UNITED STATES PATENT OFFICE.

JAMES CHURCHWARD, OF LAKEVILLE, CONNECTICUT.

ALLOY.

1,261,742. Specification of Letters Patent. Patented Apr. 2, 1918.

No Drawing. Application filed December 19, 1917. Serial No. 207,821.

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 in which certain desirable physical properties are attained in a high degree. Another object is to provide an alloy of the above nature which may be readily manufactured and the cost of which is not excessive. Other objects will be in part obvious and in part pointed out hereinafter.

An alloy which forms an illustrative embodiment of my invention may be made in the following manner:—Steel or iron with a suitable proportion of manganese is melted in the furnace or crucible together with nickel and molybdenum and the charge heated to a high temperature. The metal should be teemed at a high temperature of not less than 2650° Fahrenheit and a suitable proportion of vanadium preferably finely crushed, should be added to the metal in the trough or even in the ladle. This vanadium has, it is believed, a cleansing action with regard to certain of the objectionable gases and it also attains other advantageous results.

The proportions of the above ingredients should preferably be substantially as follows:—

Nickel from about 1% to 5%,
Molybdenum from about .25% to 3%,
Vanadium from about .15% to about .50%,
Manganese under .70%.

An alloy of this nature is valuable for either war material or commercial use, such as automobile frames, gears and the like. It is to be understood that although the above described method of making the same is preferable, nevertheless the resultant alloy may perhaps be formed by other methods. This alloy steel will be found to present a high degree of toughness and at the same time is strong and hard.

It is also to be understood that in this alloy the chief constituent is iron with the incidental elements usually found therewith to form 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, vanadium and manganese.

2. A steel alloy containing vanadium and other constituents in about the following proportions: Nickel from about 1% to about 5%, molybdenum from about .25% to about 5%, manganese under 1%.

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

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%, vanadium from about .15% to .50%, manganese under .70%.

5. A steel alloy containing vanadium and manganese and other constituents in about the following proportions: Nickel from about 1% to about 5%, molybdenum from about 1.5% to about 5%.

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

JAMES CHURCHWARD.