

UNITED STATES PATENT OFFICE.

JULIUS ELKES, OF MOUNT PLEASANT, PENNSYLVANIA.

PROCESS OF REMOVING AND RECOVERING TIN.

No. 919,839.

Specification of Letters Patent.

Patented April 27, 1909.

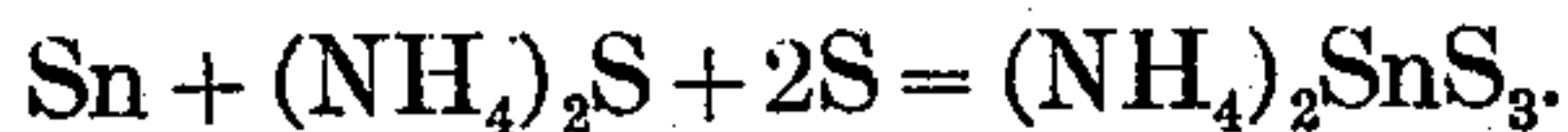
Application filed January 22, 1909. Serial No. 473,755.

To all whom it may concern:

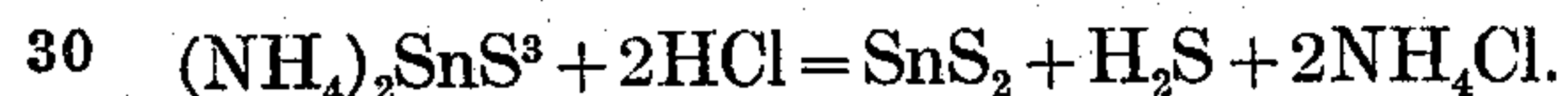
Be it known that I, JULIUS ELKES, a subject of the Czar of Russia, residing at Mount Pleasant, in the county of Westmoreland and State of Pennsylvania, have invented new and useful Improvements in Processes for Removing and Recovering Tin, of which the following is a specification.

This invention relates to a process of removing and recovering tin from tin plate, old tinware, scrap tin etc., the object of the invention being to provide a simple and economical process of this character.

In carrying my process into practice, I first make a solution of ammonium sulfid $(\text{NH}_4)_2\text{S}$, and add enough free sulfur to convert the tin into a solution of tin-sulfid;



The metal from which the tin is to be recovered is, in suitable form, placed in this bath of solution, after which sufficient water is added and the bath boiled until all the tin is removed and in solution. The metal which is now clean from tin is removed from the bath and a suitable amount of hydrochlorid acid is then added to the bath to precipitate the tin as tin sulfid, the latter being filtered to separate the precipitate:



The H_2S gas evolved during the addition of the hydrochloric acid to the bath is introduced into fresh ammonia water to obtain a new solution of ammonium sulfid for further use. The bath which contains ammonium chlorid with some sulfur is allowed to stand until the excess of sulfur is settled, whereupon it is filtered and evaporated to dryness to recover the crystallized salt ammonium chlorid. This recovery of a commercial product tends, of course, to cheapen the cost of the

process as a whole. After drying, the tin sulfid precipitate is roasted to drive off the sulfur and convert it into tin dioxid, $\text{SnS}_2 + \text{O}_2 = \text{SnO}_2 + 2\text{SO}_2$, and then this dioxid of tin is mixed with coal or an equivalent carbonaceous substance and some flux, as limestone or the like, to reduce it to metallic tin: $\text{SnO}_2 + 2\text{C} = \text{Sn} + 2\text{CO}$. This process of treatment is exceedingly simple and effective, and by its use tin from old tinware, tin plate, and scrap material may be recovered at a low cost.

I claim:—

1. The herein-described process of recovering tin from old and scrap materials, which consists in converting the tin into a tin sulfid, then converting it into a tin dioxid, and then reducing the tin dioxid with a carbonaceous substance.

2. The herein-described process of recovering tin from old and scrap materials, which consists in converting the tin into a tin sulfid, then converting it into a tin dioxid and then reducing the tin dioxid with coal.

3. The herein-described process of recovering tin from old and scrap materials, which consists in immersing the material in an ammonium sulfid bath containing an excess of sulfur, heating the bath until the tin is removed and converted into a tin sulfid, introducing hydrochloric acid to precipitate the tin sulfid, heating the precipitate to drive off the sulfur and convert it into tin dioxid, and then reducing the dioxid with a carbonaceous substance, such as coal.

In testimony whereof I affix my signature in presence of two witnesses.

JULIUS ELKES.

Witnesses:

NATHAN ABRAMSON,
DAVID SILVERMAN.