R. T. KNOX & J. OSBORN.

FURNACE AND CONDENSER FOR REDUCING CINNABAR AND OTHER VOLATILE ORES.

No. 104,323. Patented June 14, 1870.

Fig. 1.

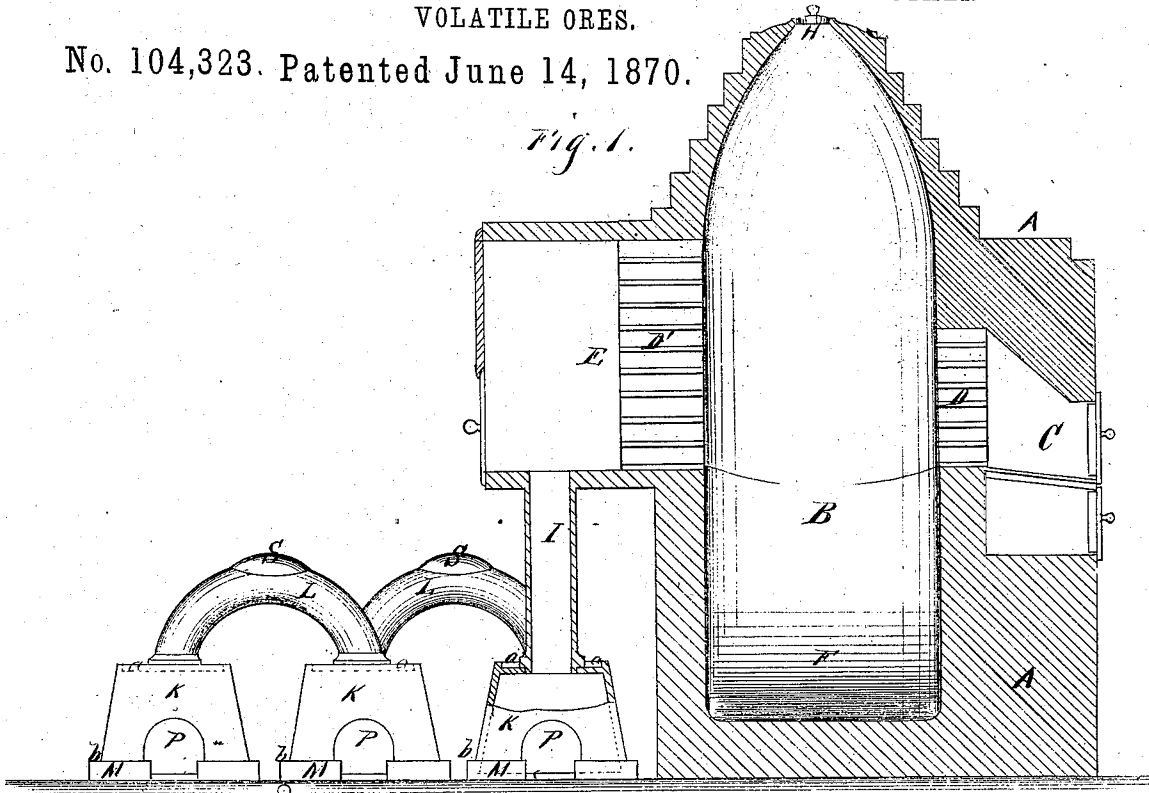


Fig. 2.

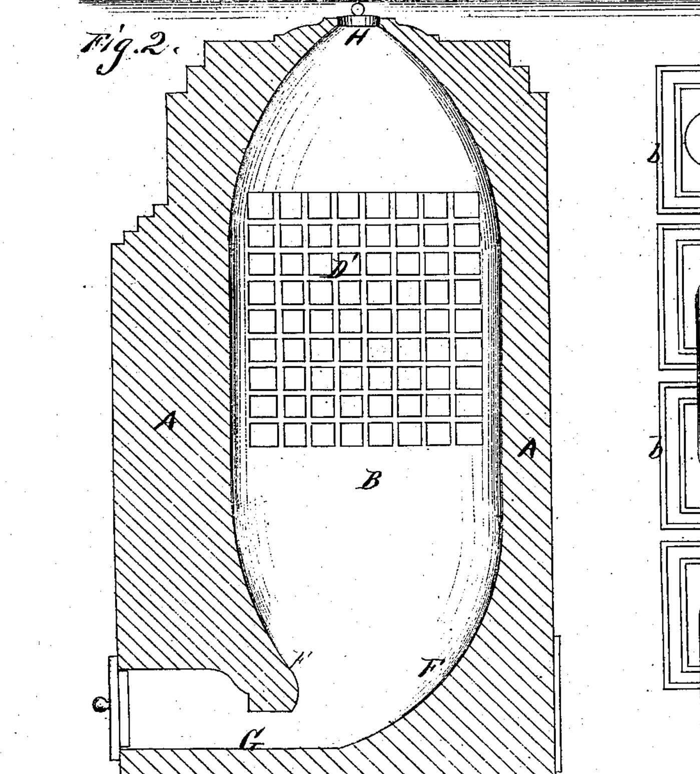
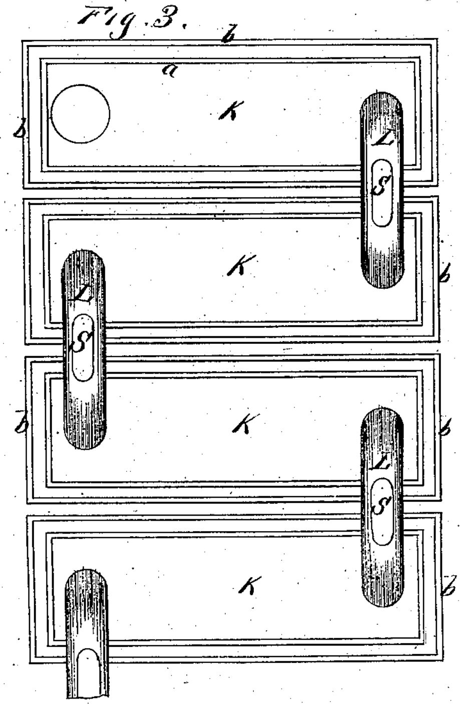


