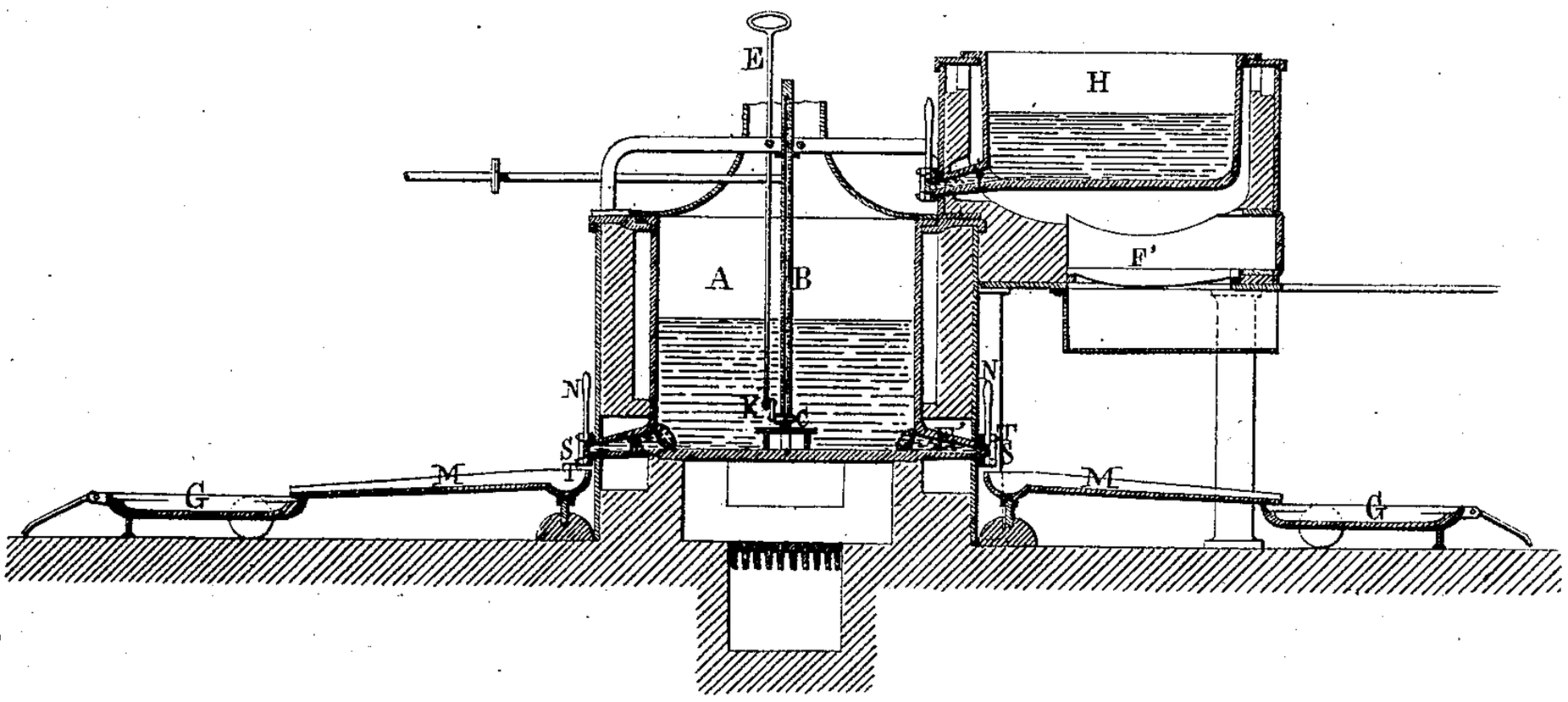
G. LUCE.

Apparatus for Refining and Desilvering Lead.

No. 144,993. Patented Nov. 25, 1873.



Witnesses
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UNITED STATES PATENT OFFICE.

GUSTAVE LUCE, OF MARSEILLES, FRANCE, ASSIGNOR TO LUCE, SON & ROZAN, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR REFINING AND DESILVERING LEAD.

Specification forming part of Letters Patent No. **144,993**, dated November 25, 1873; application filed November 16, 1872.

