UNITED STATES PATENT OFFICE.

SIMEON GUILFORD, OF LEBANON, PENNSYLVANIA.

IMPROVEMENT IN MANUFACTURING SHEET-IRON.

Specification forming part of Letters Patent No. **2,821**, dated October 22, 1842.

To all whom it may concern:

Be it known that I, SIMEON GUILFORD, of the borough and county of Lebanon, and State of Pennsylvania, have invented a new and Improved Mode of Finishing Sheet and Thin-Rolled Iron; and I do hereby declare that the following is a true description thereof.

The nature of my invention and improvement consists in finishing sheet-iron with a clean smooth surface, similar to the Russia sheet-iron, and is effected in the following manner, viz: When the sheets are rolled down to the desired thickness by the common process the oxide, rust, or scruff is removed by immersing them in an acid or acidulous liquor. The sheets are then washed off and subjected to a process of friction, and then heated to a certain temperature for the purpose of giving the iron a bluish color, when, if it is desired to give the highest finish, the sheets are to be passed while hot through surface-hardened and polished rolls.

The acid used in solution may be the sulphuric or other mineral acids, in which case it is used in very diluted state; or vegetable acid may be used. If so, a very good acidulous liquor is made by mixing rye-meal with water, so as to produce by a state of fermentation a sour liquor, which should not be so thick as to adhere to the iron when it is removed. The sheet-iron must be left in the acid liquor until the oxide or rust may be easily removed by the washing and friction which follow. When the iron is taken out of the acid liquor it must be washed off, so as to remove the acid and loose oxide, and then be put through the friction process, which may be done in various ways, conveniently thus: Place a quantity of the sheets in a box-like fixture with a strong bottom, sides, and ends, so as to retain the iron in place. Then put a strong and movable plank or other cover over the sheet-iron thus placed in the case or box, and apply upon this movable top, by machinery or otherwise, a succession of blows by stampers or hammers, so that by the concussion and friction thus produced the surfaces of the sheets shall be made bright and smooth. The sheets are next to be heated in an oven, furnace, or other fixture for heating and giving the iron the desired color. As the sheets become heated the color changes by degrees, coming first to a bright, then to a dark-gold color, and lastly to a blue, when it is to be removed or taken out, and, for the highest-finished work, passed through polished rolls, hard-finished, by case-hardening or otherwise. If it be thought not desirable to roll the iron at this stage of the process, the sheets should be left to cool gradually. As there is no oxide or scruff upon the surface of the iron, and it being annealed by the last heating and coloring, the rolls remain smooth for a much greater length of time than they otherwise would.

In order to describe more specifically the nature of my invention and the mode of accomplishing the same, I will state that when, by the common process of heating and rolling, the sheets or plates are reduced to near the thickness desired when finished, the scruff or oxide accumulated on their surfaces is removed by first immersing them in an acid liquor, which by its chemical action shall soften and in a great measure remove the oxide. The sheets are then taken out and washed off with water, when they are still further cleaned by a process of friction or rubbing which removes any adhering scruff or oxide and burnishes or polishes their surfaces. After the sheets have been thus cleaned and polished by friction they are heated to that particular degree of heat which causes clean or bright iron to turn of a blue color. The sheets or plates are then removed from the heating oven or furnace and passed through or between finishing-rolls to reduce the thickness and complete the process. The acid liquor for cleaning the iron may be made by the use of the mineral or vegetable acids. The mineral acids should be reduced with water. I have used the sulphuric acid diluted with ten times its measure of water. If the acid liquor be weak, the sheets must remain immersed longer than if it be stronger or more acidulous in order that the same effect be produced.

Any process which shall produce a rubbing of the sheets, so as to complete the cleaning, and will burnish or polish them, will accomplish what I call the "friction" process. I have performed this by putting a quantity of the sheets into a box or case constructed so as to be made to revolve, and by revolving causes the sheets to slide to and fro, and thus rub-

bing and burnishing their surfaces. I contemplate accomplishing the same purpose and effect by bringing the sheets in contact with the exterior surface of revolving cylinders or rolls, which by revolving or moving faster than the sheets will rub and polish their surfaces.

The heating of the sheets after they are cleaned and polished can be more regularly and best accomplished in an oven or furnace so constructed that the fire or fuel and the sheets shall not come in contact—viz., let a thick plate of iron intervene between the surface of the fire and the sheets which are to be blued.

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

The finishing of sheet or thin-rolled iron, free of scruff or oxide, (with which sheet-iron finished by the old process is covered,) by means of acid and friction for cleaning and burnishing the surface before the manufacture of the article is completed, together with the combined effect of the particular degree of heat used to complete the process, substantially as set forth.

SIMEON GUILFORD.

Witnesses:
J. C. GOODHART,
JOEL GOODHART.