A. O'NEILL.

PREPARING SHEET ZINC.

No. 190,071. Patented April 24, 1877.

Fig. 2

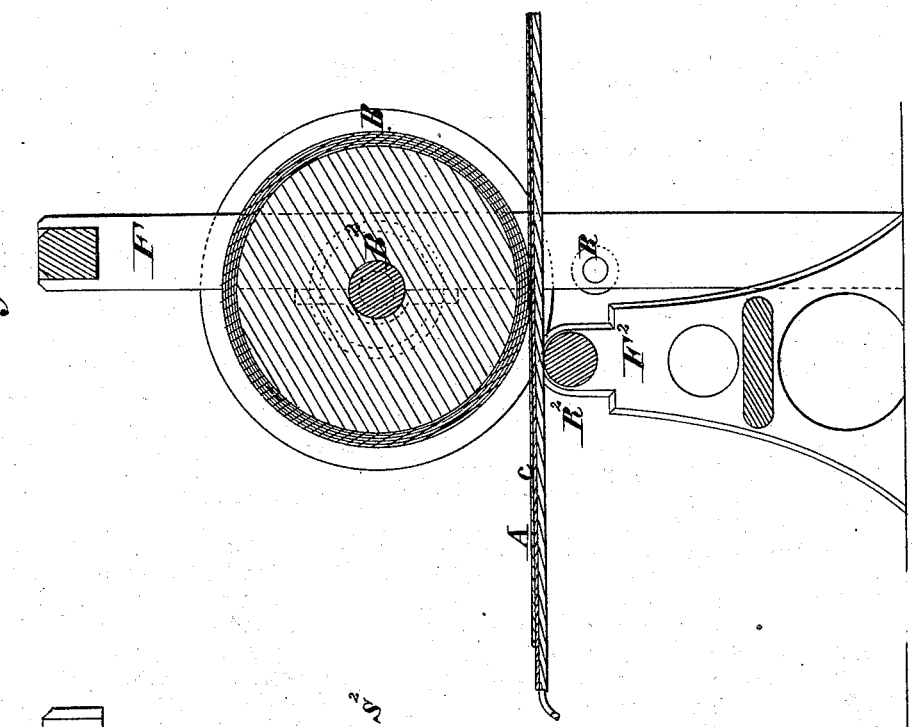
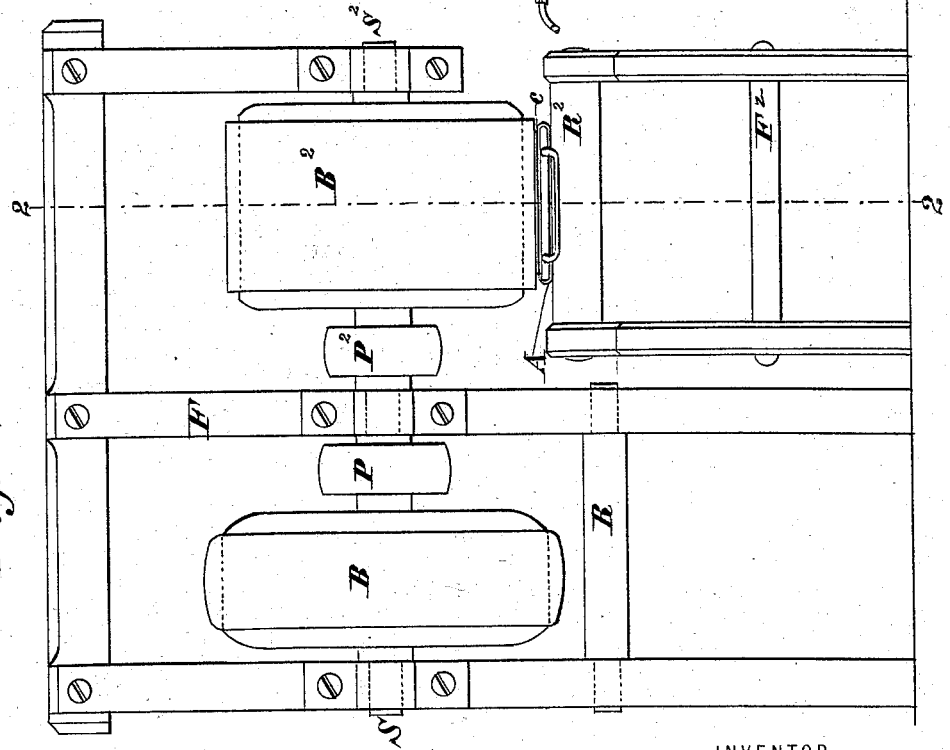


Fig. 1.



