United States Patent Office.

JOHN ALLCOCK JONES, OF MIDDLESBOROUGH, ENGLAND.

Letters Patent No. 78,806, *dated June* 9, 1868.

IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

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

TO ALL TO WHOM IT MAY CONCERN:

Be it known that I, JOHN ALLCOCK JONES, of Middlesborough, in the county of York, England, engineer, have invented a new and useful invention of "Improvements in the Manufacture of Iron and Steel;" and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in the manufacture of iron and steel from pig-iron, cast iron, or refined metal.

In carrying out my invention, I proceed as follows: I first puddle the iron or metal in a puddling-furnace. The object of the puddling is, by the aid of clean cinder, or oxides of iron, or oxide of manganese, or other oxidizing-materials, together with the act of puddling, or by the act of puddling alone, so to cleanse the pig-iron or metal from sulphur and phosphorus, and other impurities, as to make it fit for melting into cast steel. After the pig-iron or metal has been treated as above, it is boiled in the usual manner, and the cinder allowed to run from it; it is then balled into balls, and removed from the furnace, and plunged into water, or it may be removed in the shape of convenient lumps, and is placed, either hot or cold, in a receptacle or crucible, which receptacle or crucible is placed in the hearth of an ordinary reverberatory furnace, or in any other kind of furnace or heater, such as a regenerator, or other furnace, which may be suitable for the melting of the said balls or lumps into cast steel.

The balls or lumps, before being placed in the crucible or receptacle, may be broken into fragments, which I prefer, so that the metal may be more easily melted, and so that it will occupy less room, and also with a view to the selection of the pieces, and on account of being thereby able to mix the ingredients necessary for fluxing the metal through the mass.

I also take pig-iron or refined metal, and after it has been melted in a puddling, reverberatory, air, or other furnace, I tap away a portion or nearly all of its cinder, and then, removing the iron, treat it in the manner before described; or I take it in any of the intermediate stages, between the melting and balling processes, and use it as before described; but I prefer the iron boiled, and balled, and broken into fragments.

A cover may be placed on the crucible or receptacle, to exclude atmospheric air, or the cover may be dispensed with, and the scoriæ be made a sufficient protection, or a layer of clean cinder may be placed on the top for the same purpose.

When the crude iron is sufficiently melted into steel, I run the latter into moulds, either by tapping the receptacle or crucible, or by lifting the crucible out of the furnace, and running the metal into the said moulds, after which it may be hammered or rolled as desired.

For making finished castings to any shape, I run the steel into moulds, and the castings may then be annealed or not, as required.

The process above described is particularly adapted to metal or iron which in the first place is impure, though it is applicable to other descriptions of pig or metal.

In place of puddling the metal, I also take pig-iron or metal, and place it direct in the receptacle or crucible before mentioned, and after the metal is melted and partially boiled, I tap off a portion of or all the cinder, and then proceed to melt the residue, as described, but I prefer the puddling, balling, and breaking into fragments, as being better adapted for getting a finer quality of steel.

Having now described and particularly ascertained the nature of my said invention, and the manner in which the same is or may be used or carried into effect, I would observe in conclusion, that what I consider to be novel and original, and therefore claim as the invention to be secured to me by Letters Patent, is—

The preparation of iron and the production of cast steel, by firstly submitting cast or pig-iron to the processes of puddling, boiling, and balling, and then subjecting the balls so obtained, either whole or in fragments, to fusion in separate crucibles or receptacles.

In witness whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ALLCOCK JONES.

Witnesses:

WILLIAM HALL,

WILLIAM STOREY.