

# UNITED STATES PATENT OFFICE.

RICHARD A. JACKSON, OF PITTSBURG, ASSIGNOR TO ISAAC CHARLES, OF ALLEGHENY, PENNSYLVANIA, AND JAMES J. JOHNSTON, OF COLUMBIANA, OHIO; SAID JOHNSTON ASSIGNOR TO WILLIAM D. RINEHART, OF ALLEGHENY, PENNSYLVANIA.

## IMPROVEMENT IN PROCESSES FOR CONVERTING CAST-IRON ARTICLES INTO STEEL.

Specification forming part of Letters Patent No. 135,646, dated February 11, 1873.

*To all whom it may concern:*

Be it known that I, RICHARD A. JACKSON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Process for Converting Cast-Iron Articles into Steel by a single operation.

The nature of my invention consists in converting cast-iron articles into steel by embedding them, within a furnace, in a compound consisting of charcoal, tan-bark, oxide of iron, and unburned limestone, in about the proportions hereinafter specified, the said ingredients being pulverized and mixed together so as to form a homogeneous mass, and then subjecting them, while embedded in the said compound, to a process of cementation.

To enable others skilled in the art to use my invention, I will proceed to describe more fully my process for converting cast-iron articles into steel by a single operation.

I take about thirty-three (33) parts of wood-charcoal; about thirty-three (33) parts of tan-bark, (by preference the refuse—that is to say, tan-bark which has been used for tanning the hides of animals in the making of leather;) about eighteen (18) parts of oxide of iron; and about sixteen (16) parts of unburned limestone. These several ingredients are pulverized and then thoroughly mixed together so as to form a homogeneous mass of mixed particles, with which I form a bed about three inches in depth on the bottom of an ordinary converting-furnace. On this bed are laid the cast-iron articles which are to be converted into steel. These articles are then covered with the compound hereinbefore described, forming a layer about two inches in depth, and upon this layer is placed another layer of cast-iron

articles, which are also covered with the compound, and thus layer after layer of the compound and cast-iron articles are placed in the furnace until it is filled. The mouth of the furnace is then sealed up, and the furnace is heated as in the ordinary process of cementation. The heat of the furnace is kept up from one to five days, according to the thickness of the cast-iron articles to be converted into steel, the thick articles requiring more time than thin ones. After the articles in the furnace have been subjected to heat for a sufficient length of time, the furnace is allowed to gradually cool down. The charge is then drawn out and the converted articles separated from the mass with which they were covered. They are then cleaned and dressed, and may be tempered, hammered, drawn out, and welded in the same manner as is practiced in working cast-steel.

I use, by preference, hard white "pig metal," sometimes called "pot metal," for making the castings which are to be converted into steel by the compound and process hereinbefore described.

I do not claim the conversion of cast-iron into steel by a process similar to annealing in a converter, for this I am aware has been done; but

Having thus described my improvement, what I claim as of my invention is—

The union of tan-bark and unburned limestone in compositions of the nature herein described, for the purpose set forth.

R. A. JACKSON.

Witnesses:

WM. W. S. DYRE,  
EDM. F. BROWN.