

L. BRUMLEN.
Processes and Apparatus for the Manufacture of
White-Lead.

No. 154,643.

Patented Sept. 1, 1874

Fig. 1

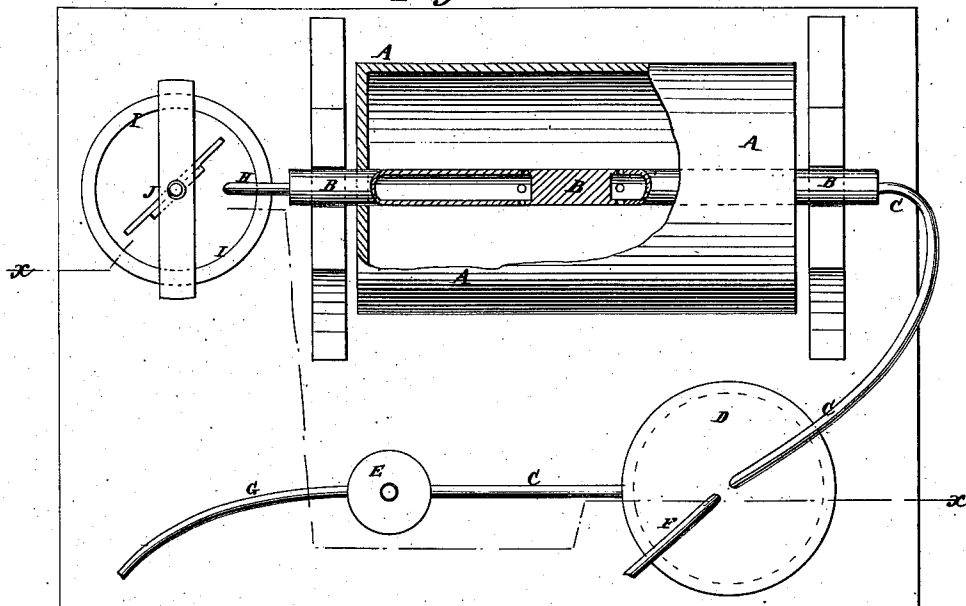
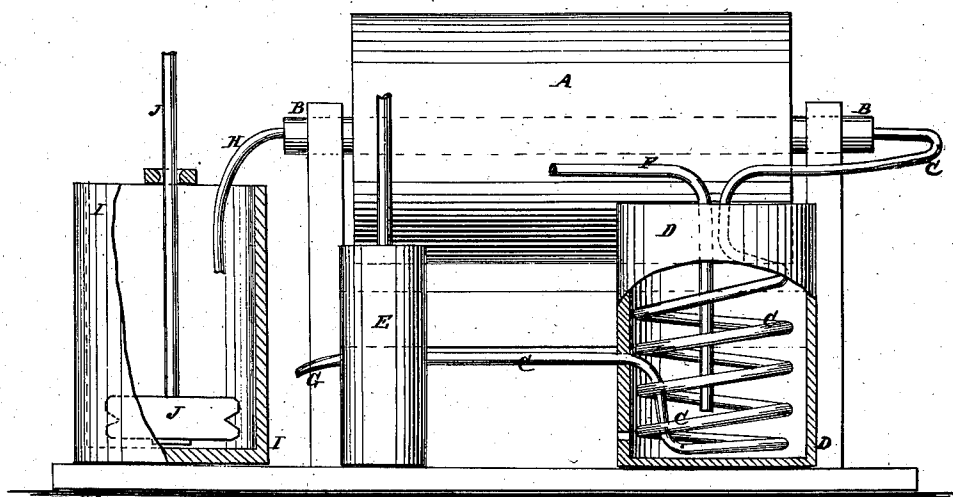


Fig. 2



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IMPROVEMENT IN PROCESSES AND APPARATUS FOR THE MANUFACTURE OF WHITE LEAD.

Specification forming part of Letters Patent No. 154,643, dated September 1, 1874; application filed May 29, 1874.

To all whom it may concern:

Be it known that I, LUDWIG BRUMLEN, of Hoboken, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Manufacturing White Lead, of which the following is a specification:

Figure 1 is a top view of my improved apparatus, part being broken away to show the construction. Fig. 2 is a side view of the same, partly in section, through the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish an improved process for manufacturing white lead, and an improved apparatus for carrying said process into practical effect, by means of which the labor and expense of the manufacture shall be greatly lessened, the materials being used economically and without waste. The invention consists in the shaft, perforated longitudinally and transversely and having a solid center, in combination with the cylinder and the stationary inlet and outlet pipes; in the combination of the cylinder, the shaft, perforated longitudinally and transversely and having a solid center, the stationary inlet-pipe, having a coil formed in it; the close heating-vessel, provided with a steam-pipe, the air-pump, the stationary outlet-pipe, and the open vessel, provided with a stirrer, with each other; in the employment of heated air in the manufacture of white lead; in the employment of acetate of lead in the manufacture of white lead, and in the process hereinafter set forth for manufacturing white lead by moistening the metallic lead with a solution of acetate of lead, oxidizing it by the introduction of heated air, carbonizing the oxide by the introduction of carbonic acid, and removing and precipitating the white lead by means of a solution of acetate of lead and the remaining carbonic acid, as hereinafter described.

