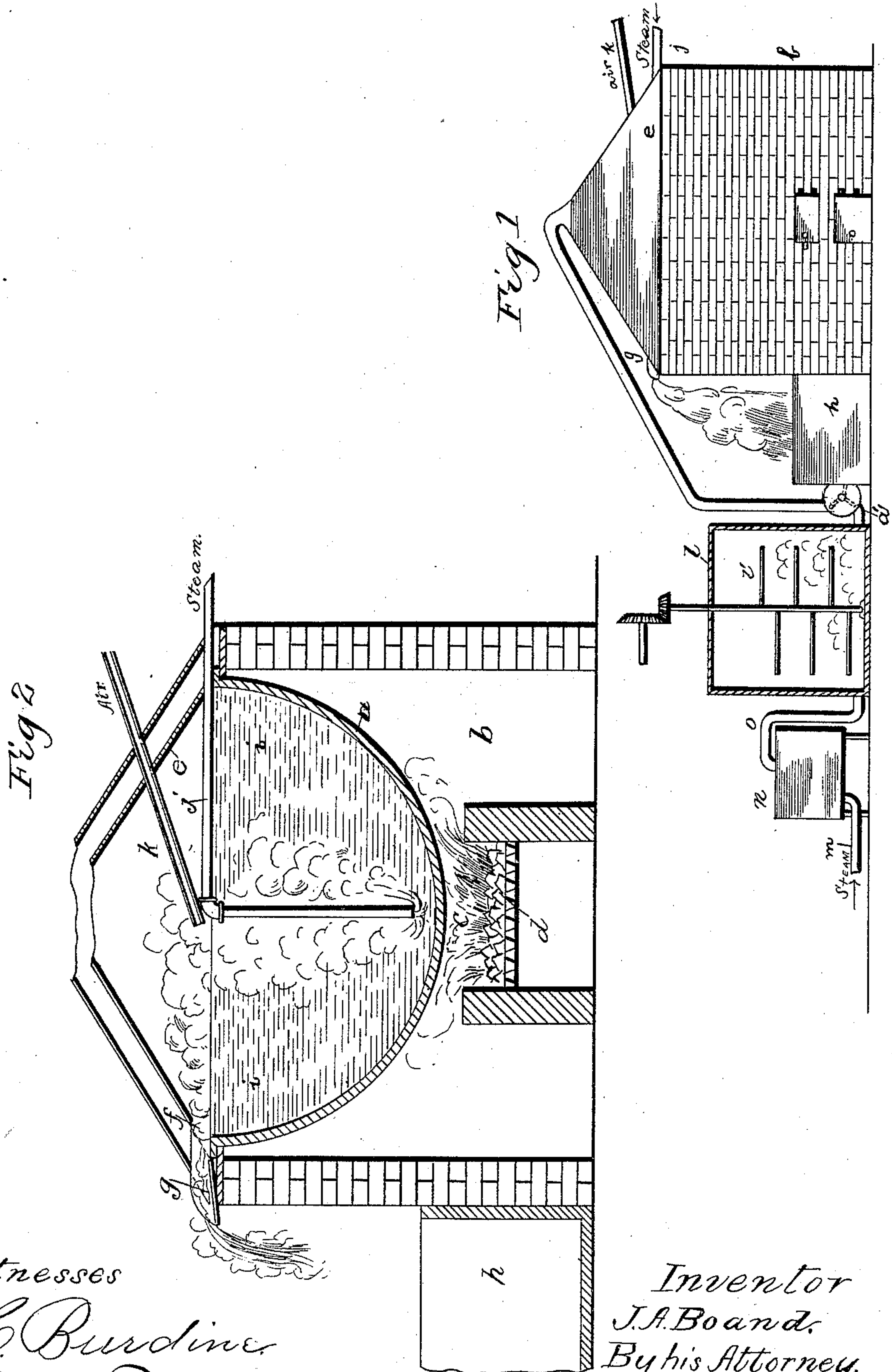


(No Model.)

J. A. BOAND.
MANUFACTURE OF WHITE LEAD.

No. 432,784.

Patented July 22, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

JULIUS A. BOAND, OF OMAHA, NEBRASKA.

MANUFACTURE OF WHITE LEAD.

SPECIFICATION forming part of Letters Patent No. 432,784, dated July 22, 1890.

Application filed December 19, 1889. Serial No. 334,319. (No model.)

To all whom it may concern:

Be it known that I, JULIUS A. BOAND, of Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in the Manufacture of White Lead; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in the manufacture of what is known in the arts as "white lead."

The object of the invention is to reduce the length of time necessary in the manufacture of white lead, to produce an article by an inexpensive, simple, and expeditious process, having all the requirements of a perfect white lead, and also to prevent injury to the health of the workmen carrying on the process. These objects are accomplished by and the invention consists in the processes and machine set forth hereinafter.

Referring to the accompanying drawings, which illustrate an apparatus for carrying on this process, Figure 1 is a diagram of the apparatus partially in section. Fig. 2 is a section of the lead-oxidizing apparatus.

