

# UNITED STATES PATENT OFFICE.

RICHARD A. JACKSON, OF ALLIANCE, OHIO, ASSIGNOR TO HIMSELF, WILLIAM REYNOLDS, HUGH BLEAKLY, HENRY P. MCINTOSH, FRANK M. ORR AND PETER KEPLINGER, OF SAME PLACE.

## IMPROVEMENT IN CONVERTING CAST-IRON AND CAST-IRON ARTICLES INTO STEEL.

Specification forming part of Letters Patent No. **107,781**, dated September 27, 1870.

### *To all whom it may concern:*

Be it known that I, RICHARD A. JACKSON, of Alliance, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Process for Converting Cast-Iron and Cast-Iron Articles subsequently annealed into Steel; and I do hereby declare that the following is a full, clear, and exact description of my aforesaid process.

The nature of my invention consists in converting cast-iron and cast-iron articles subsequently annealed into steel by embedding it or them between layers of pulverized charcoal, common washing-soda, and oyster-shells, prepared and mixed together as hereinafter described, and then subjecting the cast-iron and cast-iron articles while thus embedded to the action of heat in an air-tight furnace.

To enable others skilled in the art to use my process, I will proceed to describe it more fully.

I take about ninety-five (95) parts of wood charcoal, about three (3) parts of calcined or pulverized oyster-shells. I then mix these two ingredients thoroughly together. I then dissolve about two parts of common washing-soda in sufficient water to hold it in solution. I then sprinkle this solution on and over the mixed mass of pulverized charcoal and oyster-shells, after which the whole is thoroughly mixed together until all the particles of the mixed mass become one homogeneous compound. I then clean the surface of the cast-iron or cast-iron articles by passing them through a "rattling or scouring mill," after which the cast-iron or cast-iron articles is or are embedded in a chamber of heating-furnace between layers of the hereinbefore-described homogeneous mass, (the thickness of the layers being in proportion to the thickness of the articles embedded, thin articles requiring only a thin layer and a thick article a thick layer,) after the articles are properly embedded in the chamber of the furnace. It is then closed up and made air-tight. The furnace is then heated up, and kept at a high and uniform temperature for from one to three or more days, according in time with the size and thickness of the article to be converted.

After the articles have remained in the furnace a sufficient length of time to be properly

converted into steel, the furnace is gradually cooled down, after which the converted articles are removed from the furnace, assorted, cleaned, and finished in the desired manner.

When there is a portion of the casting or article which is not to be converted into steel—for example, the eye of a hoe, hatchet, ax, the upper end of a plane-bit, or the handle of shears, &c.—then I take about nine (9) parts of common clay and one (1) part of black lead, and mix these two ingredients thoroughly together, and then add sufficient water to form the whole into a thin paste, which is applied with a brush to the part or parts of the casting not to be converted into steel. This coating of clay and black is applied or put on the casting or article prior to embedding it in the converting material in the furnace.

In the process of converting cast-iron and cast-iron articles subsequently annealed into steel by the hereinbefore-described process, it will be found that the perfection of the process of conversion will depend much on the manner and degree of perfection used in the preparation of the converting material, the degree and uniformity of heat in the furnace, and also in the exclusion of air from the converting-chamber of the furnace.

The intelligent workman will readily, by the foregoing description of my process, and by a little practice and observation, soon be enabled to convert cast-iron and cast-iron articles subsequently annealed into a good quality of steel, which may be drawn, forged, bent, hammered, tempered, and otherwise worked, as now done, with cast-steel made in the ordinary way.

Having thus described the nature, operation, and advantages of my improvement, what I claim as of my invention—

A converting compound consisting of about ninety-five (95) parts wood charcoal, about three (3) parts of calcined or pulverized oyster-shells, and about two parts of soda, said ingredients being prepared and treated substantially as herein described, and for the purpose set forth.

R. A. JACKSON.

Witnesses:

JAMES J. JOHNSTON,  
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