United States Patent Office

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3,017,334

ZINC BRUSH PLATING SOLUTION

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1 Claim. (Cl. 204—55)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment to me of any royalty thereon.

This invention pertains to a new and an improved zinc brush plating solution for covering metal surfaces with a protective layer of zinc.

As a background for insuring a sufficient understanding of the present invention as claimed, the brush plating of protective coats on metal surfaces may be exemplified by U.S. Letters Patent No. 2,061,592, issued to Felix R. Rapids on Composition for and Method of Metal Electroplating.

In the past, baths for plating zinc on metals commonly have contained cyanide that is objectionably toxic. Issued patents wherein cyanide plating baths are described are No. 2,543,545, issued to Charles L. Faust et al. on February 27, 1951, and No. 2,451,426, issued to Robert R. Bair et al. on October 12, 1948. Other zinc plating baths are disclosed in Patents No. 2,799,635, issued to Allan E. Chester et al. on July 16, 1957, and No. 2,651,610, issued to Allan E. Chester on September 8, 1953.

A general statement of the nature and of the substance of this invention as claimed is a plating bath for use in the application of a protective layer of zinc on a metal surface and the composition of the plating bath.

An object of this invention is to provide a new and an improved zinc plating bath composition for use in the application of a protective coating of zinc on a metal surface.

The zinc plating bath that is contemplated hereby, is made up under ordinary laboratory conditions of temperature, pressure and humidity by adding together in a glass beaker or other suitable container the following materials:

Zinc sulfate	150 grams per liter of solution
Zinc acetate	200 grams per liter of solution
Ammonium chloride	30 grams per liter of solution
Boric acid	30 grams per liter of solution
Mannitol	50 grams per liter of solution

Hydrochloric acid (concentrated)	100 cc. per liter of solution

and enough distilled water to make 1 liter of solution; or

Zinc sulfate	From 10 to 20 ounces per gallon of solution
Zince acetate	28 ounces per gallon of solution
Ammonium chloride	5 ounces per gallon of solution
Boric acid	5 ounces per gallon of solution
Mannitol	7 ounces per gallon of solution
Hydrochloric acid (concentrated)	380 cc. per liter of solution

and enough distilled water to make 1 gallon of solution.

The combined reagents are heated gently to get them all into solution. Any residue or cloudiness that remains in the solution cooled to room temperature of about 20 to 25° C. and at a pressure of about 1 atmosphere, is removed by filtration.

The mannitol in the above plating bath is a hexahydric alcohol of the composition $C_6H_{14}O_6$ with the structural formula $(CH_2OH)_2(CHOH)_4$ and is used as an addition in electroplating to transform weak tribasic boric acid into its stronger monoboric form. Several stereo-isomers of the compound are known.

It is to be understood that the zinc brush plating solution that is disclosed herein is submitted as an illustrative embodiment of the present invention and that limited modifications may be made therein without departing from the scope of this invention.

I claim:

A zinc brush plating solution of the composition:

Zinc sulfate	150 grams per liter of solution
Zince acetate	200 grams per liter of solution
Ammonium chloride	30 grams per liter of solution
Boric acid	30 grams per liter of solution
Mannitol	50 grams per liter of solution
Concentrated hydrochloric acid	100 cc. per liter of solution

and enough distilled water to make one liter of solution.

References Cited in the file of this patent

UNITED STATES PATENTS

694,658	Meurant	Mar. 4, 1902
2,029,387	Pine	Feb. 4, 1936

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,017,334 January 16, 1962

Griffin L. Jones

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 5, for "10" read -- 19 --; same column 2, lines 6 and 33, for "Zince", each occurrence, read -- Zinc --.

Signed and sealed this 19th day of June 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents