

UNITED STATES PATENT OFFICE.

CHARLES EDWARD MANBY, OF CARNEGIE, PENNSYLVANIA.

STEEL ALLOY.

SPECIFICATION forming part of Letters Patent No. 771,559, dated October 4, 1904.

Application filed April 23, 1904. Serial No. 204,579. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD MANBY, a subject of the King of Great Britain, residing at Carnegie, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steel Alloys, of which the following is a specification.

This invention has relation to steel alloys, and has for its object the provision of a steel alloy of novel composition.

The alloy which constitutes my improvements is composed of iron, nickel, ferromanganese, and vanadium, these materials being alloyed together in the proportions hereinafter described. I have found by experiment that the materials may be mixed in the following proportions with satisfactory results: iron, forty-nine pounds; nickel, 12.50 pounds; ferromanganese, .75 pound; ferrovanadium, .38 pound.

In alloying the above ingredients I melt the iron and the nickel together in a crucible, and as soon as the iron and nickel have become clear I add the ferromanganese and the vanadium and allow the mixture to react for from ten to fifteen minutes and then pull out the crucible and pour the alloy into molds. I prefer to use the iron for the above composition in the form of muck-bar and basic scrap in equal parts.

The alloy prepared according to the above formula contains the various metals in about the following proportions: iron, 78.10 per cent.; nickel, twenty per cent.; ferromanganese, 1.28 per cent.; ferrovanadium, .62 per cent.

There will of course be carbon in the alloy, which will be derived from three sources, to wit: from the iron, from the ferromanganese, and a small proportion of carbon which will be derived from the crucible in which the ma-

terials are melted. Phosphorus and sulfur will also be present, but in such small quantities as to be negligible.

While I have given the above proportions as those which I have found most suitable, they may be changed according to the following formula: nickel, fifteen to twenty-five per cent.; ferromanganese, .50 to 1.50 per cent.; vanadium, .05 to .50 per cent., and iron of the character above described—that is, a mixture of muck-bar and basic scrap in equal proportions—to make up one hundred parts.

In the mixture last described carbon will be present in the proportion of .50 to 1.50; phosphorus, below .10; sulfur, below .05; silicon, from .20 to .50.

The alloy produced from the materials and in the above-described manner possesses the characteristics of great tensile strength, ductility, and resiliency and is particularly adapted for the manufacture of wire for musical instruments and for any other purpose where a tough, hard, ductile, and resilient material can be used to advantage.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. As a new article of manufacture, steel containing nickel and ferrovanadium.

2. As a new article of manufacture, steel containing ferrovanadium, nickel and ferromanganese.

3. As a new article of manufacture, a steel alloy composed of iron, carbon, nickel, manganese and ferrovanadium.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES EDWARD MANBY.

Witnesses:

H. C. EVERT,
WM. C. HEITZ.