

# UNITED STATES PATENT OFFICE.

CALEB MARSHALL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
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IMPROVEMENT IN THE MANUFACTURE OF SHEET-IRON AND REMOVING SCALE FROM IRON FOR  
COATING WITH OTHER METALS.

Specification forming part of Letters Patent No. **114,956**, dated May 16, 1871.

*To all whom it may concern:*

Be it known that I, CALEB MARSHALL, of the city and county of Philadelphia, and State of Pennsylvania, have made a new and useful Improvement in the Manufacture of American Polished Sheet-Iron, and in the preparation of iron to be coated with other metals by the process of galvanizing, tinning, and coating with other metals or alloys of metals.

The first part of my invention consists of an improved method of removing the scale from iron by means of a saline bath and subsequent heating of the iron in a suitable furnace. This method is applicable both to sheet-iron, so as to prepare it for being polished and burnished, and also for the purpose of removing the scale from all kinds of iron and iron articles which are to be coated with tin, zinc, lead, copper, and other metals and alloys.

The second part of my invention consists in finishing sheet-iron, after the scale has been removed by a saline bath, by heating it in a furnace of suitable construction and rolling, at the temperature and in the manner hereinafter more fully set forth.

The third part of my invention is a new article of polished sheet-iron free from acids in every part.

The following description will enable any one skilled in the art to make and use my invention.

I first break down and roll iron in the ordinary way. The iron thus prepared is covered with a scale, which must be removed previous to making it into polished sheet-iron or before coating it with another metal. To remove the scale, I prepare a saturated solution of common salt (chloride of sodium) in water. In this solution I immerse the sheets or pieces of iron from four to five minutes.

Heretofore it has been usual to immerse the sheets in an acid solution. This I find will not make a good article, since, even after neutralizing the acid with the bases used for that purpose, some acid still adheres, and causes the rusting of the iron after it is finished; but by using a solution of common salt or other equivalent saline solution instead of acid the preparation of the iron, by removing the scale, is obtained without the after effects of acids.

The iron, after being removed from the saline bath and drained, is placed in a furnace having a strong heat free from smoke, flame, and sulphur. The temperature in the furnace should be about the same as ordinarily used in removing scale. The furnace should be so constructed as to carry any smoke and flame over the iron and along the roof of the furnace.

The following is a suitable construction of furnace for my purpose: The fire-grate is placed at the back of the furnace. A bridge ten to twelve inches high is placed between the fire and the bottom of the furnace, in order to carry the smoke and flame over the iron, along the roof, to the stack, which is at the front end of the furnace. At the same end, under the stack, is a door through which to put in and take out the iron.

The iron is permitted to remain in the furnace till the operator or workman discovers the scale to be rising from the surface of the iron, when it is removed and dipped into a bath of lime-water or other alkaline solution. The heating in the furnace detaches the scale, and the immersion in lime-water or alkaline solution is for the purpose of preventing any rusting till the subsequent operations are finished.

If the iron is to be galvanized, tinned, or coated, these processes are performed in the ordinary manner after the scaling process above described has been completed.

The following additional treatment is required to manufacture polished sheet-iron: For this purpose the sheets are again placed in the furnace and brought to a dark cherry-red heat, which is rather lower than the heat commonly used. The sheets are then rolled with ordinary chilled rolls polished for that purpose. In this operation the sheets are rolled three or four in a pack, in the common way, and two or three heats will complete the process. To finish the sheet-iron, it is then taken and annealed, in packs or in a box, in the manner commonly practiced in most rolling-mills in making common sheet-iron, care being taken not to have the heat so high as to raise the scale. By this treatment a good article of American polished sheet-iron is produced.

If any peculiar stamp or finish on the surface is required, it may be given by proper rolls for the purpose.

There are no germs of decay or rust in the body of the iron, as is the case when acids are used. This gives my invention great value over others now used in which acids are employed.

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

1. The improved process herein described for removing scale from the surface of sheet and other iron, the same consisting in treating

the iron with a saline bath and then subjecting it to heat, so as to raise the scale, substantially as set forth.

2. The combination of the above process of removing scale from iron with the after treatment of heating, rolling, and annealing, so as to produce polished sheet-iron, as set forth.

3. The improved article of polished sheet-iron herein described.

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Witnesses:

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