Fig. 3.



Witnesses.
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RICHARD F. KNOX AND JOSEPH OSBORN, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 104,323, dated June 14, 1870.

IMPROVEMENT IN FURNACE AND CONDENSER FOR REDUCING CINNABAR AND OTHER VOLATILE ORES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that we, RICHARD F. KNOX and JOSEPH OSBORN, of the city and county of San Francisco, State of California, have invented an improved Furnace and Condenser; and we do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains, to make and use our said invention and improvements without further invention or experiment.

Our invention relates to improvements in furnaces for roasting ores, and more particularly for extracting the volatile portions of ores from which it is only desired to save the fumes, such as cinnabar or quicksilver-yielding ores.

It also relates to improvements in the condensers, whereby the metallic or other sulphurous vapors are rapidly and effectually refrigerated without actual contact with water, thereby avoiding the deterioration consequent upon such contact and the escape of deleterious vapors.

In order to explain our invention so that others can understand its construction and operation, reference is had to the accompanying drawing forming part of this specification, in which—

A represents the body of a furnace, having a chamber, B, whose greatest length is in a vertical direction.

At one side of this chamber B is placed the fire-place C, which is separated from the chamber by the grate-bars D, which we call a pigeon-hole partition.

Upon the opposite side of the chamber, and a little higher up than the fire-place C, is the discharge or draught-opening E.

This opening is also faced with a grating or pigeon-hole partition, D', of greater capacity than the gratings D of the fire-place.

The furnace is contracted gradually in width towards the bottom, as shown, and an incline, F, conveys the refuse ore to a floor, G, from which it can be raked or otherwise removed, either by hand or machinery, as most convenient.

The upper end of the furnace is closed, a small door or opening, H, serving through which to pass the ore into the chamber.

The chamber is constantly kept filled with ore, which is continually settling toward the bottom, and, as it passes between the fire-place and draught-opening, it is thoroughly roasted and the vapors carried off through the draught-opening and down through the vertical pipe I into the condenser.

The condensers K K are iron vessels, of which any number may be used.

These vessels are placed side by side, and are connected together by curved pipes L, alternately, at one end and the other, so that the vapors must pass as far as possible, and thus be exposed to the greatest cooling influence.

The tanks K are constructed with a shallow pan, *a*, upon their top, which is formed by extending the sides and ends a little above the upper side of the tank, which is made level.

These pans are kept filled with water, thus submerging the top of the tank.

The bottom plate M is cast separately from the rest of the tank, and has a flange, *b*, around the outside, to pack it, and an inner flange or lugs, between which the sides of the tank rest.

The bottom of these tanks are placed at an inclination toward the end O, in which a small door, *p*, is placed.

The joints about this door are luted tight, except a small space at the bottom, which is left as close as it will come without specially fitting, thus leaving a space for the flow of the mercury.

At the highest portion of the connecting-pipes L is a small cap, S, which fits over an opening under it, through which a rod can be introduced, to clear away any sulphur, cinnabar, or other substance which may be deposited in them.

At the end of the series of tanks K is placed a suction-blower, or other suitable device, which will aid the draught in the furnace and keep the vapor moving through the tanks.

Water is discharged upon the last tank of the series, filling the pan *a*, and flowing over down the sloping sides of the tank.

The next one in the series is placed a little lower, and the surplus water passes upon this tank, and so on to the one nearest the furnace, or it may be carried along in a trough and discharged upon each tank.

A spout or trough passes along the front of the tanks K, and receives the condensed mercury and conveys it to the proper receptacle.

Having thus described my invention,

What I claim, and desire to secure by Letters Patent, is—

1. Placing the fire-place C and draught-opening D, in opposite sides of the body of the furnace, so as to draw the heat through the passing ore, substantially as herein described.

2. Contracting the chamber B at the bottom, in

combination with one or more inclined planes, F, substantially as and for the purpose above described.

3. An automatically-feeding furnace, in which the ore is carried by the superincumbent weight in position to be acted upon by the heat, substantially as and for the purpose herein specified.

4. The condensing-tanks K, with their sides and ends extended upward, so as as to form a water-containing pan, *a*, from which the sides may be overflowed, substantially as and for the purpose above described.

In witness that the above-described invention is claimed by us, we have hereunto set our hands.

RICHARD F. KNOX.
JOSEPH OSBORN.

Witnesses:
GEO. H. STRONG,
WM. R. BOONE.