Patented June 16, 1925. 1,542,440

UNITED STATES PATENT OFFICE.

GEORGE A. DRYSDALE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO GEORGE A. CHRITTON, OF CHICAGO, ILLINOIS.

IRON ALLOY.

No Drawing. Application filed November 16, 1921. Serial No. 515,571.

To all whom it may concern:

Be it known that I, GEORGE A. DRYSDALE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Iron Alloys, of which the following is a specification.

The present invention relates to alloys of iron and will be fully understood from the following description thereof.

The iron alloy of the present invention contains iron, with carbon in excess of 1.5%, sulfur more than 0.30%, the total metalloids being sufficiently low to produce a white iron on casting. The proportion of manganese is materially less than the proportion of sulphur, being, for example, less than 0.10%. An alloy has been prepared according to the present invention containing, with iron, 0.50% silicon, 0.50% sulfur, 0.15% phosphorus, 0.05% manganese and 2.00 to 2.25% total carbon. This metal may be cast in accordance with the usual malleable casting practice, producing white castings which are tough and have a high tensile strength in the order 55,000 lbs. per square inch. Such castings are dense and homogeneous, the castings having a clear ring. In this state the metal is very hard and must be ground.

The cast metal may be annealed, for example, at temperatures of 1500 to 1800° F. and for a shorter time than is customary in malleable practice. The annealed metal loses its hardness sufficiently so that it can be machined and its tensile strength rises to about 85,000 lbs. per square inch. In this state the metal may be surface hardened by heating and quenching.

The metal may be employed for the manufacture of cast gears, and in general may be substituted for steel castings.

In making the alloy an ordinary pig iron, for example, one running about 3.50% C, 1% Si, 0.05% S, 0.02% P and 0.50% Mn may be melted as in malleable practice, and sulfur added thereto sufficient to bring the sulfur in the finished melt to above 0.30%, say to 0.50%. The sulfur is preferably added as ferrous sulfide. The sulfur causes the elimination of a considerable part of the manganese, apparently combining therewith to form sulfides which pass into the slag. Some of the carbon and some of the silicon are oxidized, so that the resulting alloy may contain 0.50% Si, 0.50% S, 0.15% P, 0.05% Mn and 2 to 2.25% C.

It is readily apparent that some or all of the added sulfur may be otherwise supplied, for example, by the use of high sulfur pigs, in the manufacture of which high sulfur ores or fuels may be employed.

I claim:

1. A homogeneous, dense, tough, malleable iron casting containing about 0.5% sulfur and materially less manganese than sulfur, said alloy containing carbon in excess of 1.5% and total metalloids sufficiently low in amount to produce a white iron casting and having a tensile strength above 50,000 lbs. per square inch.

2. A homogeneous, dense, tough, malleable iron casting containing 0.50% sulfur, 0.50% silicon, 0.15% phosphorus, 0.05% manganese and 2.00 to 2.25% carbon, and having a tensile strength above 50,000 lbs. per square inch.

3. A dense, homogeneous, annealed malleable iron casting containing about 0.50% sulfur and materially less manganese than sulfur, having a tensile strength above 80,000 lbs. per square inch.

GEORGE A. DRYSDALE.