WITNESSES

Chas. J. Goodwin

Le Blond Burdett

INVENTOR

Andrew O'Neill

By Knight Bros Attorneys

UNITED STATES PATENT OFFICE

ANDREW O'NEILL, OF ANSONIA, CONNECTICUT.

IMPROVEMENT IN PREPARING SHEET-ZINC.

Specification forming part of Letters Patent No. **190,071**, dated April 24, 1877; application filed September 8, 1876.

To all whom it may concern:

Be it known that I, ANDREW O'NEILL, now of Ansonia, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Preparing Sheet-Zinc for market, and for use, of which the following is a specification:

In Letters Patent of the United States No. 68,331, dated August 27, 1867, I patented "a sheet of copper tinned, varnished, and cold-rolled," the varnish being an opaque or semi-opaque red preparation for the copper side of the sheet.

In Letters Patent of the United States No. 88,660, dated April 6, 1869, I patented "a bright, cold-rolled, tinned sheet of copper" with or without "a transparent enamel" applied to the bright copper side of the sheet.

In Letters Patent of the United States No. 179,462, dated July 4, 1876, I patented "a machine-planished, nickel-plated, polished, and enameled sheet of copper, brass, or yellow metal," with the process and apparatus by which the same is produced.

I have now perfected another new article of manufacture, which, with the means employed to produce it, is the subject-matter of the present invention.

This invention consists, first, in a new compound metallic sheet, having a zinc base or body, with one or both sides nickel-plated, and its bright surface or surfaces protected by a transparent enamel; second, in a peculiar process of machine-planishing nickel-plating and enameling sheet-zinc; and, third, in an improved buffing apparatus for use in machine planishing and polishing sheet-zinc, as hereinafter set forth.

The new compound sheet forms a cheap and superior substitute for nickel-plated copper, brass, or yellow metal, and other plated sheet metals, and for ordinary sheet-zinc, German silver, and other sheet metals for various useful purposes. One or both of its sides have brilliant smooth and hard nickel surfaces, which are protected by the transparent enamel during transportation and storage, and while the sheet is being worked up by the artisan, the same enamel serving also to confine the nickel-plating to one side of the sheet when this is desired, and to protect the unplated surface against oxidation.

The process is simple, efficient, and inexpensive.

The improved buffing apparatus obviates marring the back or edges of the sheet by sand or clamps in this part of the process, and thus insures a superior product, besides saving time and labor.

Figure 1 is a face view of the improved buffing apparatus herein referred to. Fig. 2 represents a vertical section of the same on the line 2 2, Fig. 1.

The first step of this process is cold-rolling between polished steel rolls, which condense the sheet-zinc, and remove any inequalities or bends that may be left by the hot-rolling, and subsequent cooling and handling, and render its surfaces perfectly smooth and hard.

The cold-rolled sheets are kept in piles or packages, so as to be perfectly flat, or are flattened in a press, if they require this, before the next operation, which is that of buffing.

This is performed, by preference, in the improved buffing apparatus shown in Figs. 1 and 2, of which the following is a description: A pair of rotary buffs, B B^2, are mounted side by side in a simple vertical frame, F. The buffs have independent shafts or arbors S S^2, furnished with pulleys P P^2, which receive belts or bands by which the buffs are driven at the proper surface speed. The buff B is clothed with scrap-felt or scraps of woolen or mixed cloth, clamped in a peripheral groove, so as to present the edges of the same. The wider buff B^2 is clothed with sheet-felt wound evenly upon the flat periphery of a wooden wheel.