A is a drum, cask, cylinder, or box, of any desired size. B is a shaft, passing longitudinally through the center of the cylinder A, and to which said cylinder is securely attached, so that they may revolve together, the projecting ends of said shaft serving as journals for said cylinder, and revolving in bearings in any suitable frame-work. The shaft

B is perforated longitudinally from each end, to within about six inches of its center, leaving about a foot of its middle part solid. The longitudinal holes in the shaft B should be about two or two and a half inches in diameter. In the shaft B, upon both sides of its solid middle part, are formed a number of holes, about an inch in diameter, and leading into the longitudinal perforations near their inner ends, so that one end of the shaft B may serve as an inlet for the air and carbonic acid, and the other end as an outlet for the air and nitrogen, as hereinafter described. Both ends of the shaft B are provided with stuffing-boxes, in which are secured pipes, which pipes are stationary, while the shaft and cylinder revolve. The pipe C, connected with one end of the shaft B, enters a close vessel, D, is formed into a coil within said vessel D, passes out, and its end is connected with the outlet of an air-pump, E. The vessel D is also provided with a pipe, F, leading from a boiler or other steam-generator, to introduce steam into the vessel D, to heat the carbonic acid or air as it passes through the coil of the pipe C. With the inlet of the air-pump E is connected a pipe, G, which may be connected with a furnace for burning charcoal or coke, so that the carbonic acid thus developed may be forced into the cylinder A; or said pipe may be disconnected from said furnace, to enable air to be forced into the said cylinder A. With the other or outlet end of the shaft B is connected a pipe, H, leading into an open vessel, I, which is provided with a stirrer, J.

In using the apparatus, enough granulated lead is put in the cylinder to one-quarter or one-third fill it, and over the lead is poured enough of a solution of sugar of lead or acetate of lead to thoroughly moisten it. The solution is then drawn off through a faucet in a convenient part of the cylinder, to expose the damp lead to the action of hot air forced in by the air-pump E, the cylinder A being kept revolving to expose every particle of lead to the action of the air. The hot air attacks the lead very quickly and forms upon it a coating of oxide of lead, the nitrogen of the air being set free and escaping through the shaft B and pipe H into the open vessel I.

When a sufficient coating of oxide of lead has been formed to make the action of the hot air sluggish, the introduction of hot air is stopped, and carbonic acid is forced into the cylinder A by the pump E, which carbonic acid immediately combines with the oxide of lead previously formed, and produces white lead.

For how long the forcing of hot air and the forcing of carbonic acid into the cylinder should be continued depends upon the respective sizes of the cylinder A and the air-pump E, and upon the quantity of lead being operated upon, and must be ascertained by experiment with each apparatus; but it is of little consequence, as will be hereinafter seen, whether said operations be continued for a little longer or a little shorter time.

When, in the opinion of the operator, a sufficient coating of white lead has been formed upon the surface of the lead grains, a quantity of acetate of lead in solution is introduced into the cylinder A for a double purpose—first, to wash off all the carbonate of lead from the metallic lead; and, second, to moisten the lead and prepare it to be again acted upon by the hot air, to form another coating of oxide of lead. After or during the introduction of the acetate of lead into the cylinder A, the said cylinder is revolved for a few minutes, and the white lead and acetate of lead are drawn off through a faucet in a convenient place in the cylinder A into the open vessel I. It is difficult to always ascertain the exact moment when all the oxide of lead inside the cylinder A has been carbonized. If the introduction of carbonic acid is stopped too soon, there will remain oxide of lead uncarbonized, which will be mixed with the white lead, spoiling its color, the oxide of lead being of a dark color. If the introduction of carbonic acid is continued too long, carbonic acid would be left uncombined, which, escaping from the shaft, would endanger the health or lives of the operators, carbonic acid, in its pure state, being a deadly poison: To avoid this danger, to prevent the loss of any carbonic acid, and also to carbonize any oxide of lead that escaped carbonization in the cylinder, all the air, nitrogen, and carbonic acid that pass through the cylinder, and all the white lead and solution of acetate of lead, are conducted into the open vessel I, where the uncarbonized oxide of lead will be dissolved by the acetate of lead, which will be reduced thereby to subacetate of lead, and from which the oxide of lead will

be carbonized and precipitated by the remaining carbonic acid until litmus paper will turn red, which is a sure proof that every particle of oxide of lead has disappeared, and the acetate of lead has again become neutral. The white lead is then separated from the liquid acetate of lead by decanting or filtering, in the usual way, and the liquid acetate of lead is ready to be used over again.

The process, as thus described, is a combination of the two processes by which white lead has heretofore been manufactured—viz., the German, or Dutch process, in which white lead is made by exposing blue lead in chambers, pots, or other vessels, to the alternate or joint action of acetic acid and carbonic acid; and the French process, in which white lead is precipitated by leading carbonic acid into a basic solution of lead in acetic acid.

I am aware that cylinders constructed and operating differently from mine have heretofore been used in the manufacture of white lead; therefore I do not claim the use of a cylinder, broadly; but

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

1. In combination with the cylinder A and the stationary inlet and outlet pipes G and H, the hollow shaft B, having a solid center and transverse perforations, that open communication between the interior of the cylinder and the inlet and outlet pipes, substantially as and for the purpose specified.

2. The combination of the coil-pipe C, steam-pipe F, steam-receptacle D, and force-pump E with the hollow shaft B, for the purpose of heating and forcing air and carbonic-acid gas into the receptacle A, substantially as and for the purpose specified.

3. The process herein described of manufacturing white lead from metallic lead, by moistening it in a revolving cylinder, constructed as described, with a solution of acetate of lead, oxidizing it by the introduction of heated air, combining the oxide with heated carbonic acid by the introduction of the same, and of removing and precipitating the white lead by a solution of acetate of lead and the uncombined carbonic acid from the cylinder, substantially as specified.

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Witnesses:

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