UNITED STATES PATENT OFFICE.

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ELECTROLYTE AND METHOD OF ELECTRODEPOSITING NICKEL.

942,729. Specification of Letters Patent. Patented Dec. 7, 1909.

No Drawing. Application filed September 7, 1909. Serial No. 516,503.

To all whom it may concern:

Be it known that I, EDWARD F. KERN, citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Electrolytes and Methods of Electrodepositing Nickel, of which the following is a specification.

This invention relates to the electrodeposition of metals, and has particular reference to an improved process for the electrodeposition of nickel.

The invention also relates to an electrolyte for use in the practice of said process.

I have discovered that a smooth, dense, coherent and adherent deposit of nickel may be obtained by the electrolysis of a bath containing fluo-silicate of nickel in solution, and that particularly good results may be obtained by the electrolysis of a bath containing in addition to the fluo-silicate of nickel, either an alkaline fluorid, as ammonium fluorid, alone, or an alkaline fluorid and a soluble fluo-silicate of a metal which is more basic than nickel, preferably aluminum fluo-silicate.

In the practice of my process, I prefer to use a bath containing the materials above mentioned in the following proportions, the parts being by weight:

Water	100	or	more	parts.
Fluo-silicate of nickel	10	"	"	"
Ammonium fluorid	5	"	"	"
Aluminum fluo-silicate	5	"	"	"

In the practice of my process, I employ a nickel anode, or an anode consisting of an alloy the greater part of which is nickel.

I have found it advisable to add ammonium fluorid to the bath from time to time during the operation of the process, this addition serving to restrain the separation of silica.

While I have stated the proportions of the materials which I prefer to employ, it is to be understood that these proportions may be widely varied, and that certain of the constituents of the electrolyte may be omitted as hereinbefore indicated without departing from the spirit of my invention or the scope of the appended claims.

Having described my invention, I claim:

1. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel.

2. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel with an anode of nickel.

3. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel and an alkaline fluorid.

4. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel and ammonium fluorid.

5. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel, an alkaline fluorid, and a soluble fluo-silicate of a metal which is more basic than nickel.

6. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel, an alkaline fluorid and aluminum fluo-silicate.

7. A process of electrodepositing nickel, which consists in electrolyzing a solution containing fluo-silicate of nickel, ammonium fluorid, and aluminum fluo-silicate.

8. An electrolyte comprising fluo-silicate of nickel.

9. An electrolyte comprising fluo-silicate of nickel, and an alkaline fluorid.

10. An electrolyte comprising fluo-silicate of nickel, and ammonium fluorid.

11. An electrolyte comprising fluo-silicate of nickel, an alkaline fluorid, and a soluble fluo-silicate of a metal which is more basic than nickel.

12. An electrolyte comprising fluo-silicate of nickel, an alkaline fluorid, and aluminum fluo-silicate.

13. An electrolyte comprising fluo-silicate of nickel, ammonium fluorid, and aluminum fluorid.

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

EDWARD F. KERN.

Witnesses:
JOHN A. ROCHAT,
H. W. MYNDERS.