

UNITED STATES PATENT OFFICE.

FREDERICK WILLIAM MARTINO, OF SHEFFIELD, AND FRANCIS RICHARD MARTINO, OF BIRMINGHAM, ENGLAND.

METALLIC ALLOY.

SPECIFICATION forming part of Letters Patent No. 489,314, dated January 3, 1893.

Application filed September 13, 1892. Serial No. 445,800. (No specimens.) Patented in England September 18, 1890, No. 14,768; in France June 26, 1891, No. 214,415; in Belgium June 26, 1891, No. 95,425; in Germany July 3, 1891, No. 62,852, and in Austria-Hungary November 27, 1891, No. 32,235.

To all whom it may concern:

Be it known that we, FREDERICK WILLIAM MARTINO, residing at Sheffield, and FRANCIS RICHARD MARTINO, residing at Birmingham, England, subjects of the Queen of Great Britain, have invented certain new and Improved Metallic Alloys, (for which we have received Letters Patent in England, No. 14,768, dated September 18, 1890; in France, No. 214,415, dated June 26, 1891; in Belgium, No. 95,425, dated June 26, 1891; in Germany, No. 62,852, dated July 3, 1891, and in Austria-Hungary, No. 32,235, dated November 27, 1891;) and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The said invention consists of metallic alloys having the composition hereinafter described which said alloys are specially fitted for the manufacture of boring and cutting tools. Tools made of the said alloys have the hardness of tools made up of hardened and tempered steel and are not liable to lose their hardness in use by the heat of friction as tools made of ordinary steel are. The said alloys are also of use generally for such purposes as hardened and tempered steel is applied to. The alloys constituting the said invention have the same general composition and properties but vary in the quantity or percentage of their constituents to suit them for special purposes.

The following is the composition of an alloy made according to our invention and suitable for the manufacture of boring tools such as drills, milling-cutters, reamers and the like.

In one hundred parts.

Pig iron	17.25
Ferro-manganese	3.00
Chromium	1.50
Metallic tungsten	5.25
Metallic aluminium	1.25
Nickel	0.50
Copper	0.75
Bar iron	70.50
	100.00

The following is the composition of an alloy made according to our invention and suitable for the manufacture of nail-cutting blades, cutting blades for machines, cutting out tools and the like.

In one hundred parts.

Pig iron	17.25
Ferro-manganese	4.50
Chromium	2.00
Metallic tungsten	7.50
Metallic aluminium	2.00
Nickel	0.75
Copper	1.00
Bar iron (Swedish)	65.00
	100.00

In making either of the alloys described in the foregoing formulas we melt the following metals first; namely, pig iron, ferro-manganese, chromium and tungsten and employ for that purpose graphite crucibles and cover the contents of the crucibles with stick charcoal or fragments of charcoal and with thin layers of dried or calcined borax. We prefer to melt the pig iron and tungsten first and to add the other materials to the melted mixture. After having thus made this alloy in graphite crucibles we remelt the same in clay crucibles together with the bar iron adding afterward the nickel, copper and aluminium in the proportions described. We prefer to add the nickel and copper in the form of an alloy instead of adding them separately, that is, we prefer to employ an alloy of nickel and copper having the relative proportions indicated. We cover the alloy in the clay crucibles with stick charcoal or fragments of charcoal with or without flux. The alloys constituting the said invention may be cast in sand molds into cutters and other articles in a manner similar to that in which articles in steel are cast. For tools where in addition to hardness a certain amount of elasticity or springiness is required such as rolls, shear blades, drills and tools which are subject to great concussion such as punches and stamping tools, the alloys should be cast into ingots which, afterward can be forged, rolled or drawn into the required form. The said alloys have the hard-

ness of hardened and tempered steel without the application of the hardening and tempering process and the hardness of tools made of the said alloys is not interfered with by heating them or by the heat developed by friction in the use of the said tools.

Although we have described the proportions of the ingredients in the metallic alloys constituting the said invention which we have found in practice to answer well, yet we wish it to be understood, that we do not limit ourselves to the precise particulars hereinbefore given as the said particulars may be slightly varied without materially affecting the properties of the said alloys. Neither do we limit ourselves to the precise details hereinbefore given in conducting the manufacture of the said alloys as the process or processes may be

somewhat varied without materially affecting the results.

Having now particularly described and ascertained the nature of the said invention and the manner in which the same is to be performed, we declare that we claim as the said invention:—

A composition for the manufacture of tools and other purposes, consisting of pig iron, ferro-manganese chromium, metallic tungsten, metallic aluminium, nickel, copper and bar-iron, substantially as described.

FREDERICK WILLIAM MARTINO.
FRANCIS RICHARD MARTINO.

Witnesses:

GEORGE SHAW,
RICHARD SKERRETT.