To all whom it may concern:

Be it known that I, GUSTAVE LUCE, son, of Marseilles, France, merchant, assignor to the firm of LUCE, SON & ROZAN, of the same place, have invented an Improvement in Apparatus for Refining and Desilvering Lead, of which the following is a specification:

This invention consists in the apparatus, as hereinafter described, for refining and desilvering lead by injecting steam into the bottom of the vat which contains the mass of melted lead, which produces a violent agitation of the lead, causing the lead to crystallize, and oxidizing the foreign metals. For this purpose the crude argentiferous lead is melted down in a vessel heated by a fire, and provided at its lower end with a spout closed with a slide, through which, when the lead is melted, it is caused to flow down into a lower vessel or vat heated only at times directly by a special fire, and at other times by the waste heat from the fire of the upper vessel. When the lower vessel is full, steam is introduced through a central pipe leading down to near the bottom of the vessel, where it is provided with a cock turned by a rod from above, and with a disk for the purpose of dividing the steam as it enters. The steam in passing up through the molten lead effectually oxidizes all impurities, which then rise in the form of scum to the top of the metal, whence they are removed. The introduction of the steam at the same time produces a violent ebullition of the lead, causing it to crystallize; and when this crystallization has taken place to a sufficient extent the introduction of steam is stopped by closing the cock on the steam-pipe, and the remaining liquid portion of the lead, in which the greater proportion of the silver will be found concentrated, is run off through one or more spouts into troughs turning on pivots for conducting the lead into a series of ingot-molds. During this time a fresh charge of lead, containing a percentage of silver approximating to that of the crystals in the lower vessel, has been melted down in the upper vessel, and is run into the lower vessel as soon as all the liquid portion has been removed therefrom. Steam is then again introduced, effecting a further purification and separation of silver; and this process is continued until, by the repeated crystallization, one part of the lead is rendered comparatively free from silver, to be used as merchant lead, while the lead run off is sufficiently rich in silver for the cupelling process.

The figure of the drawing shows a vertical section of the apparatus.

A is the crystallizing-vat, and H is the upper melting-caldron. B is the pipe for introducing steam into the vat A, which pipe is provided at its lower end with a steel cock, C, actuated by the rod E attached to an arm, K, fixed to the plug of the cock. E′ E′ are spouts adapted to the vat A, and I is a similar spout adapted to the caldron H, heated by the fire-grate F′. Each spout is closed or opened by means of a lever, N, hinged, which constitutes a slide, fitting exactly against the planed surface of the flange of the end of the spout, the slide being kept against the flange by means of the guide S secured to the flange by means of two screw-bolts, T, by screwing up which, to a greater or less degree, the pressure of the slide against the orifice of the spout is regulated. By lifting the slide the orifice of the spout is uncovered, more or less, so as to regulate the flow of the melted lead.

In operating with this apparatus, steam is introduced through the pipe B into the vat A, which steam, in passing in, is distributed equally, and which, under a pressure of three atmospheres, agitates the bath of molten lead so as to produce crystallization in proportion as the temperature decreases. In passing through the molten metal the steam is decomposed, and produces oxides of lead, antimony, and copper, according to the degree of impurity of the lead. The oxides rise to the surface of the bath, whence they are removed. When the proportion of lead crystals appears to be sufficient, the current of steam is stopped by closing the cocks C, and the spouts E′ are opened so as to allow the molten portion of the lead, in which is concentrated the greater proportion of the silver, to flow into the ingot-molds G G by means of a chute, M, turning on a pivot, as shown. As soon as all the lead is run out the spouts E′ are closed. While the crystallization was proceeding in the vat

A a fresh charge of lead has been melted down in the caldron H, equal in quantity to that run into the molds, and having a percentage of silver approximating as nearly as possible to that of the crystals in the vat A. This charge is then run down into the vat A and melts the crystals there formed. Steam is then again introduced, and the before-described operation is repeated, resulting in the production, by gradual decrease of the percentage of silver, of merchant-lead on the one hand, and on the other hand of lead ready for the cupelling process. The duration of each operation, for twelve to thirteen tons of argentiferous lead, is about from two and a half to three hours.

I do not wish to be understood as broadly claiming injecting steam into a mass of molten lead for the purposes of refining and desilvering, as such I am aware is not new.

Having thus described the nature of this invention, and in what manner it is to be performed, what I claim is—

The combination of the melting-caldron H, the crystallizing-vat A arranged to receive the melted lead from the caldron, the steam-pipe B extending to the bottom of the vat and provided with the cock C, and the operating-rod E, the said vat provided with the spout or spouts E′, all substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

GUSTAVE LUCE.

Witnesses:
L. GIRARD, Jr.,
AUGT. ANIS.