

UNITED STATES PATENT OFFICE.

GEORGE THOMSON, OF ELIZABETH, NEW JERSEY.

PROCESS OF MANUFACTURING ALLOYS CONTAINING COPPER AND MANGANESE.

SPECIFICATION forming part of Letters Patent No. 682,891, dated September 17, 1901.

Application filed January 7, 1899. Serial No. 701,485. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGE THOMSON, of Elizabeth, in the State of New Jersey, have invented a certain new and useful Art or Process of Manufacturing or Making an Alloy Containing Copper and Manganese, of which the following is a specification, such as will enable those skilled in related arts to readily operate the invention.

10 The invention has for its object the reduction of cost of producing such an alloy and an improvement in other respects over methods of production heretofore known.

Alloys of copper and manganese have been made and used in the arts and manufactures for many years, but to a limited extent, owing to the amount of iron usually associated with the manganese. By my process I am enabled to produce from materials containing iron an alloy almost free from iron and to recover the iron in a useful form. To accomplish this I proceed as follows: I make an alloy or mixture of copper, manganese, and iron, varying somewhat according to the materials procurable in the market. The copper may be either oxid or metallic copper and is finely divided. It may be mixed with manganese-iron ore, such as carbonate or oxid, and pressed into briquets and then charged with suitable fuel into the blast-furnace with soda or other flux. The mass is melted and reduced in the well-known manner and then is preferably transferred to a reverberatory furnace and covered with a layer of charcoal or other covering to prevent its oxidation, where the combination below described takes place between the copper and manganese. By experience I find that for, say, two thousand (2,000) pounds of copper there will be approximately sixteen hundred (1,600) pounds of manganese, with four hundred (400) pounds of iron, in addition usually to a small percentage of carbon. I allow this alloy or mixture to remain in a molten or liquid condition for about an hour, preventing oxidation from exposure to the air in the manner above stated. During this time about eighty-five per cent. (85%) of the copper combines or alloys with about half its weight of the manganese, and being of greater specific gravity than the iron it settles to the bottom of the furnace almost free of iron. This alloy of

about two parts copper to one of manganese is liquid at about the same temperature as cast-iron, and it can be readily cast into any desired form. The mixture or alloy lying above this copper-manganese alloy contains almost all the iron with the balance of the manganese and copper. To separate and recover the copper from it and to utilize the iron and the manganese for steel, I carefully draw the top mixture off from the copper-manganese alloy and treat it as follows: I prefer to use a Siemens gas-furnace, and while the mixture or manganese-iron-copper alloy is in a fused condition I add scrap-steel to utilize and take up the carbon and part of the manganese. I find that when the ratio of manganese to iron is reduced to about one per cent. (1%) the copper separates, and being of greater specific gravity than the manganese steel it settles to the bottom of the furnace and is easily drawn off at a lower tap-hole than the one used for the steel. The steel may be finished and utilized by any of the usual methods. The copper may be used for the further production of the manganese-copper alloy by my process.

From the foregoing it will be seen that I produce three distinct products by my complete process—a copper-manganese alloy, a manganese steel, and the copper recovered from the iron—thus utilizing all the constituents of the original copper-manganese-iron mixture or alloy with which the process commenced.

I claim as new and desire to secure by Letters Patent the following:

1. The process of making an alloy of copper and manganese and an alloy of iron and manganese from materials containing iron, manganese and copper which consists in forming a molten mass containing copper, iron and manganese, in preserving such mass in a fluid quiescent state until an alloy or mixture of a portion of the copper and of the manganese is left at the bottom and all or most of the iron with the rest of the copper and manganese has risen toward the top, in thereafter drawing off or otherwise separating the upper portions from such alloy or lower portion, and in reducing the proportion of manganese to iron by the addition of steel (or iron), causing the manganese to combine or

alloy therewith and to throw down or separate by gravity the copper, thereby recovering the copper while producing manganese steel, substantially as set forth.

- 5 2. The process of alloying manganese with copper, which consists in adding manganese containing iron to the copper, and forming a molten mass, then separating some of the copper alloyed with manganese by settling from
10 the molten mass, then recovering the remaining copper from the iron and manganese in

the molten state by introducing a substance having a greater affinity than copper for the manganese, thereby causing the separation and settling of the copper, substantially as 15 set forth.

Signed this 30th day of November, 1898, at Elizabeth, New Jersey.

GEORGE THOMSON.

Witnesses:

ALEXANDER DICK,
LILLIE B. MENDELL.