

# UNITED STATES PATENT OFFICE.

BYRON W. NICHOLS, OF CANTON, OHIO, ASSIGNOR TO HIMSELF, CORNELIUS AULTMAN, GEORGE H. BUCKINS, PERCY S. SOWERS, AND A. CLARK TONNER, OF SAME PLACE.

## IMPROVED COMPOUND FOR HARDENING CAST-IRON.

Specification forming part of Letters Patent No. 90,014, dated May 11, 1869.

*To all whom it may concern:*

Be it known that I, BYRON W. NICHOLS, of Canton, in the county of Stark and State of Ohio, have invented or discovered a new and Improved Process or Composition of Matter to be used in the Process of Hardening Common or Gray Cast-Iron, after the same has been cast into the desired forms for use; and I do hereby declare the following to be a full and exact description thereof.

I take, in proportions, about twenty (20) parts of black oxide manganese; ten (10) parts common salt; ten (10) parts sulphate of iron; and sixty (60) parts (by weight) of common resin. I melt the resin in a suitable vessel, then add the other ingredients slowly, carefully stirring, keeping the vessel over a gentle fire until the mass is thoroughly mixed. When cold, the compound becomes hard, not unlike pitch in appearance.

To harden the iron, whatever the form into which it has previously been cast, I heat it in any convenient way to a red heat, then rub the compound thoroughly over the surface, after which the iron is again slowly heated to redness and plunged into cold water or any of the solutions commonly known and used for hardening purposes.

I modify the above compound, as convenience may require, by softening or liquefying it by an addition of fish-oil, or its equivalent, so that I may be able to plunge the heated castings into it when it is found more convenient to do so.

I have given the proportions of the several ingredients which I deem best suited to ordinary purposes; but the proportions may be varied according to the quality of the iron to be operated upon, or the degree of hardness it is desired to produce.

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

1. The employment of the ingredients herein named, or their chemical equivalents, when compounded and used (either in solid or liquid form) about in the proportions, and substantially in the manner and for the purpose set forth.

2. The employment of manganese and resin in the process of hardening cast-iron.

In testimony whereof witness my hand this 17th day of April, A. D. 1869.

BYRON W. NICHOLS.

Witnesses:

H. H. DOUBLEDAY,  
EDM. F. BROWN.