This invention relates to the electrolysé separation of red lead from high-antimony lead alloys.

The invention is an improvement on the method of obtaining high-antimony lead alloys by electrolysis, in which lead is used as anode and antimony as cathode. The antimony content in the alloy can be controlled by adjusting the current density and the duration of electrolysis. The method is suitable for the production of high-antimony lead alloys for use in the manufacture of batteries and other electrical components.

The electrolytic cell consists of an anode made of a high-purity lead sheet and a cathode made of a pure antimony sheet. The cell is filled with a mixture of sulfuric acid and antimony. The current is passed through the cell until the desired antimony content is achieved.

The electrolyte used is a mixture of sulfuric acid and antimony. The current density is adjusted to control the antimony content in the alloy. The process is simple and can be carried out on a commercial scale.

Advantages of the new process:

1. Complete recovery of antimony: Lead is generally recovered from secondary sources by the thermal method. In this method, only a small proportion of the antimony is recovered, but the resultant product is impure and has to be subjected to a further process of refining. The small proportion of the antimony which is recovered is obtained as sodium antimonate and not as metal.

2. By the electrolytic process, practically all the antimony is recovered from the anode. The anode mud may be used as a substitute for the untreated lead sulphate, etc., present in the anode material. The anode mud is subjected to chemical analysis to determine the composition of the electrolyte and the anode material.

3. The process of electrolytic separation is of special interest and significance for the production of high-purity lead alloys.
lead-antimony alloys, viz., battery lead, from which both lead and antimony can be obtained in a pure form.
4. The percentage recovery of both lead and antimony is very high, well above 95 per cent.
5. The metals recovered, being very pure, can well be utilised for building new batteries having longer life and better performance-characteristics.

We claim:

1. A process for the electrolytic separation of pure lead from high-antimony lead alloys by electrolysis wherein a mixture of lead nitrate, nitric acid and boric acid contained in a concrete cell lined with bitumen, is employed as electrolyte and wherein high antimony lead alloy is used as the anode from which lead preferentially dissolves during electrolysis and deposits at the cathode as pure lead, the antimony being left at the anode as anode mud.
2. A process as claimed in Claim 1 wherein anode consists of impure lead-antimony alloy containing up to 10 per cent. of antimony and other impurities.
3. A process as claimed in Claim 1 and 2 wherein a stainless steel cathode is employed.
4. A process as claimed in any of the preceding claims wherein anodes are surrounded by white drill diaphragm.
5. A process as claimed in any of the preceding claims wherein perspex frame is provided for the stainless steel cathode.
6. A process as claimed in any of the preceding claims wherein glue is added to the electrolyte in concentration of 0.05 per cent.
7. A process as claimed in any of the preceding claims wherein a current density of 12 to 13 amperes/sq. ft. is employed.
8. A process as claimed in any of the preceding claims wherein current efficiency is 95 per cent.
9. A process as claimed in any of the preceding claims wherein the anode mud containing 85 to 90 per cent. antimony is deposited.
10. A process as claimed in any of the preceding claims wherein a cell voltage varying from 0.35 to 0.45 or more is employed.
11. A process as claimed in any of the preceding claims wherein power consumption is about 0.05 K.W. H./lb. of lead produced.
12. A process for the electrolytic separation of lead in a state of high purity from high antimony lead alloys, containing up to 10 per cent. of antimony, and in particular for the secondary recovery of lead from battery lead, substantially as herein-before described.
13. Pure lead separated from high antimony lead alloys according to a process substantially as herein-before described.

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Dated this 12th day of February 1957.