

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN THE MANUFACTURE OF WHITE LEAD.

Specification forming part of Letters Patent No. 92,816, dated July 20, 1869.

*To all whom it may concern:*

Be it known that I, ISAAC M. GATTMAN, of the city, county, and State of New York, have invented a new and Improved Process of Manufacturing White Lead; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to understand the same.

The nature of my invention consists in manufacturing white lead by a new and improved process of corrosion, whereby the metal is wholly converted without waste into white lead of great purity and perfect opacity in a very short time compared with the ordinary and most improved mode of corrosion hitherto employed.

In the manufacture of white lead from metallic lead by means of corrosion two different processes are generally adopted—first, the old Dutch process, where metallic lead (cast in sheets, or buckles, or grates) is in earthen or stone ware pots embedded in manure or tan-bark exposed to the exhalation of acetic-acid and carbonic-acid gases created by the fermentation or slow combustion of the manure or tan; second, the “chamber process,” where metallic lead cast in sheets of various sizes and thicknesses are in chambers of wood, brick, or glass exposed to the action of acetic-acid and carbonic-acid gases. In the best-conducted factories working under these two processes it takes from eight to twelve weeks’ time to corrode the lead, and then only about sixty-six per cent. of the metal first employed is corroded. The balance has to undergo the same operation again for its conversion into white lead. The length of time, the shortness of the yield, and the waste of labor are impediments which to overcome have taxed the minds of many without any material improvement.

In my experience of over twenty years in the manufacture of white lead, and after close study and observation, I have come to the conclusion that the failures in the process of corroding lead are owing to the following causes: first, the compactness of the metallic lead, which resists the action of the different gases necessary for its corrosion; second, the deficiency or want of atmospheric air, which is indispensable for the oxidation of the metal;

third, the want of pressure, whereby the gases are forced to come in contact with the metallic lead to be corroded. All these deficiencies I supply and overcome by my improved process.

In the first place, instead of casting the lead in the form of sheets or buckles, I cast it in the form of spangles, wire, or shot, although for convenience’ sake I prefer casting it into spangles, whereby the surface of the metal to be exposed to the action of the different gases is greatly enlarged. The metal so divided I put into a perfectly-tight cistern, constructed of wood or other suitable material, arranged in the following way: The cistern, when round, has a diameter of from five to six feet and a height of from nine to ten feet. About eighteen inches from the real bottom it is provided with a second or false bottom perforated with a great many holes of about the thickness of a goose-quill. About nine inches from the top a similar perforated bottom is inserted but loosely, and easily to be taken out when required. The top of the cistern is tightly closed with a well-fitting cover or lid, into which a pipe is fitted, bent downward to dip into a vessel under water. Into the lower apartment of this cistern, between the real and the first perforated bottom, I put about thirty gallons of a two-per-cent. vinegar for every ton of metallic lead to be corroded. A steam-pipe is fitted into this apartment to heat and evaporate the vinegar with dry steam. The space between the lower and upper perforated bottom is loosely filled with the spangled lead and the tight lid or cover put on. Underneath the lower perforated bottom and above the surface of the vinegar two different pipes enter, the one connected with a force-pump for the admittance of carbonic-acid gas, the other connected with a fan or blower for atmospheric air, (hot air preferred.) The vinegar vapors created in the lower apartment pass in connection with the atmospheric air and the carbonic-acid gas through the perforated bottom, and are all effectively disseminated through the metallic lead between the two perforated bottoms. The surplus gases collect between the upper perforated bottom and the tight lid, and by the pipe dipping under the water a pressure is effected above that



of the pressure of the atmosphere according to the depth of the water. The air, deprived of its oxygen by its affinity for the lead, as also the vinegar vapors and the carbonic-acid gas not taken up by the lead in the corroding-cistern, are thereby condensed, and when the water is sufficiently impregnated with the vinegar vapors it might be used in the place of vinegar in the next process of corrosion. By these means the corrosion and carbonization of the lead is most economically and thoroughly effected in at least as many days as it took weeks heretofore, and the whole process can be watched and the deficiencies supplied at any time when desired.

When the lead in the corroding-cistern is sufficiently corroded and ready to be taken out, I force through the corroding-cistern watery vapors or steam for the purpose of dampening the lead to prevent the raising of dust, so injurious to the health of the workmen in white-lead manufactories. The lead is then taken out, the lid and upper perforated bottom are removed, and the lead taken out through suitable apertures on a level with the lower perforated bottom and treated in the usual way.

This arrangement can be modified in different ways. In the first place, instead of putting the vinegar in the lower apartment of the corroding-cistern it might be taken into a separate tight vessel, through which the carbonic-acid gas is forced, and when impregnated with the vapors of the vinegar passed into the corroding-cistern; or a perforated pipe closed at both ends might be set up in the middle of the corroding-cistern and the different pipes for the distribution of the carbonic and acetic acid and the atmospheric air enter into it and be disseminated through the metallic lead, or several perforated bottoms might be inserted, particularly when cisterns of larger dimensions are used, to break the weight of the

metal, or the metallic lead might be put in baskets of white willowware or other suitable perforated vessels or boxes and in the corroding-cistern subjected to the action of the different gases and vapors herein described; but all these are things of minor importance.

Having thus described my invention, what I claim is—

1. Manufacturing white lead in a pure amorphous form by subjecting metallic lead to a blast of air, carbonic and acetic acid under superatmospheric pressure by means of a hydrostatic column, substantially as set forth, whereby the same gaseous elements are kept constantly in contact with the metal with unvarying pressure from the beginning to the end of the process.

2. Equalizing the pressure by means of the hydrostatic column, as described.

3. Condensing the surplus acetic-acid vapors in the hydrostatic column, substantially as set forth.

4. Preventing the escape of white-lead dust in the room by watery vapor, substantially as described.

5. Exposing metallic lead to the simultaneous action of the gases and vapors under a higher than atmospheric pressure.

6. Subjecting atmospheric hot air to metallic lead, in combination with currents of acetic and carbonic acid gas.

7. The combination of acetic and carbonic acid gas with a blast of atmospheric air.

8. The manufacture of pure amorphous white lead by the corroding process, substantially as described.

The above specification of my invention signed by me this 11th day of June, 1868.

ISAAC M. GATTMAN.

Witnesses:

ALEX. F. ROBERTS.

FRANK BLOCKLEY.