The two buffs may be used successively—one for rough-polishing and the other for finishing—or they may be used respectively for cleaning and polishing sheets of different dimensions; and they may both be of either style of construction above described, or of any other approved construction, and the number of buffs in the apparatus will depend on the amount and character of work to be done.

A superior buffing-board, A, is formed by taking a wooden board, of the required dimensions, and covering it with a flat sheet of unpolished copper, *c*, secured in place by tacks, or in any preferred way. This copper sheet holds the sheets of zinc by friction,

without the aid of clamps, and without roughening the board by means of sand or dirt. Clamps mar the edges where they take hold, and the sand or dirt scratches the back of the sheet, so as to impair its surface. All this is obviated by the use of the frictional copper sheet *c*, and the time occupied in sanding, or clamping, and cleaning, or unclamping, is saved. Rollers R R^2 support the board A and the superimposed sheet of zinc beneath the respective rotary buffs B B^2, as illustrated in Fig. 2. By tilting the board slightly the sheet is brought into or out of contact, and by slowly propelling the board the whole length of the sheet is cleaned and polished. The roller R is mounted parallel to the axis of its buff B, at a fixed distance below the same in a different vertical plane, as shown in Fig. 2. The roller R^2 is mounted in a movable frame or stool, F^2, so as to be adjustable with reference to the buff B^2 to accommodate sheets or slabs of different thicknesses. Either arrangement of the roller may be adopted to the exclusion of the other, if preferred. The buffing-board carrying the sheet or slab of zinc is propelled by hand, and Vienna lime, crocus, or other suitable cleaning and polishishing material, is applied from time to time beneath the buff. One or both surfaces of the sheet are thus buffed, and this concludes the preliminary machine-planishing of the sheet, which insures the perfect adhesion and polish of the plating of nickel, and prevents its uneven wear in the subsequent parts of the process and in use, by rendering its backing perfectly clean, smooth, and even.

The polished surface or surfaces of the sheet are next wiped off, and, if only one side is to be plated, the sheet is prepared so that its other side or back will repel the plating-solution in the following manner:

The polished sheet is laid face downward on a table, and the upper surface is coated with a lacquer compounded as follows: Spirits of turpentine, one quart; dammar-varnish, one quart; sugar-of-lead, half a pound; with about a tea-spoonful of oxalic acid dissolved in half a pint of water. The lacquer is applied with a soft brush, and is dried by transferring the sheet to a hot steam-table, where the heat evaporates the turpentine and vulcanizes the lacquer. A tenacious, hard, glossy, and flexible coating is thus formed. This is my transparent enameling, which I have found to be a convenient and reliable repellent for this use.

The prepared sheet is now placed in the bath of the electroplating apparatus, which may be of any preferred form, supplied with any suitable solution. Here the exposed side or sides of the sheet are plated with nickel to the required thickness, which will vary according to the uses for which different grades are intended.

When the sheet is removed from the plating-bath it is placed in an oven or drying-room and slowly dried, so as to expel moisture from its pores.

If the back was enameled to confine the plating to the face of the sheet, this enamel may now be removed by means of common kerosene-oil, or benzine, or turpentine, with a little whiting or Vienna lime, or it may be left on to protect the back against oxidation.

The sheet is next lightly buffed again, to clean and polish the plated side or sides, which are to be bright, the same means being employed as in the buffing operation before described.

When the plate does not have to be struck up or spun or grooved in the use for which it is intended, it is at this stage, or subsequent to the drying operation, again cold-rolled, to supplement the electroplating by welding the two metals together, and to still further densify, harden, and stiffen the sheet. Its effect in this direction necessitates or renders advisable the omission of this rerolling in the production of sheets which are to be struck up, or spun, or grooved, while it greatly improves the sheet for other uses, as hereinafter set forth.

Finally, the sheet is again placed on the lacquering-tables, and the transparent enamel, as before described, is applied to the bright surface or surfaces of the sheet, to protect the same and preserve their luster. If the plate has an unpolished or unplated back, this may also be enameled as an additional protection against oxidation; but this is optional.

