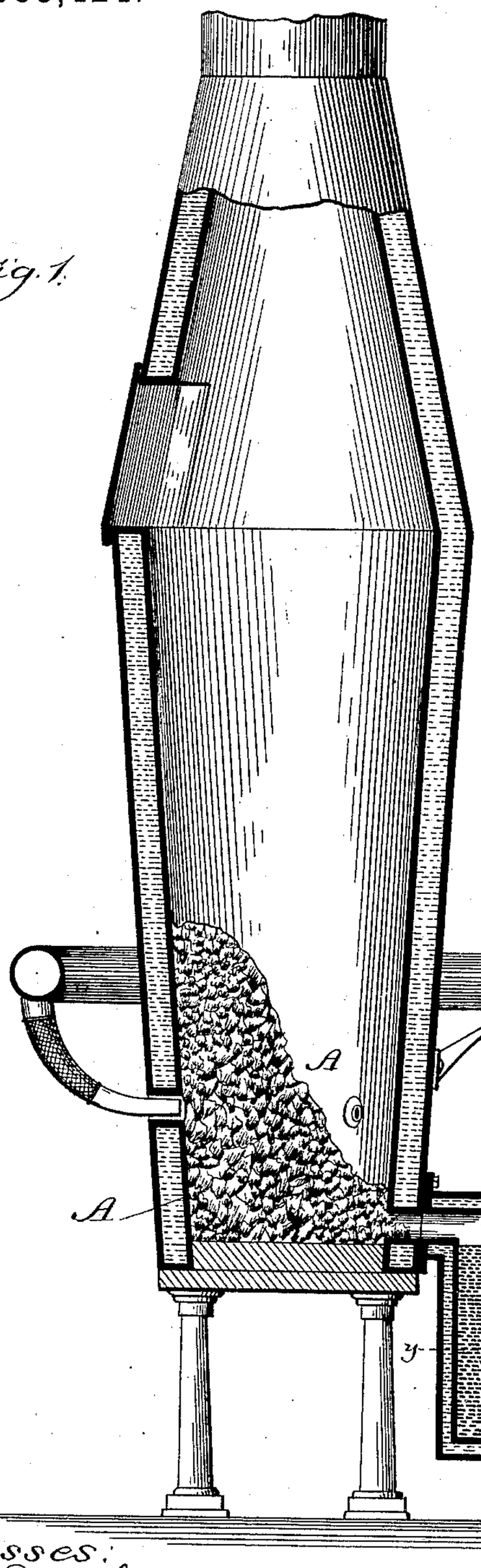

Fig. 2.

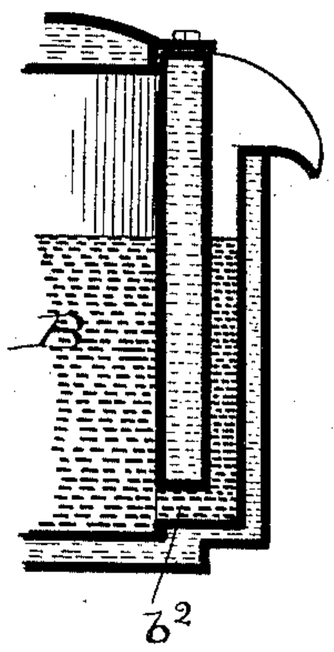

Fig. 3.

Witnesses:
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ORRIN B. PECK, OF CHICAGO, ILLINOIS.

SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 385,424, dated July 3, 1888.

Application filed May 5, 1887. Serial No. 237,273. (No model.)

To all whom it may concern:

Be it known that I, ORRIN B. PECK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Smelting-Furnaces, of which the following is a specification.

The object of my invention is to construct a furnace especially adapted to the smelting of what are known as "refractory" and "dry" ores containing little or no lead; and the invention consists in the features and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section of a smelting-furnace; Fig. 2, a vertical section taken in line *x x*, and Fig. 3 a horizontal section taken in line *y y* of Fig. 1.

A is the crucible of the furnace; B, the receiver; *b*, an opening in the side; *b'*, an air-pipe entering the top, and b^2 an opening at the bottom thereof; and C the pipe or connection between the crucible and receiver.

In the smelting of refractory and dry ores it is common to use lead as a flux and for collecting the gold and silver contained in the ores being smelted, the lead being introduced along with the fuel and ores. It being sometimes difficult or expensive to procure sufficient lead for this purpose, my invention has in view the repeated use of lead, the same being introduced again and again while in a molten state. To accomplish this object I construct and operate my smelting-furnace as follows: The general construction of the furnace is in the usual way; but I prefer to have the tuyeres enter the crucible at a point higher or farther from the bottom than is usually the case. This leaves a space below into which the molten lead is introduced, as hereinafter described.

The receiver, which is a tank or vessel into which the smelted ores pass, capable of being made air-tight, as hereinafter described, is connected to the crucible of the furnace by a pipe so constructed as to permit it to be connected with the receiver at a point considerably below its connection with the crucible, which is, of course, near its bottom. This enables the molten lead and slag to pass out and down through such pipe into the lower part of the receiver; and as they continue to flow therein the surface thereof continues to rise in the receiver until it reaches a point as high as the point of outflow from the crucible, after which the slag may overflow or escape through the pipe or opening in the side of the receiver. In this way, the bottom of the receiver being considerably below the bottom of the crucible, and the connecting-pipe constructed and attached as above described, a large body of molten lead and slag may be collected in the receiver before there will be any outflow or escaping thereof.

The lead being heaviest, of course collects in the bottom of the receiver, the slag rising above the same, and when the receiver is filled to the point of overflow the hole or opening in the side thereof, *b*, is hermetically sealed with clay, or otherwise, after which an air-pressure is applied by pumping in air through the pipe *b'*. This air-pressure, which may be applied by means of the pipe referred to, or in any other convenient way, forces the molten lead and slag back again, the lead being at the bottom of course passing out first, so as to bring them a second time into the furnace in such a way as to subject the smelting ore in the base of the crucible to a lead bath. The pressure being removed, the operation is of course reversed and the molten lead and slag again allowed to flow out into the receiver, and so on, the pressure being applied and the lead and slag forced back into the crucible, or removed, and the lead and slag allowed to flow out into the receiver continually, or as long as desired.

To provide for the escape or overflow of surplus lead, I provide a lead-well or overflow at the side of the receiver and communicating therewith through the hole b^2 at its bottom. This lead-well or overflow-pipe may extend up to about the height or level of the tuyeres; but it should of course terminate at such a point as will permit the surplus lead to overflow while the air-pressure is being applied. The surplus slag will of course flow out through the opening in the side of the receiver after the clay is taken out and the pressure removed. To prevent incovenience by the cooling of the metal in the connecting-pipe between the crucible and receiver, I prefer to construct the same in two parts and to line them with

plumbago or fire-clay to keep them hot. These parts may be connected together by bolts, or in any other suitable manner, and when so connected the two together operate to form the complete or finished pipe. I have shown a pipe constructed in this way and having elbow-joints; but I do not wish to be understood as limiting myself to this particular form, or to other minor features or details of construction.

I claim—

The combination, with the crucible of a smelting-furnace, of a receiver air-tight when its overflow is stopped, a connecting passage entering the receiver at or near its bottom, and means whereby the slag in the receiver may be forced or returned through the passage to the smelting-furnace, substantially as described.

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