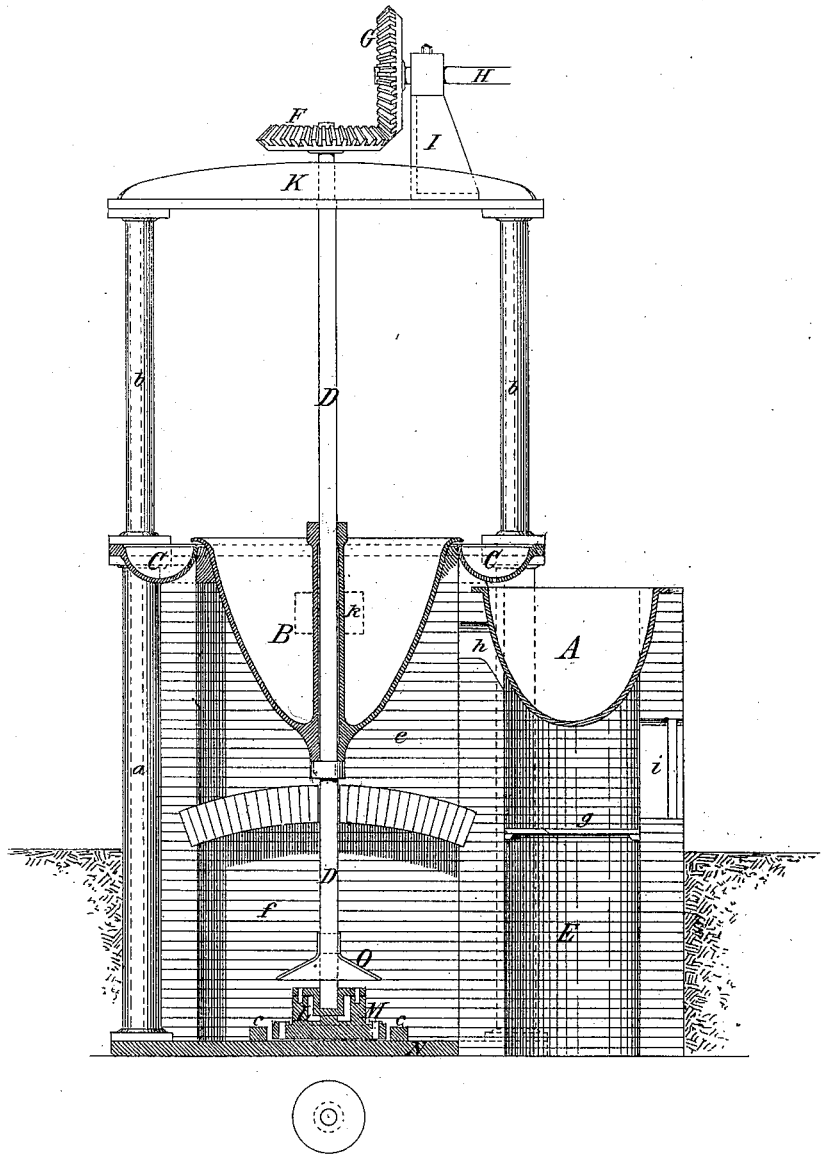
2 Sheets—Sheet 1.

A. K. EATON.

Process and Apparatus for Separating Silver and other Precious Metals from Lead.

No. 196,204. Patented Oct. 16, 1877.

Fig. 1.



Witnesses:

Daniel Breed

Augustus Watson.

Inventor

Abakel K Eaton

2 Sheets—Sheet 2.

A. K. EATON.

Process and Apparatus for Separating Silver and other Precious Metals from Lead.

No. 196,204. **Patented Oct. 16, 1877.**

Fig. 4.

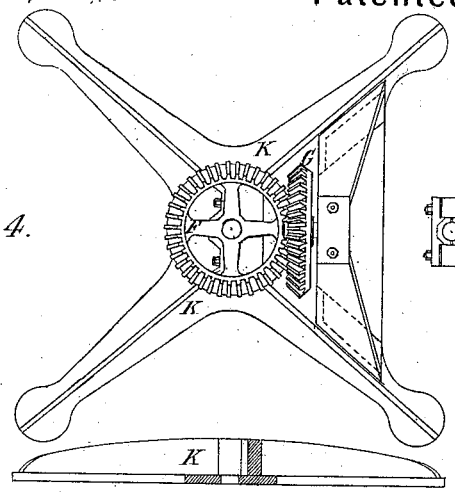


Fig. 5.

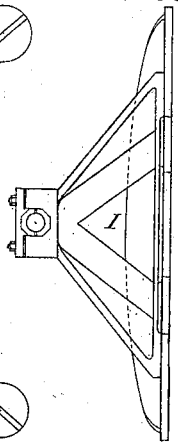


Fig. 3.

