

# UNITED STATES PATENT OFFICE.

GEORGE B. GARMAN, OF WASHINGTON TOWNSHIP, ELKHART COUNTY, IND.

## IMPROVEMENT IN TEMPERING STEEL.

Specification forming part of Letters Patent No. **111,446**, dated January 31, 1871.

*To all whom it may concern:*

Be it known that I, GEORGE B. GARMAN, of Washington township, in the county of Elkhart, in the State of Indiana, have invented a new and Improved Mode of Tempering Steel in such a manner as to give it extraordinary strength and toughness as well as extreme hardness; and I do hereby declare that the following is a full and exact description of my mode, and of the materials used by me.

First, I heat the steel to a cherry red in an ordinary clean smith's fire, then cover it 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 into the fire, and repeat this process of applying salt to the steel and to the fire until there is no appearance of sulphur upon the steel. This application of such salt to the steel and the fire has the effect of purifying the fire and neutralizing the sulphur therein, and of contracting and refining the steel. Second, I then plunge the steel, at a cherry-red heat, into a solution composed of rain water, one gallon; nitrate of potassa, or saltpeter, one-half ounce; alum, one and one-half ounce; and said chloride of sodium, or common salt,

four ounces, and in the same proportions when more or less of this solution is needed.

The chemicals should be of perfectly pure quality to insure satisfactory results, and I find it necessary in most cases to purify the salt by boiling. Different proportions of these chemicals named from those above given will produce a good temper, but my experiments have convinced me that the proportions named above will give the most satisfactory results in producing a temper combining at once the qualities of extreme hardness, toughness, and strength.

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

The method and mode of tempering steel by cleansing the fire as above described, and the application to the steel of the said chloride of sodium, in the manner hereinbefore mentioned, and the use of the said solution of chemicals in the proportions and in the manner above set forth and described, or in the use of a solution of said chemicals in substantially the same proportions.

GEORGE B. GARMAN.

Witnesses:

H. H. FOWLER,  
A. H. SIEGFRIED.