

# United States Patent Office.

ELLIOT SAVAGE, OF WEST MERIDEN, CONNECTICUT.

Letters Patent No. 99,007, dated January 18, 1870.

## IMPROVEMENT IN ALLOYS OF MANGANESE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, ELLIOT SAVAGE, of West Meriden, in the county of New Haven, and State of Connecticut, have invented a new and useful Improvement in Metallic Alloys; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention consists in the combination of metallic manganese, to form alloys with copper, or with copper and other metals.

The object of the invention is, more especially, to obtain an alloy which forms a cheaper substitute for German silver, and one which is superior for the manufacture of such articles as are commonly made of German silver.

In the production of such alloys, I use the oxide of manganese, and it is necessary to separate the oxygen of this oxide from the metallic manganese, and combine the latter with some one or more of the metals with which it is to form an alloy. This must be accomplished while that metal or those metals are in a fused state, and in the presence of carbonaceous substances which will protect the metallic manganese from oxidation until it has become united with the other metal or metals.

In the preparation of the oxide of manganese for this purpose, I finely divide, or pulverize and mix with it, a sufficient quantity of coal-tar, crushed charcoal, or other carbonaceous substances, or reducing-agents, to absorb or take up the oxygen which is liberated in the process of reduction.

When the oxide of manganese has been thus prepared, I place it in a crucible, or other suitable vessel, with the proper quantity of the metal or metals with which it is to form an alloy, cover it with a layer of crushed charcoal, and place a cover upon the mouth of the crucible or vessel, to exclude the air, and then heat it in a suitable furnace until the reduction of the oxide of manganese is accomplished. The furnace employed may be such as is commonly used in the melting of steel or brass. The other metal or metals, having become fused during the process, readily unite with the metallic manganese, and the alloy, thus produced, is poured into suitable moulds, and allowed to cool.

In the production of a given quantity, that is to say, ten (10) pounds of an alloy, composed of copper, manganese, and nickel, intended as a substitute for German silver, I take, by preference, the following proportions or quantities of the metals and substances

used; but I do not wish to confine myself to these exact proportions or quantities:

Eight (8) pounds of copper, four (4) pounds of the peroxide of manganese, one-half ( $\frac{1}{2}$ ) pound of nickel, two (2) pounds of crushed charcoal, one-half ( $\frac{1}{2}$ ) pound of cyanide of potassium, and a sufficient quantity of coal-tar to moisten the oxide of manganese and charcoal, so that they shall adhere to each other.

This mixture, when treated as above described, will produce an alloy remarkable for its hardness, malleability, and ductility, and of a color and lustre closely resembling silver.

It is well known that alloys of copper, nickel, and zinc, known in the arts as "German silver," must be made to contain from fifteen to twenty per cent. of nickel, in order to produce a metal sufficiently white in color.

It is also found that "German silver" usually contains a small quantity of sulphur, which produces, in the polished surface of the metal, small spots or blisters, which are with difficulty removed. The metal, thus impregnated with sulphur, will also crack badly during the process of rolling or hammering into plates or sheets, or when being worked into the various forms for which it is used, thus greatly impairing its usefulness in the arts.

The action of the manganese metal in my invention overcomes the above-named difficulties, the sulphur being entirely removed and carried off by it into the slag, and a much smaller percentage of nickel can also be used, the manganese metal contributing to the production of an alloy, of a white or silvery color, thus greatly reducing the cost of the alloy, while the quality and usefulness of the metal are greatly increased.

Similar results follow when the metallic manganese is used in combination with other metals. I have made an alloy of copper, silver, and manganese, by first obtaining an alloy of copper and manganese, by the process herein described, and afterward melting this alloy, with silver, in a crucible. I propose, also, to obtain alloys of gold, copper, and manganese, in the same way.

What I claim as my invention, and desire to secure by Letters Patent, is—

An alloy, substantially such as is herein described, of manganese with copper, or copper and other metals.

ELLIOT SAVAGE.

Witnesses:

FRED. HAYNES,  
HENRY T. BROWN.