

UNITED STATES PATENT OFFICE.

CHARLES H. PERKINS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN THE MANUFACTURE OF SHEET-IRON.

Specification forming part of Letters Patent No. 53,476, dated March 27, 1866.

To all whom it may concern:

Be it known that I, CHARLES H. PERKINS, of the city and county of Providence, in the State of Rhode Island, have invented a new and Improved Process for Treating Sheet-Iron Plates that are intended to be coated with zinc in the process for making so-called "galvanized iron," or which are to be finished in imitation of Russia iron, of which the following is a specification.

The great difficulty which has been experienced in all attempts to manufacture either galvanized or Russia iron plates from common sheet-iron is the presence of the "scale," as it is termed, or the oxide of iron which coats the surface of the latter. All previous processes for treating sheet-iron with a view to the manufactures above mentioned have proceeded upon the supposition that it was necessary to remove this scale, and various means have been resorted to to effect this purpose, depending upon either mechanical or chemical action, or both.

My process does not involve as one of its steps in working it the removal of the superficial oxide in the sense of separating the scale from the sheet, as in the instance where the plates have been cleaned of scale by the use of mechanical or chemical agents for that purpose; but, on the contrary, I convert the scale into pure iron by depriving it of the elements with which the iron combined to form the oxide during the process of its manufacture, and at the same time improve the quality of the metal of the sheet by driving off any constituent impurities which it may contain.

I take a convenient number of plates of common sheet-iron and pack them in an iron flask of the proper dimensions to accommodate them. The pile of plates is completely covered, as well as their surfaces between each pair, with turnings or chips of iron. The flask is similar in form to that used by molders, but is provided with a close-fitting cover, which, after the plates are put in the box and covered with chips, should be made at the joint as tight as possible to exclude all air, and this can be done by smearing the joint with clay. The flask, with its charge of plates and iron, is then placed in a furnace, which may be of the reverberatory character, or of any other preferred kind which will furnish a

uniform heat of a high temperature. The flask and its contents are thus heated to a degree which it will be better to have not much short of the point which the flask can endure without fusion. I allow the flask to remain exposed to this heat for a longer or shorter period, depending upon the condition of the furnace and the quality of the iron which I am using—upon the average about twelve hours. After the flask has become sufficiently cooled it is opened and the plates removed for the next operation. It will be found that each plate has undergone a change both as to color and quality. Its surface is of the dull color of unpolished silver, and the scale will be found to have been reconverted into pure iron, and, in fact, the impurities which existed in the iron of the body of the sheet will be found to have been in a great degree dissipated as the effect of the process of decarbonization which it has undergone. This part of my process, I am well aware, is the same as that which has been generally employed in making small castings malleable, and therefore I do not claim to have discovered that cast-iron when subjected to a high heat in a close vessel undergoes purification; but my invention consists in the application of this principle to sheet-iron plates as an improved means for overcoming the difficulties due to the presence of scale or other impurities in the manufacture of Russia iron or of plates which are to be coated with zinc or other metals. The several plates are next subjected to pressure by being passed between the surfaces of polished rollers, the effect of which operation is to render the two surfaces of the sheet smooth and bright and to roll the films of pure iron which formerly constituted the scale into the perfectly-annealed sheet, so as to exhibit hardly a trace of their ever having existed. The effect of the rollers, however, is to increase the density of the sheet, and in consequence render it stiff; and as it is desirable, especially if Russia iron is to be manufactured, that the sheet should be perfectly annealed, I deem it advisable to repeat the operation of piling the sheets in a close flask with iron chips and turnings, as before, and expose them again to the heat of the furnace for a period of twelve hours, more or less, according to their condition. The sheets, having been allowed to cool

gradually, when taken from the flask will be found to be quite soft and deprived of all elasticity. Their color, more nearly than before, approaches to that of dull silver, and an examination will show that the metal is decarbonized throughout. Plates thus prepared are now ready to be blued, if the same are to be finished to imitate Russia iron, by the process described in an application for a patent upon the subject of manufacturing this variety of iron by me heretofore made, or by any other process which will accomplish the result; and if, instead of bluing the sheets, it is intended to cover them with a coating of zinc to produce galvanized iron, or with any other metal, their surfaces are in proper condition to readily take on such coating when dipped in the bath prepared for that purpose according to the method employed in such manufacture.

Although my invention is especially adapted to the preparation of sheet-iron plates for galvanizing, tinning, or otherwise coating them with metallic substances and for manufacturing Russia iron, it is obvious that the same principle can be successfully employed in preparing other articles—as, for example, nails and screws—for receiving a coating of metal to prevent oxidation.

It will be observed that the process which I have described accomplishes not only the cleaning of the plates on their surfaces, but

improves the quality of the iron of which they are composed, whereas all former processes with which I am acquainted do not comprehend more than the cleaning and smoothing of the surfaces by chemical or mechanical agents applied to such surfaces.

I do not mean to confine myself to the use of cast-iron chips for covering the plates while the same are exposed to the action of heat; but I mean to include any equivalent material which can be used for the purpose, for my invention does not relate to the means by which the result of decarbonization is effected, but to the application of the means described, or the equivalent chemically thereof, for the purposes declared.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Preparing plates of sheet-iron, whether for receiving a coating of zinc or other metal or preparatory for polishing and coloring in imitation of Russia iron, by the application of the decarbonizing process, substantially as described.

2. Preparing plates of sheet-iron for coloring in imitation of Russia iron by first decarbonizing them and then rolling them, substantially as described.

CHARLES H. PERKINS.

Witnesses:

JOHN D. THURSTON,
GEO. B. BARROWS.