UNITED STATES PATENT OFFICE.

ALBERT NODON, OF BORDEAUX, FRANCE.

PROCESS OF RECOVERING TIN FROM WASTE.

940,471. Specification of Letters Patent. Patented Nov. 16, 1909.

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To all whom it may concern:

Be it known that I, ALBERT NODON, of 12 Rue de Moulis, Bordeaux, Gironde, France, have invented certain new and useful Improvements in and Relating to Processes of Recovering Tin from Waste, of which the following is a specification.

This invention has for its object to provide an improved process for the recovery of tin from all kinds of tin lead waste, and more particularly from waste tinned plate, waste lead tin alloy and plated goods resulting from the manufacture of metal "tin capsules", "tin foil" and "tin tubes".

The improved process consists in dissolving the tin alloyed with or adhering to the lead by subjecting the metal waste to the action of a hot solution of stannic sulfate with the addition of sulfuric acid, mixed with an alkaline stannic haloid salt, which solution has no chemical action on lead, and then separating the tin from the solution by electrolytic means on tin electrodes in suitable galvanoplastic tanks.

The improved process is carried out as follows: At the beginning of the operations, the metal waste is cleaned in a dilute solution of sodium carbonate heated, and washed, for example, by means of a spraying rose. After the washing operation, the metal waste is submitted to the action of a solution of a stannic salt, more particularly an ammoniacal bichlorid of tin and stannic sulfate containing an excess of free sulfuric acid. This stannic liquor is maintained at a temperature of about 40 degrees C. Owing to the presence of the stannic sulfate and the sulfuric acid, the lead in the metal waste is not acted on by the haloid salt, and only the tin is dissolved in the form of ammoniacal chlorid of tin. The same reaction is produced when the tin instead of being mixed with the lead, is alloyed with the latter. The lead freed from the tin which remains as the residue of the operation may be afterward melted down for re-use in manufacture. The stannic liquor resulting from the dissolution of the tin, is then conveyed into electrolytic tanks of which any desired number may be provided. These tanks are made of sand stone or any other material that is unaffected by acids. They contain graphite anodes arranged against the inner sides of the tanks on either side of the cathodes. The cathodes are composed of pure tin, preferably of sheets of tin contained in baskets or porous vessels of canvas placed in the center of the tanks. These vessels retain the arborescent deposits of tin which are formed on the sides of the cathodes. The deposition is effected by means of an electro-motive force of 2 to 3 volts and a current strength of about 1 to 2 amperes per square decimeter of active cathode surface. The electrolytic tanks may be, for instance, 4 to 6 in number, coupled in series and fed by an electrolyzing dynamo, having an electromotive force of 15 to 20 volts according to the number of tanks coupled in series, and a current strength of from 100 to 300 amperes, according to the magnitude of the operations.

The strength of concentration of the stannic liquor is kept constant during the entire process by checking its density by means of a densimeter or of a salt-scale.

When sufficient tin has been deposited, it is washed over strainers or canvas filters, in order to collect the arborescent deposits of tin, the washing liquor being collected at the bottom of the tank. The deposit is then melted down with the cathodes in order to utilize the metal again in manufacture.

The residual liquors collected are evaporated and when they have reached the desired degree of concentration, they are returnd to the electrolytic tanks. The liquor which has been deprived more or less of its tin by the electrolytic process, is returned into the solution tank. Thus the same liquor can be used over again for an indefinite period.

The improved process has the advantage of recovering the tin from lead as this latter metal is not affected by the solution. It is very economical because the chemical reaction and the electrolytic process constitute a closed cycle in which the liquor is being constantly regenerated.

The improved process can be carried out with great regularity, and it requires only a few hours it also yields pure lead that can be readily used again.

The improved process is applicable to the recovery of tin from its state of mixture or alloy with lead in waste rolled or "plated" tin and other waste compound metal. It is also applicable to the extraction of tin mixed or alloyed with any other metal that is not affected by the solutions hereinbefore mentioned.

I claim—

1. The improved process for the recovery of tin from waste mixtures or alloys of or plated goods of tin with lead, which consists in treating such waste with a solution which will dissolve the tin without affecting the lead, and then electrolyzing the resulting liquor.

2. The improved process for the recovery of tin from tin lead waste, which consists in treating the material with a solution of stannic sulfate having an excess of sulfuric acid mixed with an alkaline stannic halogid salt and electrolyzing the resulting liquor.

3. A process for recovering tin from tin lead waste, which consists in treating the material with a solution of stannic sulfate having an excess of sulfuric acid mixed with ammoniacal stannic bichlorid, and electrolyzing the resulting liquor.

In testimony whereof I have hereunto placed my hand, at Bordeaux, France, this 25 day of March 1908.

ALBERT NODON.

In the presence of—

I. COASTEL,

A. CHAVIER.