(No Model.)

F. J. CLAMER.

PROCESS OF CLEANING, PREPARING, AND COATING METAL PLATES AND OTHER METAL SURFACES.

No. 363,593. Patented May 24, 1887.

Fig I.

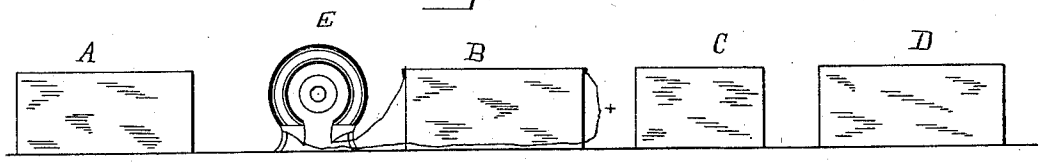
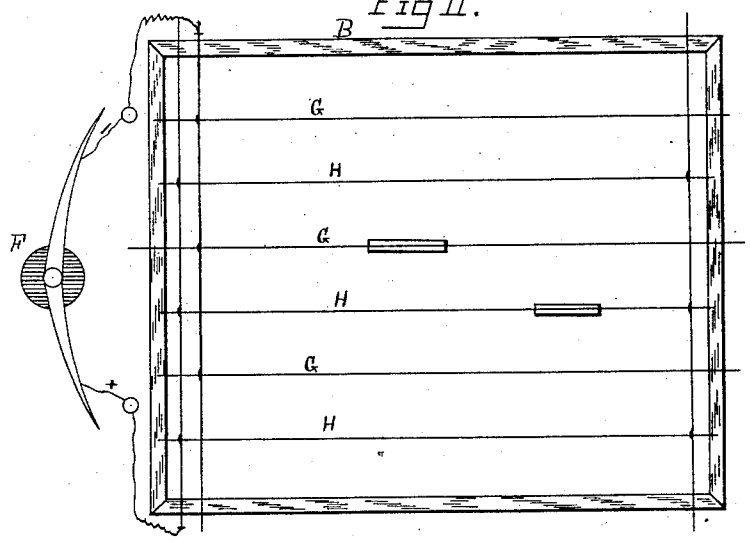


Fig II.



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UNITED STATES PATENT OFFICE.

FRANCIS J. CLAMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOSEPH G. HENDRICKSON, OF SAME PLACE.

PROCESS OF CLEANING, PREPARING, AND COATING METAL PLATES AND OTHER METAL SURFACES.

SPECIFICATION forming part of Letters Patent No. 363,593, dated May 24, 1887.

Application filed April 7, 1887. Serial No. 233,992. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. CLAMER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in the Processes of Cleaning, Preparing, and Coating Metal Plates and other Metal Surfaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates specially to a process of cleaning, preparing, and coating iron or steel plates, surfaces, and articles.

My present invention contemplates the complete chemical cleaning and preparation of iron or steel plates, articles, and surfaces for the reception of a coating or bath of molten metal; and I prefer to use as the bath for depositing the coating on such plates, &c., the bath prepared under the patent granted to me on the 14th day of August, 1883, No. 283,077, as I have found that the bath named therein, when used in connection with the process which forms the principal feature of the present application, gives a better and more perfect coat than I can otherwise obtain; but I would not be understood as confining myself to the use of the herein-described process of cleaning and preparing the plates, &c., in connection with the metallic bath set out in the said patent alone, as it can be used with equally good effects so far as the cleaning and preparing of the plates, &c., goes when followed by a metal bath of any character.

The principal object of my present invention is to thoroughly chemically clean and prepare the metal plates, &c., for the reception of the coating of molten metal.

