

UNITED STATES PATENT OFFICE.

ALEXANDER H. SIEGFRIED, OF SOUTH BEND, INDIANA, ASSIGNOR TO
HIMSELF AND GEORGE B. GARMAN.

IMPROVEMENT IN REFINING IRON AND STEEL.

Specification forming part of Letters Patent No. 113,532, dated April 11, 1871.

To all whom it may concern:

Be it known that I, ALEXANDER H. SIEGFRIED, of the city of South Bend, in the county of St. Joseph and State of Indiana, have invented a new and Improved Mode of Tempering and Refining Steel by removing therefrom all impurities and bringing the particles thereof in such close contact as to give it a strength, toughness, tenacity, and very extreme hardness far superior to anything known; and I do hereby declare that the following is a full and exact description of my mode and of the materials used by me.

I first heat the steel to a cherry-red in an ordinary clear-smith's fire, then withdraw from the fire, and immediately cover the steel with pure chloride of sodium, (common salt,) and cleanse the fire by throwing upon it a portion of the same salt, and again return the steel to the fire and raise it to a cherry-red heat; then withdraw the steel from the fire and cover it with a compound composed of twelve (12) parts of chloride of sodium, pure, and one (1) part each of pure sulphate of copper, sal-ammoniac, and sal-soda, together with one-half part of pure nitrate of potassa, all by weight. The above proportions may be slightly varied without materially altering or modifying the result; but the use of the above-mentioned chemicals, and in substantially the proportions above given, has been found by me to produce the best results. I then again return

the steel to the fire and heat to a cherry-red, as before, and then withdraw it from the fire and refine by hammering upon the anvil, and again return it to the fire and raise it to the same degree of heat, as before; then withdraw it from the fire, and again cover the steel with said compound above described, and again return the steel to the fire and heat to a cherry-red, as before, and then withdraw it from the fire and plunge it at once into a bath composed of rain-water, one gallon; nitrate of potassa, pure, one-half ounce; alum, one and one-half ounce; sal-soda, one ounce; sal-ammoniac, one-half ounce; and chloride of sodium, six ounces; and in substantially the same proportions when a greater or lesser quantity of this solution is required.

The said chemicals should be of the purest quality possible to obtain, and it is sometimes necessary to purify the chloride of sodium by boiling.

What I claim as my invention, and desire to secure by Letters Patent, is—

The within-described process of tempering and refining steel by the use of the before-mentioned compounds of chemicals, in the manner as set forth.

ALEXANDER H. SIEGFRIED.

Witnesses:

A. S. DUNBAR,
GEO. H. ALWARD.