No. 768,818. PATENTED AUG. 30, 1904.

J. NELSON.

CLEANSING SHEET ZINC.

APPLICATION FILED APR. 30, 1903.

NO MODEL.

Fig. 1.

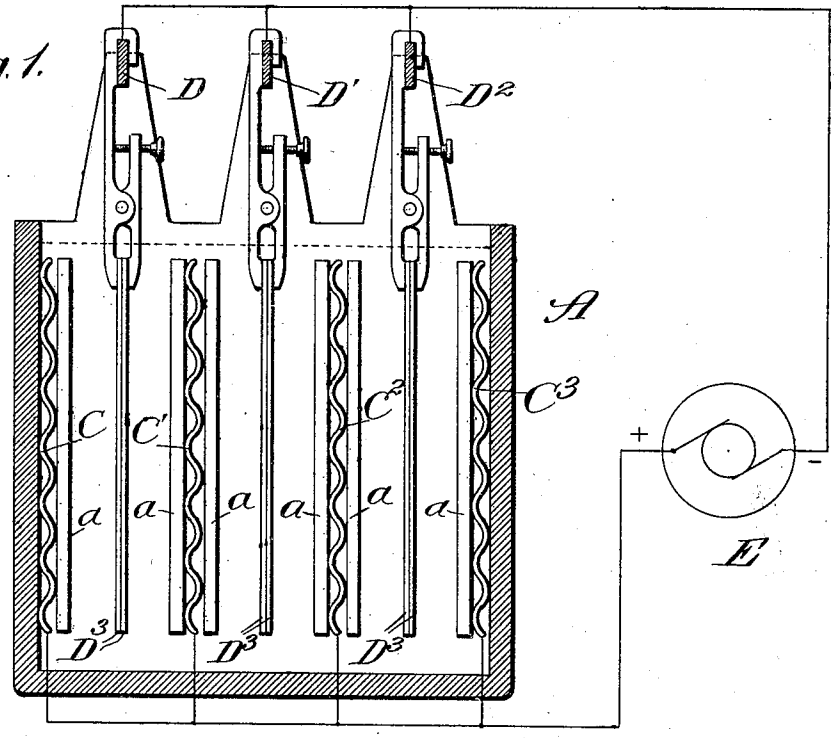
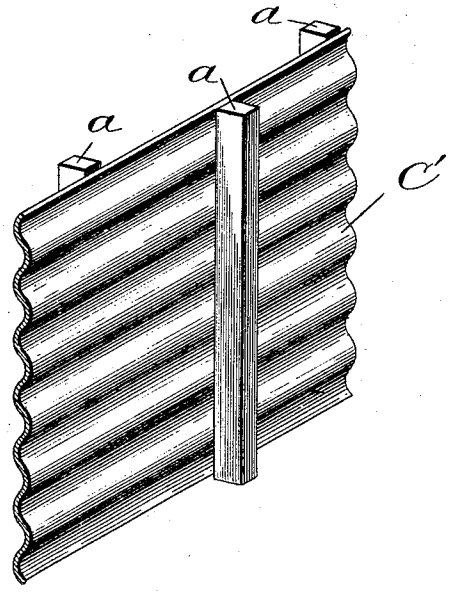


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN NELSON, OF PERU, ILLINOIS, ASSIGNOR TO AMERICAN NICKELOID & MANUFACTURING COMPANY, OF PERU, ILLINOIS, A CORPORATION OF ILLINOIS.

CLEANSING SHEET-ZINC.

SPECIFICATION forming part of Letters Patent No. 768,818, dated August 30, 1904.

Application filed April 30, 1903. Serial No. 154,988. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN NELSON, a citizen of the United States, residing at Peru, in the county of Lasalle and State of Illinois, have invented a new and useful Improvement in Cleansing Sheet-Zinc, of which the following is a specification.

My invention relates particularly to means for and methods of treating sheet-zinc preparatory to plating the same.

My primary object is to provide a composition or bath adapted to the purpose mentioned, an improved method of cleansing sheet-zinc, and improved apparatus for carrying out the method.

The apparatus for carrying out the improved method is illustrated in the accompanying drawings, in which—

Figure 1 represents a transverse vertical section of the apparatus, and Fig. 2 a sectional perspective view of an anode employed.

