

# UNITED STATES PATENT OFFICE.

S. W. WOOD, OF CORNWALL, NEW YORK.

## IMPROVED PROCESS FOR MAKING CAST-STEEL.

Specification forming part of Letters Patent No. **46,041**, dated January 24, 1865.

*To all whom it may concern:*

Be it known that I, S. W. WOOD, of Cornwall, in the county of Orange and State of New York, have invented a new and Improved Method or Process of Making Cast-Steel; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in making cast-steel by melting decarbonized iron, prepared substantially as hereinafter specified, in connection or contact with carbon in the form of charcoal, or its equivalent, as herein set forth.

The decarbonized iron to be used for this purpose is prepared substantially as follows: Pig-iron, or any other suitable carbonized iron, is treated in a puddling-furnace until the completion of the boil in the same manner as for making wrought-iron. Then, instead of continuing the heat and working the mass into balls, it is allowed to remain in small lumps or particles—a sort of granular form—which, when in this state, it spontaneously acquires, the metal being iron nearly or entirely decarbonized and mixed, as well as more or less coated, with cinder. It is then taken out of the furnace, and when cooled is pounded by stamps or otherwise sufficiently to disengage the cinder and reduce it to a powder. The iron is then separated from the cinder-dust by a magnetic separator or by sifting out the cinder. This prepared decarbonized iron is placed in a crucible or a suitable furnace for melting, and with it is put a proper amount of charcoal, or any other suitable form of carbon, to produce the required degree of carbonization for making the desired grade of cast-steel. For a medium grade of steel about eight ounces of any good wood charcoal to every hundred pounds of the decarbonized iron will make a proper proportion, and for higher or lower grades a correspondingly greater or less pro-

portion; but the exact amount must be determined by the particular character of steel to be produced. It is not material in what state the charcoal is placed in the crucible, whether coarse or fine, nor how situated therein, whether at the bottom, mixed with the iron, or on the top of it, since the agitation of the metal and its affinity for carbon soon unite the two materials into homogeneous steel. Heat is then applied and the iron is thoroughly melted and kept in a boiling state till the charcoal or carbon is all absorbed or taken up by the metal. The steel is then cast into ingots, the cinder present being removed at the time of pouring. The ingots are heated, hammered, and rolled in the usual way.

It is found to improve the melting process and to make a somewhat better and more certainly even quality of steel by adding in the crucibles a small quantity of black oxide of manganese. The exact quantity of the oxide is not essential to state, a very small amount sufficing—say, about six ounces to every hundred pounds of the decarbonized iron. Any of the common fluxes may be used instead of the oxide of manganese, with some, but not so good, effect.

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

Making cast-steel by melting decarbonized iron, prepared substantially as herein described, in connection or contact with charcoal or other form of carbon, either with or without the use of black oxide of manganese or flux, substantially as specified.

In witness whereof I hereunto set my hand this 23d day of December, 1864.

S. W. WOOD.

Witnesses:

J. S. BROWN,

J. B. WOODRUFF.