

# United States Patent Office.

THOMAS J. CHUBB, OF WILLIAMSBURG, NEW YORK.

*Letters Patent No. 90,928, dated June 8, 1869.*

## IMPROVEMENT IN MAKING BLOOMS OF STEEL AND WROUGHT-IRON.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, THOMAS J. CHUBB, of Williamsburg, Kings county, State of New York, have invented new Improvements in Making Blooms of Steel and Wrought-Iron; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention and improvements consists in making blooms of steel and wrought-iron, of a superior quality, direct from the crude cast-iron, without the usual amount of puddling, by means of submerging natured iron, or pieces of wrought-iron into a bath of molten cast-iron, or into a mass of molten cast-iron or similar carburetted metal, contained in a stationary fixed vessel in a furnace that is heated by air and gas which has been previously heated or reheated before combustion, in continuous currents, in a separate furnace or apparatus, and, after refining the metal, extracting all of the surplus carbon by aid of the heated air, and also in extracting the surplus carbon from the metal by introducing into the refining-vessel or chamber a quantity of sand of ore, or finely-pulverized iron-ore in the form of sand, or partly-natured iron-ore, and submerging, stirring, or incorporating the ore, or partly-natured iron into the molten cast-iron, whereby the oxygen from the ore will attack the surplus carbon in contact with the cast-iron, and burn it out. A portion of the carbon will also incorporate itself with the metal of the ore, making a uniform metal in the vessel or furnace-chamber. To produce a low steel, similar to puddled steel, and to produce a refined wrought-iron, I regulate the supply of heated gas and heated air so that I obtain a surplus quantity of heated air in contact

with the metal, and thereby burn out, or extract the balance of the carbon from all the metal, producing wrought-iron similar to puddled iron.

To enable others skilled in the art to use my improvement and invention, I will proceed hereby to describe the mode of operating.

I construct a furnace similar to any one of those described in my patent of the 30th day of June, A. D. 1868, No. 79,313 and No. 79,314, or similar to one described in the specification accompanying a separate application filed herewith.

I introduce into the melting-chamber of the furnace the crude cast-iron, and, when melted, and sufficiently heated, I insert the wrought-iron pieces, or the iron-ore, or the partly-natured iron-ore, and submerge it or them into the molten mass; and, when all is melted, I refine it by inserting such chemicals as the character of the metals require, and, when sufficiently refined, I turn on more highly-heated air, and extract all of the carbon, to make wrought-iron, and part of the surplus carbon to make low steel.

I then ball up the mass, and take it from the furnace, and squeeze, hammer, or roll it, in the usual way that puddled steel or iron is made into blooms.

I claim—

1. Making blooms of low steel, similar to puddled steel, by the means herein described.
2. Making blooms of wrought-iron, similar to puddled iron, by the means herein described.

THOS. J. CHUBB.

Witnesses:

JACOB REPERT,  
JOHN STEWART.