

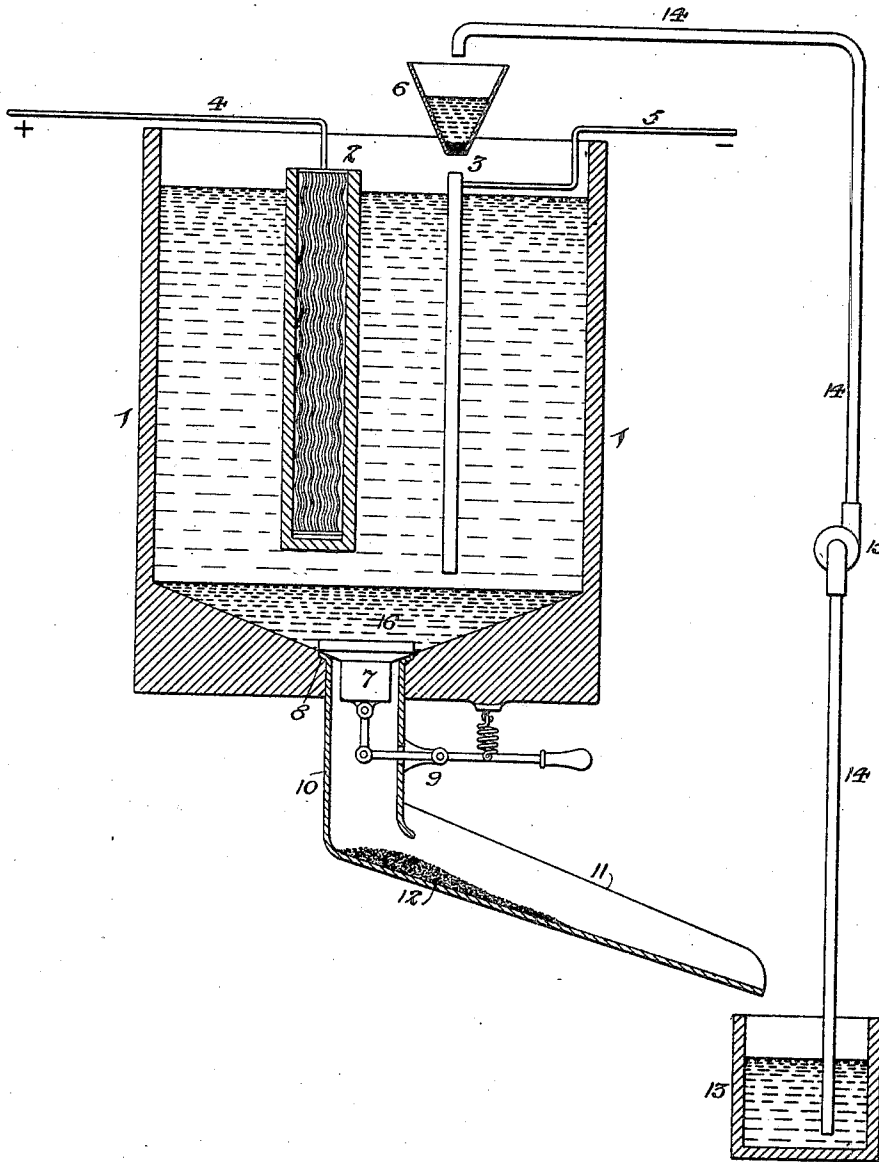
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Patented July 16, 1901.

A. J. SHINN.
PROCESS OF RECOVERING ZINC.

(Application filed June 4, 1900.)

(No Model.)



Witnesses:-

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PROCESS OF RECOVERING ZINC.

SPECIFICATION forming part of Letters Patent No. 678,816, dated July 16, 1901.

Application filed June 4, 1900. Serial No. 19,063. (No specimens.)

To all whom it may concern:

Be it known that I, ALBERT J. SHINN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Processes of Recovering Zinc, of which the following is a specification.

The object of my invention is to improve the method of obtaining zinc from solutions of its salts or other compounds. This object
10 I attain by depositing the zinc electrolytically on a moving cathode of mercury, said zinc being collected and removed from the solution, as fully described hereinafter.

In the accompanying drawing the figure is
15 a sectional view of one form of apparatus for carrying out my improved process.

Referring to the figure, 1 is a receptacle for containing the electrolyte from which the zinc is to be recovered, 2 contains the anode, and
20 3 is the plate over which the movable cathode flows. Within the porous cup 2 is the anode, preferably of corrugated sheet-lead, which has been either previously peroxidized or peroxidized during the process of oxidation of
25 spent battery fluid regenerated simultaneously with the process described hereinafter, the said anode being connected to a conductor leading to the positive terminal of an electric generator, and in proper position in respect to this porous cup is the plate 3, connecting the cathode to a conductor 5, leading to the negative terminal of the source of electrical energy.

