

UNITED STATES PATENT OFFICE.

EDWARD F. KERN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO PERCY S. BROWN,
OF NEW YORK, N. Y.

ELECTROLYTE FOR DEPOSITING ZINC.

999,655.

Specification of Letters Patent.

Patented Aug. 1, 1911.

No Drawing.

Application filed October 11, 1910. Serial No. 586,476.

To all whom it may concern:

Be it known that I, EDWARD F. KERN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrolytes for Depositing Zinc, of which the following is a specification.

This invention relates to the electrodeposition of zinc and has particular reference to an improved process of electrodepositing zinc and to a novel electrolyte for use in the practice of such process.

I have discovered that a dense coherent deposit of zinc, free from crystals of compounds of zinc or any of them, can be obtained by the electrolysis of a bath containing chlorid of zinc, preferably combined with an alkali or alkaline earth metal in the form of a double chlorid of zinc and alkali or alkaline earth metal, as for example sodium, together with chlorid of aluminum and an alkali or alkaline earth metal, preferably combined in the form of a double chlorid of aluminum and such alkali or alkaline earth metal, as for example sodium. I have also discovered that the addition of an organic addition agent such, for example, as grape sugar, improves the bath and that the operation of the process is still further improved by heating the same, preferably to a temperature of about 40° C.

A preferred embodiment of my improved electrolyte contains the following ingredients in the approximate proportions specified:

Zinc chlorid ($ZnCl_2$)	10	parts by weight
Sodium aluminum chlorid		
($Al_2Cl_6 \cdot 2NaCl$)	3	" " "
Sodium chlorid ($NaCl$)	2	" " "
Grape sugar	3 to 4	" " "
Water	100	" " "

In the practice of my process I prefer to employ an anode of zinc or an alloy, the greater portion of which is zinc.

A particular advantage of my improved

electrolyte is that a high current density is obtainable with a very low current voltage. In the use of the preferred embodiment of my electrolyte above set forth, with a current of 20 amperes per square foot at a temperature of 40° C. the voltage was only from .55 to .66 and a very dense, adherent deposit was obtained which was wholly free from zinc oxid or other zinc salt.

While I prefer to employ the alkali metals with the zinc and aluminum chlorids, some measure of success may be obtained by substituting alkaline earth metals therefor and to this extent the alkaline earth metals are contemplated as equivalents of the alkali metals in the practice of my invention.

While I have stated the proportions which I prefer to employ and the temperature at which the electrolysis is preferably practiced, it is to be understood that these proportions may be widely varied, equivalents employed, and that commercially satisfactory results may be obtained by omitting certain of the ingredients, notably the grape sugar, and that the electrolysis may be carried out at any desired temperature.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. An electrolyte comprising chlorid of zinc, and a double chlorid of aluminum and another metal.

2. An electrolyte comprising chlorid of zinc, and a double chlorid of aluminum and an alkali metal.

3. An electrolyte comprising chlorid of zinc and a double chlorid of aluminum and sodium.

4. An electrolyte comprising chlorid of zinc, an alkaline chlorid and a double chlorid of aluminum and another metal.

5. An electrolyte comprising chlorid of zinc, an alkaline chlorid and a double chlorid of aluminum and an alkali metal.

6. An electrolyte comprising a double chlorid of zinc and another metal and a double chlorid of aluminum and another metal.

7. An electrolyte comprising a double chlorid of zinc and an alkali metal and a double chlorid of aluminum and an alkali metal.

5. 8. An electrolyte comprising chlorid of zinc, a double chlorid of aluminum and an alkali metal and an organic addition agent.

9. An electrolyte comprising a double chlorid of zinc and an alkali metal, a double

chlorid of aluminum and an alkali metal 10 and an organic addition agent.

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

EDWARD F. KERN.

Witnesses:

CHING YU WEN,
E. L. KURTH.