

# UNITED STATES PATENT OFFICE.

DAVID A. MORRIS, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN MANUFACTURE OF SHEET-IRON.

Specification forming part of Letters Patent No. 21,772, dated October 12, 1858.

*To all whom it may concern:*

Be it known that I, DAVID A. MORRIS, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new Improvement in the Manufacturing of Sheet-Iron; and I declare that the following is a full and exact description thereof.

The article of iron known as "polished Russia sheet-iron" possesses peculiar qualities that distinguish it from all other kinds of sheet-iron. The principal feature is a blue-black enamel, which gives the iron a beautiful finish and protects it from corrosion. The other important feature is to be found in the iron itself, which is extremely tough and malleable, easily worked into intricate shapes. The surface is steel-like, dense, and hard, not easily defaced, but very durable.

Now, my process for manufacturing sheet-iron to possess the above-named qualifications is—

First. Procuring well carburated pig-iron, charcoal cold blast having silicum, aluminium, and manganese only alloyed with the iron, being free from sulphur, arsenic, phosphorus, copper, &c., which are difficult to extract, and always injurious to the iron. After having learned, by analysis or otherwise, the proportion of the metalloids combined in the pig-iron, I propose a flux or compound of reagents so constituted and proportioned as to take up the excess of aluminium, silicum, and manganese, only permitting a minimum of each to remain. This flux may be used either in the refinery or the puddling-furnace. By this means a very pure iron can be made—an iron that will have little or none of the "cold-short" and "red-short" qualities.

Second. The iron, being well charged with carbon, requires to be thoroughly worked in the puddling process, and the puddle-balls must be well hammered and the iron afterward treated in the ordinary way for reducing iron into sheets or plates.

Third. When the sheets are reduced to nearly the required thinness I pass them through etched or mottled rolls a few times, which gives the sheets a fine dappled appearance.

Fourth. I next place the sheets in a suitable heating-furnace or oven inclosed in a tight iron case, and as soon as the sheets are heated up to a bright cherry red I take out a sheet and sprinkle or dust finely-pulverized charcoal, either animal or vegetable, over the entire surface. Then I take another sheet and place it on top of the first, cover it with charcoal in the same manner and repeat until I have ten or more on the pile, which is placed on a large heavy block of cast-iron, so arranged on rollers as to be moved with facility. Then I move the whole forward under a gang of heavy trip or tilt hammers, which are immediately set in motion, and the anvil kept moving back and forth and the hammering continued until the iron is no longer red, which will be a considerable time, as the heat is kept up by the combustion of the charcoal between the sheets. It may be more convenient sometimes to run this pack or pile of sheets several times through the heavy mottled rolls, which operates very well; but I prefer using the gang of trip-hammers.

Fifth. I place the sheets a second time in the tight iron cases and heat them to a bright-brown or low-red heat. Then I take them out quickly and pile fifty or more of them on the movable anvil, and give them a second hammering, using a heavier blow than before. This second hammering will take out the "buckle" and improve the finish. If the sheets happen to get a little too hot, I pile them with cold sheets alternately.

Sixth. I then pack the sheets in large airtight cases and place them in a suitably-constructed annealing-oven, and after they are properly annealed I take them out and shear them to proper sizes, which completes the center process.

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

Manufacturing enameled anti-corrosive sheet-iron by the process above specified.

D. A. MORRIS.

Witnesses:

WILLIAM COLTAST,  
JOHN W. KELLBERG,  
THOS. STEEL.