

UNITED STATES PATENT OFFICE.

JAMES CHURCHWARD, OF LAKEVILLE, CONNECTICUT.

ALLOY.

1,261,743.

Specification of Letters Patent.

Patented Apr. 2, 1918.

No Drawing.

Application filed December 19, 1917. Serial No. 207,822.

To all whom it may concern:

Be it known that I, JAMES CHURCHWARD, a citizen of the United States, and a resident of Lakeville, in the county of Litchfield and State of Connecticut, have invented an Improvement in Alloys, of which the following is a specification.

This invention relates to steel alloys, that is, alloys in which iron is a preponderating constituent element. One of the objects thereof is to provide an alloy of the above type which shall possess certain desirable physical qualities in a marked degree. Another object is to provide an alloy of the above nature which can be readily manufactured at a moderate cost. Other objects will be in part obvious and in part pointed out hereinafter.

An alloy which embodies an illustrative form of my invention may be made as follows: Steel or iron with a suitable proportion of manganese should be melted together in the furnace or crucible with nickel and molybdenum. The charge should be heated to a high temperature and the metal should be teemed at a temperature of about 2650° to 2750° Fahrenheit.

A suitable proportion of titanium should be finely crushed to either put into a charge in the furnace just before tapping or into the trough while the metal is running from the furnace to the ladle. It may even be added in the ladle. The addition of this titanium is believed to act to a considerable extent as a cleanser, tending to collect oxygen and nitrogen and carry these gases into the slide, but is advantageous in other respects. This action results in a closer grade and firmer adhesion in the cooled metal.

The proportions of the ingredients by which this steel alloy is made should preferably be substantially as follows:

Nickel from about 1% to 5%,
Molybdenum from about .25% to 3%,
Titanium from about .15% to .50%,
Manganese from about .15% to .50%.

The titanium, due to its action above described, may be to a large extent reduced in the resultant metal and may even appear merely as a trace after it has performed the above functions, but the remaining elements are believed not to suffer any great loss, thus

bringing the resultant alloy within the terms of the following claims.

An alloy of this nature is valuable for various uses and it is to be understood that although the above described method of forming the same is preferable, nevertheless the resultant alloy may perhaps be otherwise formed. This steel possesses toughness in a high degree and also great hardness and strength. It is suitable for various types of merchant steel such as automobile frames and gears as well as for use in other relations in which the above properties are of value.

It is also to be understood that in this alloy the chief constituent is iron with the incidental elements usually combined therewith in steel.

It is further to be understood that, although I have described this alloy as made in an open hearth furnace, it may be manufactured in electric furnaces, crucibles and the like.

I claim as my invention:

1. A steel alloy containing nickel, molybdenum, titanium and manganese.

2. A steel alloy containing manganese and titanium, and other constituents in about the following proportions: nickel from about 1% to about 5%, molybdenum from about 1% to about 3%.

3. A steel alloy containing manganese and other constituents in about the following proportions: nickel from about 1% to about 5%, molybdenum from about .25% to about 5%, titanium from a trace to about .50%.

4. A steel alloy containing constituents in about the following proportions: nickel from about 1% to about 5%, molybdenum from about .25% to about 3%, titanium from a trace to about .50%, manganese under .70%.

5. A steel alloy containing constituents in about the following proportions: nickel from about 1% to about 5%, molybdenum from about .25% to about 3%, titanium from about .15% to about .50%, manganese under .70%.

In testimony whereof, I have signed my name to this specification this 15th day of Dec., 1917.

JAMES CHURCHWARD.