The plated sheet thus protected may be safely shipped to any distance, and handled without unusual care during its manipulation into final products; and articles made therefrom may be so shipped, as, for example, bath-tubs, signs, and the like, the enameled plating meanwhile presenting an attractive appearance, so as to render the sheet or article merchantable; and when the destination or ultimate shape is reached the enamel can be quickly removed by means of kerosene, or benzine, or turpentine, and whiting, or Vienna lime, as hereinbefore suggested. And it may here be remarked that the peculiar chemical properties of kerosene render it the best cheap oil which is known for rubbing up nickel-plated surfaces.

The polished nickel-plating protects the face of the sheet against oxidation, and presents a hard, smooth, and brilliant surface, which will resist the action of acids, and will stand a much higher degree of heat and more wear than an ordinary zinc surface.

The new compound sheet of zinc and nickel, polished and enameled, as above described, is much cheaper than my nickel-plated copper, brass, or yellow metal, owing to the employment of the relatively cheap base, while it is equally good for many purposes—for example, for lining water-coolers, refrigerators, bath-tubs, undertakers' ice-boxes, and other vessels used for holding cool and moist articles;

also, for metallic signs and reflectors, and for show-case frames and other similar trimmings for which plated sheet metal has been or may be used; and it is a superior substitute for ordinary zinc in other places where the latter has been more exclusively used, as for wash-boards, stove-boards, linings of oven-doors, and the like. It is also adapted to be used for clock-movements, where it is cheaper than brass and better than wood; also, for making clasps for porte-monnaies and satchels, and for buckles and other small articles for which German silver and other more expensive or less attractive material has been employed. The new compound sheet is also suitable, and is particularly designed for, ship-sheathing. To specially adapt it for this use, and for use on flat surfaces generally, where it is exposed to moisture, or where it has to bear considerable attrition or friction, the electroplated sheet is cold-rolled, as hereinbefore described, to increase its homogeneity and density. Such cold-rolling welds the metals together, as before stated, and so densifies the sheet that it will not absorb moisture to any considerable extent.

The soft-planished or once-rolled sheet will double-seam-and-groove perfectly, which provides for making tight and secure joints, and it can be stamped or spun into shape without impairing the nickel surface.

The apparatus for machine-planishing herein referred to, except the improved buffing-board, is substantially of the description more fully set forth in my Patent No. 179,462, hereinbefore referred to, and the apparatus and compound for enameling are the same as those described in said former patent; and with the electroplating apparatus and solution, these and substitute appliances not involving invention, will be made or selected by those skilled in the art without further description of them in this specification.

Ordinary sheet-zinc of commerce is cold-rolled before it is sent from the mill, and I may take such ordinary sheet-zinc and begin my process with buffing without repeating the cold-rolling preliminary to the plating operation. Of this description of partially-prepared sheet I prefer to employ that kind of sheet-zinc which is known as "Silesian zinc." This is of peculiar purity, and has narrow transverse stripes, whereby it can be distinguished. "La Salle zinc" is also a good article for the purpose. I propose, however, carrying out the process as hereinbefore described, in continuation of the ordinary process of manufacture in zinc-mills, and different products may obviously be manufactured by means of said process used in whole or in part.

Having described this, my present invention, the following is what I now claim as new, and desire to secure by Letters Patent, namely:

1. The machine planished and enameled compound sheet of zinc and nickel herein described, as a new article of manufacture.

2. The process of preparing sheet-zinc for the market and for use by cold-rolling the sheet, and buffing, nickel-plating, and again buffing one or both sides, and finally coating the polished surface or surfaces with transparent enamel, substantially as herein set forth.

3. The process of preparing nickel-plated sheet-zinc for ship sheathing, bath-tubs, and other purposes, consisting in cold-rolling the sheet after it is electroplated, as herein specified.

4. In combination with a rotary buff, B, the buffing-board A, having a covering of sheet-copper, to cause sheet-zinc to adhere thereto by friction, during the buffing operation, without other means of attachment, as herein set forth.

ANDREW O'NEILL.

Witnesses:
JAS. L. EWIN,
ISADOR GRAYHEAD.