

# UNITED STATES PATENT OFFICE.

WM. H. BRUNT AND JOS. W. McELROY, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF STEEL.

Specification forming part of Letters Patent No. **40,732**, dated December 1, 1863.

*To all whom it may concern:*

Be it known that we, WILLIAM H. BRUNT and JOSEPH W. McELROY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful improvements in the process of making steel suitable for edge-tools of all kinds out of pig-iron in a common puddling-furnace; and I do hereby declare that the following is a full, clear, and exact description of the same.

We are aware that iron has been carbonized in a puddling-furnace to partially prepare it for the after-conversion of it into steel by re-carbonization in crucibles. We are also aware that a kind of blister or inferior steel, not applicable to the making of edge-tools, has been made in a puddling-furnace from pig-iron. We do not claim either of these processes or products.

Our invention consists in making a cast-steel suitable for edge tools of all kinds in a puddling-furnace out of pig-iron by one single process of carbonization in the furnace; and we would further state that although our process by a single operation makes perfect steel, suitable in hardness for the purposes named, yet, as in all steel, it must be afterward remelted in crucibles, not, however, to carbonize or re-carbonize it, but for the purpose of making its fibers firm and compact and allowing them to weld under the rolls or hammer.

To enable others skilled in the art to make and use our invention, we will proceed to describe the process we follow.

We place pig metal (charcoal pig metal preferred) in an ordinary puddling-furnace, and puddle it in the usual well-known way until it commences to flux. It is then worked very hot until it commences to granulate, at which

point in the process pulverized charcoal or other carbon is thrown into and the furnace closed up for a few minutes. The metal is then brought out and made into bars or blooms in the usual way, which bars or blooms are afterward broken up and remelted in a crucible to make the fiber of the steel compact and firm. During the "boiling" of the metal it should be made very hot, and all the cinder carefully kept in the furnace.

By our process cast-steel is made from pig-iron by one act of carbonization, and that done in the puddling-furnace, by which we save much time and expense. The closing up of the furnace after the carbon is thrown into it holds the carbonic-acid gas in the furnace, and this prevents what carbon remains in the metal in the furnace from being consumed. This we believe to be the action that takes place, in whole or in part, by the closing up of the furnace after the carbon is thrown into it. We know that we produce a steel equal to the best cast-steel for edge-tools by one act of carbonization only, and that done in the puddling-furnace.

Having thus fully described our invention, what we claim therein as new, and desire to secure by Letters Patent in the process of making steel direct from pig-iron in an ordinary puddling-furnace, is—

Throwing into the furnace pulverized charcoal or other carbon when the iron begins to granulate and closing up the furnace to retain the gases evolved therein, as herein described.

WM. H. BRUNT.  
J. W. McELROY.

Witnesses:

A. B. STOUGHTON,  
HAVER FENDRICH.