By "plate" as here used I mean any surface which may be connected to a source of
35 electrical energy and over which mercury will flow. Said plate may be made up of a series of bars or grids, and while I have shown but one plate a series may be used. I have
40 also shown but a single porous cup; but in large apparatus porous partition-plates may be used to contain the anode.

Over the metal plate 3 a stream of mercury, forming the cathode of the cell, is directed
45 from the funnel or hopper 6. For mercury may be substituted any amalgam of the same, only slightly or not at all attacked by the solution from which the zinc is to be deposited. The metallic stream passes over the vertical
50 or otherwise suitably-arranged plate 3, which, being preferably amalgamated, serves the pur-

pose of a distributor, as well as provides means by which electrical contact is made between the conductor from the electrical generator and the liquid cathode of mercury. 55

The bottom of the receptacle 1 is preferably inclined toward the center 8, in which is set an outlet-pipe 10. Through this the amalgam is drawn off as it collects, the flow being controlled by the valve 7, operated by
60 a lever 9, projecting through a suitable opening in the side of the vertical outlet-pipe 10. To the bottom of this pipe is connected an inclined trough 11, leading to a receptacle 13.

15 is a pump whose suction end dips into
65 the receptacle 13, the discharge end being connected to a nozzle over the funnel or hopper 6. In small plants the pump may be dispensed with, the mercury being dipped from the receptacle 13 and emptied into the hopper 6. Again, in large plants a single pump may be used for a number of regenerating units.

The operation of my invention is as follows: The solution from which the zinc is to be recovered is placed in the vessel 1 and the conductors 4 and 5 are connected to a suitable source of electrical energy. The funnel or hopper 6 is filled with mercury, which is allowed to flow over the surface of the plates 3. 80 As the decomposition of the electrolyte proceeds zinc is deposited in the film of mercury spread and flowing over the surface of plate 3 and forms with it a liquid amalgam, which flows down the plate and collects in
85 the bottom of the receptacle 1. From time to time the valve 7 is opened and the amalgam and surplus mercury drawn off. For this may be substituted any means for drawing off the accumulated amalgam and mercury either continuously or intermittently. The trough 11, through which it flows, is so inclined that while the mercury and more liquid part of the amalgam drain off and are caught in the receptacle 13 the thick or more solid
95 amalgam collects, as at 12, and may be removed periodically. By means of a pump or other suitable device the liquid in the vessel 13 is conveyed to the funnel or hopper 6, which is supported over the metal plate 3. 100 This hopper has an aperture or series of apertures either directly over the metal plate

or over a channel which serves to convey the liquid to the plate. To regulate the flow of mercury or dilute amalgam and to collect the more concentrated amalgam, a suitable amount of this pasty material is always kept in the hopper 6. By varying the amount of this amalgam the size of the stream of mercury flowing over the amalgamated plate is regulated. The thick amalgam collected here and also that from the inclined trough at 12 may be freed from mercury by pressure, distillation, or other convenient means in order to obtain the zinc in solid form.

It is obvious that the flow of mercury over the plate may be regulated by other means than by the use of amalgam, as described.

I claim as my invention—

1. The process herein described of recovering zinc from a solution of any of its compounds, said process consisting of electrolytically decomposing said solution, collecting the zinc thrown out as an amalgam upon a stream of mercury flowing over a metal plate, separating the thick or pasty amalgam from the surplus mercury and liquid amalgam during the operation of the process, and returning this liquid to be used repeatedly in the above process, substantially as described.

2. The process herein described of recovering zinc from a solution of any of its compounds, said process consisting of electro-

lytically decomposing said solution, collecting the zinc thrown out as an amalgam in a stream of mercury flowing over a metal plate, separating the thick or pasty amalgam from the surplus mercury and liquid amalgam by causing the mixture to flow over a surface which will retain the thick material and allow the mercury and more liquid amalgam to pass off, said mercury and liquid amalgam being returned to be used repeatedly in the above process, substantially as described.

3. The process herein described of recovering zinc from a solution of any of its compounds, said process consisting of electrolytically decomposing said solution, collecting the zinc thrown out as an amalgam in a stream of mercury flowing over a metal plate, separating the surplus mercury and more liquid amalgam from the thick or pasty amalgam, returning this liquid to a hopper or funnel from which it flows over the metal plate and accumulating enough thick amalgam in said hopper to regulate the flow of said liquid, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT J. SHINN.

Witnesses:

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