A represents a tank, which may be of wood; C C′ C^2 C^3, anodes located in said tank; D D′ D^2, a series of longitudinal bars serving to support sheets of zinc D^3, and E a dynamo having its positive pole connected with the anodes and its negative pole connected with the rods D D′ D^2. The anodes comprise longitudinally-corrugated sheet-iron members equipped at intervals with vertical cleats *a* of wood or other non-conducting material. The anodes C C^3 constitute linings for the sides of the tank and have cleats on one side only. The remaining anodes are cleated on both sides and are preferably separated from each other and from the side anodes by spaces of about twelve inches. The rods are supported about four inches above the tank midway between the anodes. When the sheets of zinc are to be plated on one side only, they are arranged in pairs back to back before immersion in the cleansing-bath.

The improved process is carried out by employing the sheets of zinc as cathodes, immersing them in an alkaline bath, and passing an electric current in the manner indicated. A solution well adapted to the purpose has the following composition: one gallon water (H_2O), one-half ounce potassium cyanid (KCN), one and one-third ounces sodium carbonate ($NaCO_3$), one and one-third ounces lye (two-thirds ounce NaOH + two-thirds ounce KOH).

To one hundred and fifty gallons of the above mixture is added one gallon 4 F ammonium hydrate (NH_4OH). A pressure of about seven volts for the electric current gives the best results, and for cleansing three pairs or sheets with six exposed surfaces of three feet by seven feet a current of about four hundred amperes is required. The operation usually requires from five to ten minutes' time. In the electrolytic action which occurs when the bath is subjected to the electric current the positive elements, or ions, pass to the sheets of zinc, and violent chemical reactions take place there, some of the elements finally uniting with the grease and zinc oxid on the zinc sheets and any dirt present being loosened and falling to the bottom of the tank. The chief function of the ammonium hydrate is to prevent the escape of a noxious gas during the electrolytic action, although ammonium is in itself a good solvent of grease.

It appears to be unnecessary to set forth the chemical reactions concerned in the process, as most of them will be readily understood when once the method is known, and there is still some doubt as to the nature of others.

It is noteworthy that in my improved process no acid is brought into contact with the sheets of zinc—such, for instance, as would occur if the current were reversed and the cyanid ion (CN) liberated, having affinity for the plus pole, were freed at the (now) zinc anodes. Moreover, no such salts are employed as might supply acids which would attack the iron anodes. I refer to sodium chlorid and other salts of like nature.

The corrugations of the anodes increase the area thereof, and the vertical cleats of wood prevent short-circuiting at the bath.

The effect of subjecting the sheets of zinc to the electrolytic action of a bath of the nature described is to cause them to be thoroughly cleaned without having their polish destroyed,

which would occur if the zinc were to be attacked by an acid. The importance of this will be more readily appreciated when it is recalled that zinc is very readily attacked by the most of the acids.

Changes within the spirit of my invention are contemplated. Hence no undue limitation should be understood from the foregoing detailed description.

What I regard as new, and desire to secure by Letters Patent, is—

1. The method of cleansing sheet-zinc, which consists in immersing the sheets in an alkaline bath free from compounds from which harmful acids might be formed, connecting them with the negative pole of a generator, and passing an electric current through the bath and sheets, for the purpose set forth.

2. The method of cleansing sheet-zinc, which consists in immersing the sheets in a bath containing potassium cyanid, sodium carbonate, lye and ammonium hydrate, in proportions suited to the coating to be removed, said bath being free from compounds from which harmful acids might be formed, and passing an electric current through the bath in the direction of the sheets and through the sheets back to the generator, for the purpose set forth.

3. The method of cleansing sheet-zinc, which consists in immersing the sheets in a bath containing potassium cyanid and other alkaline solution, in proportions suited to the coating to be removed, said bath being free from compounds from which harmful acids might be formed, and passing an electric current through the bath in the direction of the sheets and through the sheets back to the generator.

4. The method of cleansing sheet-zinc, which consists in immersing the sheets in a bath containing potassium cyanid and sodium carbonate, in proportions suited to the coating to be removed, said bath being free from compounds from which harmful acids might be formed, and passing an electric current through the bath in the direction of the sheets and through the sheets back to the generator.

JOHN NELSON.

In presence of—
W. B. DAVIES,
WALTER N. WINBERG.