

UNITED STATES PATENT OFFICE.

JAMES CARTMELL RIDLEY, OF NEWCASTLE-UPON-TYNE, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF MALLEABLE IRON AND STEEL.

Specification forming part of Letters Patent No. 117,684, dated August 1, 1871.

To all whom it may concern:

Be it known that I, JAMES CARTMELL RIDLEY, of Newcastle-upon-Tyne, England, engineer, have invented certain Improvements in the Manufacture of Malleable Iron and Steel; and that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same.

My invention relates to the manufacture of malleable iron and steel from molten pig or cast-iron, whereby the quality is much improved and the length of time of manufacture shortened. It consists in adding to the metal, when in a molten state, a certain quantity of metallic lead, or red or other oxide of lead, or salts of lead. This may be mixed with the metal in the puddling or other furnace, or in the converter or ladles or other vessels in which such iron or steel is under treatment. The quantity or proportion of the metallic lead, or oxide of lead, or salts of lead to be mixed with a given quantity of metal cannot here be noted, as it will vary according to the nature of the metal and the degree of malleability or quality required.

I proceed to describe the application of my invention to the process of puddling: After the charge of pig or cast-iron in the puddling-furnace is completely melted I throw into the metal a certain quantity of metallic lead, or oxide of lead, or salts of lead, and work the charge in the ordinary manner of puddling, or manipulate in any of the methods known to skillful workmen.

I do not confine myself to add the metallic lead, oxide of lead, or salts of lead at the period above mentioned, as it may be added at other periods of the process.

With regard to proportions, as I before said, I do not confine myself, as they will vary with the

quality of the iron used and result to be obtained; but half a pound to one pound weight of metallic lead to the hundred-weight of low-class pig or cast-iron charged into the puddling-furnace will be found to produce puddled iron of very good quality.

It is advisable in applying my invention to the process of puddling to work the iron at as high a temperature as possible.

In applying my invention to the process known as the Bessemer process, I charge the metallic lead, oxide of lead, or salts of lead into the converter, either before the molten iron or during the process of blowing. The proportion of metallic lead, oxide of lead, or salts of lead, to the charge of pig or cast-iron will vary according to the quality of pig or cast-iron used.

The charge of metallic lead, oxide of lead, or salts of lead thrown into the molten pig or cast-iron, or placed in the puddling-furnace or Bessemer converter, or other vessel or furnaces used in the manufacture of malleable iron or steel, may be enveloped in wood or other materials or in a covering of cast-iron, so as to enable the lead to be more thoroughly incorporated with the charge by its not melting until under the surface of the iron.

Having specified the mode of application of my invention to the processes of puddling iron and to the Bessemer process, I claim—

The use of metallic lead in the manufacture of malleable iron from molten pig or cast-iron, when the same is applied after the charge of molten or pig-iron in the furnace is completely melted, as herein described.

J. CARTMELL RIDLEY.

Witnesses:

TITO BECHERINI,
VICTOR HUGO BENSON.