Patented July 7, 1931

1,812,992

UNITED STATES PATENT OFFICE

WALTER C. SMITH, OF MOYLAN, PENNSYLVANIA, ASSIGNOR TO ALLIED PROCESS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

METHOD OF CASTING METALS AND ALLOYS THEREFOR

No Drawing. Application filed October 12, 1927. Serial No. 225,845.

My invention relates to the production of sound ingots, bars, rods, and other castings from copper, copper alloys, such as brasses and bronzes, zinc and zinc alloys, nickel, cupro-nickel alloys, iron, steel, and ferrous alloys, such as rustless irons.

Difficulties in producing such castings often occur because of the presence of sulfur or oxygen or both in the metal. When the metal is cast gases are evolved, and the finished castings frequently contain blow holes or retain substances, such as oxides, which affect the working qualities of the metal.

I have discovered that the addition of a small amount of lithium to the molten metals before casting obviates these difficulties and objections.

The percentage of lithium to be added may vary widely, but it is in any event relatively small.

For example, in casting copper bars for use in making wire, the quantity of lithium added was from 0.00018% to 0.0024% of the weight of the copper. The metal flowed quietly into the mold and the castings were substantially free from blow holes or inclusions.

The upper limit of the useful amount of lithium for casting copper and its alloys appears to be about 0.04%, as around this point some of the lithium alloys with the copper, which usually is not desired.

The lithium may be added as metal, but it is preferably added in the form of an alloy, such as an alloy of copper, iron, or other suitable metal. For example, I have used a copper alloy containing about 6% of lithium. It will be understood that the nature of the alloy will depend upon the nature of the metal treated and the character of the finished product desired.

For example, a lithium-copper alloy containing 6% of lithium has been successfully used.

Alloys of the other metals specified with lithium in correspondingly substantial amount may similarly be used as alloys for addition of the small amounts of lithium needed for the purposes of this invention. It will be understood that as to these addition alloys, my invention is not limited to the specific proportions given.

The addition of the lithium in proper amount improves the physical properties of the metal, such as ductility, malleability, tensile strength and elongation.

Even a small excess of lithium, however, has been found to seriously affect the electrical conductivity of copper and the like.

I have found that oxygen is largely removed by the use of lithium in the manner described. The extent to which sulfur and other elements are removed has not yet been determined.

The addition of lithium is beneficial not only in casting copper, but also in the casting of copper alloys, such as brasses or bronzes, and nickel or cupro-nickel alloys (the foregoing metals being referred to in the claim as "copper") and in casting iron, steel, and ferrous alloys, such as rustless irons, zinc and zinc alloys.

As will be understood from the tenor of the foregoing description the lithium is added to the copper at the customary copper-refining temperature, that is, at temperatures of from about 1100° C. to about 1250° C.

I claim:

In the method of making sound castings of "copper" the step which consists in adding lithium to the molten metal at the customary copper refining temperature of from about 1100° C. to about 1250° C. in amount from 0.00018% to 0.04% of the weight of the metal.

In testimony whereof, I affix my signature.

WALTER C. SMITH.