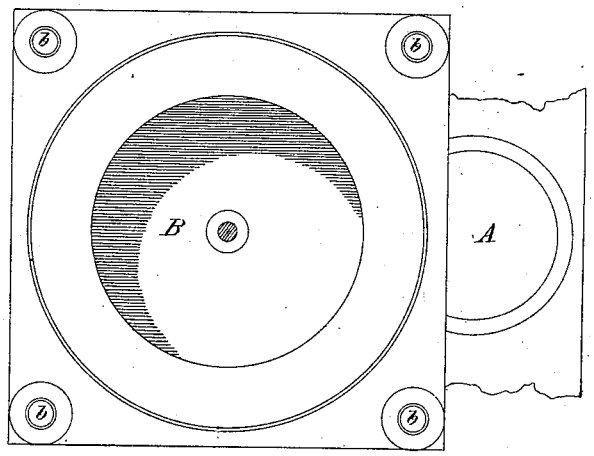
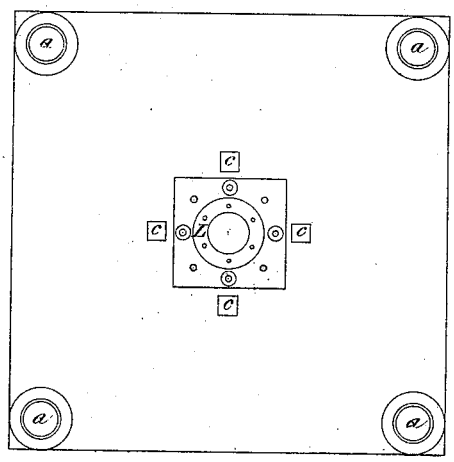


Fig. 2.



Witnesses:
Daniel Breed
Augustus Watson

Inventor:
Ashel K. Eaton

UNITED STATES PATENT OFFICE.

ASAHEL K. EATON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PROCESSES AND APPARATUS FOR SEPARATING SILVER AND OTHER PRECIOUS METALS FROM LEAD.

Specification forming part of Letters Patent No. **196,204**, dated October 16, 1877; application filed April 12, 1877.

To all whom it may concern:

Be it known that I, ASAHEL K. EATON, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Process and Apparatus for Separating Silver and other Precious Metals from Lead, which is fully set forth in the following specification and the accompanying drawings, in which—

Figure 1 is a vertical section of the machine. Fig. 2 is a plan of the base of the machine. Fig. 3 is a horizontal section, showing the annular trough and the top view of the bowl. Figs. 4 and 5 are detached views.

This invention relates to the working of silver-lead, and enables me, by mechanical means, to concentrate, immediately, cheaply, and completely, the silver with a small portion of the lead, the great bulk of the latter metal being, at one operation, made practically free from silver, thus dispensing with the prolonged and tedious processes usually conducted by manual labor.

Lead, as produced from argentiferous galena, carries from six ounces to two hundred ounces, or more, of silver per ton of crude silver-lead, and the first step in the separation of these metals involves the elimination of most of the lead in a commercially pure form, leaving, practically, all the silver combined with very little lead, the last portions of which are separated by the ordinary process of cupellation.

My invention consists in the construction of a rotary desilverizer, the character and action of which are illustrated by the accompanying drawings.

The invention consists of a large cast-iron bowl, B, mounted upon a vertical shaft, D, so that it can be rotated at the required velocity by means of the spur-wheels F G.

The silver-bearing lead, alloyed with from one to two per cent. of zinc, or its equivalent, is introduced into the bowl, the latter having been previously heated to about the melting-point of the alloy by means of the furnace *g*. The bowl is then set in rotation, the speed being at first moderate and gradually increased. The bath of metal, obeying the action of centrifugal force, sinks at the center and rises correspondingly upon the sides of the vessel B, until, at length, when the motion of the bowl is sufficiently rapid, the isolated lead pours over the edge of the vessel, and is received in the circular trough C, from which it is discharged into the kettle A. The zinc and silver, having formed a persistent alloy which is much lighter than the lead, does not respond as readily to the action of centrifugal force as does the lead, and therefore remains in the bottom of the vessel, associated with a small portion of the heavier metal.

While I have mentioned zinc as the metal I prefer to use in alloying with the silver, it is apparent that any other metal that will combine with it more readily than the lead does, and form an alloy of relatively lighter specific gravity, will serve my purpose as well. I wish to be understood, therefore, as including all such metals as being within the spirit and purpose of my invention.

The tendency of the zinc alloy to remain behind in the vessel is greatly increased by the solidification that begins to take place as soon as the rotation is commenced, since this gradual consolidation makes the alloy less mobile than the lead. If gold be present, as well as silver, it is better to allow the metal to cool down before rotating until a crust begins to form. Having kept up the rotation until most of the lead has been delivered into the circular channel, the speed may be greatly increased. The effect of this increase of motion is to throw out of the remaining pasty alloy an additional quantity of lead, leaving the remainder in the condition of a dry spongy alloy. This stage of the operation obviates entirely the necessity of the process of liquation, which is a necessary and troublesome part of all of the ordinary processes.

The form of bowl used, and which I think preferable, is, as will be seen by the drawings, parabolic, but this is not absolutely essential.

The advantages arising from this invention are as follows:

First, the work of concentration is done very rapidly, and almost wholly by mechanical appliances, instead of by manual labor, as in the usual methods.

Second, by one single operation the mass of

the lead may be separated practically free from silver. By the ordinary methods it requires, two or three successive treatments.

Third, the operation of liquation, as practiced in all other processes, is entirely dispensed with, thus eliminating this source of expenes.

What I claim as my invention is—

1. The process of separating silver or other precious metals from lead, which consists in alloying zinc with the combined metals and then subjecting the molten bath to centrifugal action, whereby the isolated lead is caused to overflow the edge of the containing-vessel, leaving the light silver alloy in a concentrated condition, substantially as herein set forth.

2. The combination of the rotating bowl, the annular trough, and the receiving-pan, substantially as described.

ASAHEL K. EATON.

Witnesses:

DANIEL BREED,

A. MOORE.