I have found that where acids alone are relied upon to clean the plates, &c., as is commonly done in the methods at present pursued in coating metal surfaces, that the surface or plate will not be entirely freed from ferric oxide and will not be chemically clean, so that the said plates, &c., will not have a complete and perfect affinity for the molten metal of the succeeding metal bath; and I propose to use the acid bath, when I employ it at all, only as a preliminary step in the cleaning process for removing quickly the greater portion of the ferric oxide before the thorough cleaning is effected by other means, which form the essential features of my invention; and in instances where time is not an object, and in case of cleaning hollow ware, I dispense with the acid bath entirely. The plate or surface to be chemically cleaned, whether having been first treated or immersed in the acid bath or not, is placed in a cyanide bath composed of cyanide of potassium and water in about the proportion of six ounces of the former to one (1) gallon of the latter, (more or less,) with or without caustic potash or ammonia, where it is connected with a galvanic current and placed in the position occupied by the anode in an ordinary electroplating-bath, and I place a suitable surface on the negative pole or cathode and apply the current. The plate on the anode side is thereby thoroughly and perfectly chemically cleaned and stripped of every particle of ferric-oxide, acid, or other impurity. The action of the galvanic current in the cyanide bath (which, of course, is an alkaline bath) removes all the sulphureted hydrogen, which is always produced by a previous cleaning in an acid bath, and thereby precludes the possibility of the re-formation of oxides in a space of time which is ample for the prosecution of the subsequent steps of the process.

When the plates are first treated in an acid bath before the immersion in the cyanide bath, I prefer to rinse them in water after removing them from the acid bath before placing them in the cyanide bath. After being thus chemically cleaned by being made the anode in a galvanic current in the cyanide bath, the metal plates or other articles are immersed in a suitable flux—as, for instance, a bath of muriate of zinc, which may be made by dissolving metallic zinc in muriatic acid until it is thoroughly saturated and will take up no more of the metallic zinc. This flux prepares the plates or surfaces for a more ready adhesion of the molten metal, and constitutes an important step

in the present process, as it completes the preparation of the plates for the reception of the coating of molten metal after they are cleaned in the cyanide bath. From the flux the plates or surfaces are passed to the bath of molten metal with which they are to be coated, where they are treated in the usual way by being immersed therein and withdrawn therefrom. This bath of molten metal may be any of the well-known coating baths; but, as above stated, I have had the greatest success with the bath described in my patent above mentioned, which bath consists of lead or similar metals mixed with sal-ammoniac, arsenic, phosphorus, and borax, or similar flux, in the manner set forth in said patent.

Any strength of current sufficient to create action in the bath can be used and increased, as desired.

The preliminary acid bath is composed of sulphuric or muriatic acid.

I am aware that metal plates and surfaces have been stated to have been cleaned by being made the cathode of an electric current in a cyanide bath, and I do not claim such.

The accompanying drawings illustrate a means whereby the above-described process can be carried out.

Figure I is a view showing the general arrangement of the several receptacles for containing the various baths. Fig. II is a plan view of the cyanide bath having the galvanic appliances for holding the plates and for reversing the current attached.

A is the acid bath; B, the cyanide bath. C is the muriate-of-zinc bath, and D is the final bath of molten metal.

E is a dynamo-machine, with positive and negative conveyers indicated by the usual positive and negative signs.

F is a switch for reversing the current, and G G G are positive wires or rods in the cyanide bath, and H H H are negative wires or rods in the same.

The operation will be understood from the description already given.

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

1. The herein-described process of treating metal plates or other metal surfaces, consisting in cleansing the same by making them the anode in a cyanide bath through which a galvanic current is passing, then immersing them in a flux, and finally immersing them in a bath of molten metal, substantially as set forth.

2. The herein-described process of coating metal plates or other metal surfaces, consisting in cleansing the same by making them the anode in a cyanide bath through which a galvanic current is passing, then immersing them in a flux, and finally immersing them in a bath consisting of lead or similar metal, sal-ammoniac, arsenic, phosphorus, and borax, or similar flux, as set forth.

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

FRANCIS J. CLAMER.

Witnesses:
J. F. HENDRICKSON,
I. N. KALB.