

# UNITED STATES PATENT OFFICE.

JOHN GREY AND THOMAS GREY, OF PITTSBURG, PA., ASSIGNORS TO THEMSELVES AND JOHN D. AND WM. GREY, OF SAME PLACE.

## IMPROVEMENT IN THE MANUFACTURE OF SHEET-IRON.

Specification forming part of Letters Patent No. 50,203, dated September 26, 1865.

*To all whom it may concern:*

Be it known that we, JOHN GREY and THOMAS GREY, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Imitation Russia Sheet-Iron; and we do hereby declare the following to be a full, clear, and exact description thereof.

The object of our invention is to manufacture sheet-iron having the glazed surface and high polish peculiar to Russia sheet-iron as well as the mottled appearance and freedom from liability to rust possessed by that article.

A successful mode of manufacturing sheet-iron possessing the remarkable properties and appearance of the Russia sheet-iron has long been eagerly sought after, but has never heretofore been fully attained. Various methods have been tried, resulting with more or less success in producing sheet-iron having some of the peculiar features desired. The use of hammer-dressed rolls and of etched rolls has been tried to produce the mottled appearance of Russia iron. The purification of the iron during the refining process, so as to give it a susceptibility to a high polish by rolling, has been suggested; but the most common mode of endeavoring to attain the desired end has been to apply some carbonaceous substance, either dry or in the shape of a paint, to the surface of the sheets during the finishing-rolling, usually accompanied by the previous removal of the scale or oxide, and sometimes without such removal; but all these methods have been attended with imperfect results.

The ordinary mode of rolling sheet-iron without removing the scale prior to the finishing-rolling produces, as is well known, a very rough article of sheet-iron, destitute of any of the peculiarities of Russia sheet-iron, and very liable to rust by exposure to dampness or wet. It has therefore been supposed that the presence of the scale or oxide of iron formed on the surface of the metal, in consequence of the heating necessary for the proper reduction of the sheets, was the cause of their roughness, and that this oxide must be removed by an acid bath or covered over and incorporated with some other substances, chiefly carbonaceous, to produce the desired enameled sur-

face. We have, however, discovered by experiment that an excellent imitation of Russia sheet-iron may be made without the use of any pigment, carbonaceous or otherwise, and without the removal of the scale or oxide, and that the enameled surface which is susceptible of the high polish as well as the mottled appearance of the sheet, and its property of resisting the action of water or moisture, is owing to the presence of the oxide on the surface of the sheet.

The oxide of iron formed on the surface of iron after being heated is a hard brittle substance having a less degree of ductility than the iron, and, therefore, when the sheets are rolled in the ordinary way the iron is drawn out more than the scale, which forms in spots over the surface of the sheet, leaving their impression thereon, and frequently scaling off, leaving a rough and uneven surface.

To enable others skilled in the art to use our improvement, we will proceed to describe the process of manufacturing sheet-iron which we have invented.

After the sheets of iron are reduced sufficiently to be ready for the finishing-rolls they are heated in packs in a furnace, in the usual way, to the ordinary heat. They are then allowed to cool, before passing them through the finishing-rolls, until they get below a cherry-red. They are then passed in packs repeatedly through the rolls without removing the scale. They are not, however, allowed to grow cold, but are reheated from time to time considerably above a cherry-red, and allowed to cool each time to a point below a cherry-red, when they are again rolled, and so on, successively being heated and allowed to cool down below a cherry-red before being passed through the finishing-rolls. The result of this process is that the scale or oxide is spread out uniformly over the surface of the sheet without peeling off, and communicates to the iron the peculiar glossy, enamelled surface desired, attended by the mottled appearance so characteristic of the Russia sheet-iron. After the sheets are finished they are annealed in the usual manner.

The rolls we use are of chilled iron turned and polished.

We do not claim as new rolling sheet-iron

without removing the scale or oxide, as that is the ordinary mode of rolling common sheet-iron, and of itself would not produce the desired result; but

What we do claim as our invention, and desire to secure by Letters Patent, is—

The mode of finishing sheet-iron by the process hereinbefore described, consisting of passing it repeatedly through the finishing-rolls without removing the scale or oxide, when the iron has been previously heated to the ordinary high heat for rolling, and allowed to cool

after each heat below the point of a cherry-red before passing it through the finishing-rolls, for the purpose hereinbefore described.

In testimony whereof we, the said JOHN GREY and THOMAS GREY, have hereunto set our hands.

JOHN GREY.  
THOMAS GREY.

Witnesses:

W. D. LEWIS,  
ALLAN C. BAKEWELL.