In carrying out this process the pig-lead is first oxidized in a peculiar manner, and the lead oxide removed from the molten lead. The next step consists in placing the oxide in a closed chamber, where it is constantly agitated and subjected to the action of steam laden with acetic-acid vapor and carbonic-acid gas, whereby in a certain length of time, by the combined action of the acetic-acid fumes, moisture from the steam, and the carbonic-acid gas, the lead oxide is converted into céruse. The pig-lead to be treated is placed in an ordinary cast-iron or other smelting kettle *a*, suspended in an inclosed furnace *b* over a fire *c* of coke, charcoal, or anthracite coal *d*. This kettle is covered with a hood *e*, provided with a discharge-opening *f* into a throat *g* through the furnace-wall and discharging into a suitable receptacle *h*. This opening is located slightly above the upper

surface of the molten pig-lead *i* in the kettle. A pipe *j* extends from a suitable exterior source (not shown) of superheated steam or compressed air down into the kettle with its discharge end located near the bottom of the kettle, as clearly shown in Fig. 2. Another compressed air or steam pipe *k* extends from a suitable source through the hood of the kettle opposite the discharge-opening *f*, and at an angle to the top surface of the molten metal and with its discharge end located above and directed toward the surface of said metal.

l is a closed corroding-chamber provided with stirrers *l'* or other means for constantly agitating and stirring the contents of said chamber. The chimney of the furnace *b* is connected with this corroding-chamber, so that the carbonic-acid gas from the fire *c* will be discharged into the said chamber by means of the fan *a'*. A closed tank *n* is located near the corroding-chamber and contains the desired quantity of acetic acid. A steam-pipe *m* opens into the acid in this tank to discharge a light stream of steam through the acid therein, which steam and the acid fumes carried thereby are conveyed into the corroding-chamber by pipe *o*.

The suitable quantity of pig-lead is melted in the melting-kettle *a* to a heat of, say, 700° or 800° Fahrenheit. A stream of steam or compressed air is then passed into the body of molten metal, thereby keeping the lead in constant motion and throwing and bubbling it up to the surface, whereby the oxygen contained in the air is absorbed by the lead, thereby converting the same into lead oxide or sub-oxide, which floats on the surface of the molten lead, and as fast as formed is blown therefrom out through the discharge-opening into the receptacle *h* by the blast of air or steam discharged by the inclined pipe *k*. The oxide could be skimmed off with a perforated ladle; but in order to save labor and have the oxide free from pig-lead the foregoing method is employed. When the lead oxide in the receptacle *h* is sufficiently cool and dry to be handled, it is removed therefrom and placed in the corroding-chamber *l*, and the agitating apparatus *l'* is started to constantly stir and turn over the oxide, there-

by exposing all portions thereof to the combined action of the carbonic-acid gas blown into the corroding-chamber by the fan and the acetic-acid fumes conveyed into said chamber by the steam passing from the acetic-acid tank. After the lead oxide has been exposed to the action of these agents for from one hundred to one hundred and twenty hours it is chemically changed to céruse or white lead and can be removed from the corroding-chamber and prepared for use. By this process the time necessary to produce the white lead is greatly reduced, as processes for this purpose commonly followed require a much longer period, the "Dutch" process requiring from one hundred to one hundred and twenty days and more modern processes requiring from ten to twelve days; but by my process the time is reduced to from one hundred to one hundred and twenty hours, and a much better article produced without injury to the health of the workmen.

Great advantages are attained by the presence of the steam in the corroding-chamber during the entire corroding process and by conveying merely the acetic-acid fumes into the chamber with the steam, as the required amount of moisture in the chamber is kept more regular and certain throughout the action than if acetic acid and water were applied direct, and consequently the white lead made by the process has all the requirements of a perfect product, and, further, the required quantity of moisture being kept constantly in the corroding-chamber, which is perfectly tight and closed, there is no necessity of opening said chamber for any purpose during the action. Consequently there is no escape and loss of acetic-acid fumes and carbonic-acid gas, and the surroundings are kept free from dust, thereby removing one of the greatest obstacles and disadvantages heretofore in the manufacture of white lead—viz., injury to the workmen's health.

Of course any other corroding compound that will answer the same purpose as acetic acid can be employed in lieu thereof.

The apparatus herein shown and described merely illustrates one machine by which this process can be carried into effect, and the invention is by no means limited to it.

What I claim is—

1. The process of manufacturing white lead, which consists in constantly stirring and agitating a mass of lead oxide in a closed vessel,

passing a stream of carbonic-acid gas into said constantly-agitated mass and simultaneously passing a stream of steam laden with acetic-acid fumes into said mass and subjecting the mass of lead oxide to the combined and simultaneous action of the steam, acid fumes, and carbonic-acid gas until converted into céruse, substantially as described.

2. The process of manufacturing white lead, which consists in passing a stream of carbonic-acid gas into a mass of lead oxide in a closed vessel, and passing a stream of steam through a body of acetic acid in a closed vessel, and then conveying the steam laden with the acid fumes into said mass of lead oxide, and subjecting the oxide to the combined and continued action of the steam, acid fumes, and carbonic-acid gas in the closed chamber, substantially as described.

3. The combination of the melting-vessel in a furnace, a cover for the same, having a lateral discharge from the edge of said vessel into a receptacle, a steam or air pipe discharging into the bottom of said vessel, and a blast-pipe above said vessel discharging opposite said lateral discharge and arranged to direct a blast at an angle upon the surface of the molten metal in the vessel, substantially as described.

4. An apparatus for manufacturing white lead, consisting of a closed corroding-chamber provided with a pipe to supply carbonic-acid gas therinto, a stirring apparatus for said chamber, a closed acetic-acid vessel, a pipe discharging steam into the bottom of the same, and a pipe from the top of the same into the lower portion of the corroding-chamber, substantially as described.

5. The herein-described apparatus for manufacturing white lead, consisting of the lead-oxidizing apparatus, the oxide-corroding chamber in proximity thereto, provided with a stirring apparatus and connected with a carbonic-acid-gas supply, and an inclosed acetic-acid vessel provided with a steam-pipe extending therinto and provided with an exit-pipe therefrom opening into said corroding-chamber, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JULIUS A. BOARD.

Witnesses:

DAVID ROSS,

WALTER B. STARK.