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METALLIC ALLOY

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2 Claims. (Cl. 75—154)

This invention relates to a metallic alloy and more particularly to an alloy of copper.

Bronze alloys comprising principally copper with admixtures of tin and silicon are well known in the art as being generally characterized by a combination of high tensile strength and resistance to corrosion, being generally particularly resistant to corrosive attack by acid agents.

An object of the present invention is to produce a silicon-tin bronze alloy having high ductility in addition to high tensile strength and resistance to acid corrosion.

One embodiment of the invention contemplates an alloy comprising from 2.50% to 3.25% silicon, 0.50% to 1.25% tin, from 0.10% to 0.60% manganese, and the balance substantially all copper.

Other objects and characteristic features of the invention will appear from the following detailed description of an embodiment thereof.

In one instance there was charged into a clay-graphite crucible, set in a pit furnace and fired with a mixture of coal and coke, the following, 60 lbs. electrolytic grade copper, 12 oz. manganese-copper (24% Mn—76% Cu), and sufficient granulated charcoal to cover the surface of the melt. The temperature was brought to between 2100° F. and 2200° F. and held there long enough to melt the charge, to which was then added 15 lbs. silicon-copper (15% Si—85% Cu). The temperature was maintained at 2100° F.–2200° F. until the added material was melted, and the melt was stirred briefly with an iron rod.

The crucible was then lifted out and there was added 12 oz. tin which was stirred in briefly. Enough charcoal was then skimmed from the surface to give clean pouring and the charge was poured into an iron billet mold.

This material when rolled into rod could be drawn cold without intermediate annealing from three eighths inch rod to No. 12 B & S gauge wire, and in No. 8 B & S gauge wire showed 155,000 lbs. per sq. in. tensile strength, and in No. 12 B & S gauge wire showed 167,700 lbs. per sq. in.

It is found that manganese added to copper-silicon-tin alloys in amounts from 0.01% to 0.60% appears to have the definite effect of increasing to a remarkable extent both the cold workability and the tensile strength of such alloys. An alloy substantially like that above described with manganese omitted showed, in one case, a tensile strength of 145,000 lbs. per sq. in. when drawn into No. 8 B & S gauge wire, and required intermediate annealing to enable further drawing to be done, which annealing would prevent the development of high tensile strength.

The optimum manganese content is found to be about 0.25% manganese in alloys comprising also 2.50–3.25% silicon and 0.50–1.25% tin with the balance substantially all copper.

The particular alloy disclosed above is merely one illustration of the invention which is not limited to the specific proportions nor to the method of preparing the alloy there disclosed. These may be departed from and altered in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. An alloy of copper having high tensile strength and ductility and consisting of copper, with 2.50% to 3.25% silicon, 0.50% to 1.25% tin, and 0.01% to 0.60% manganese.

2. An alloy of copper having high tensile strength and ductility and consisting of copper with about 2.75% silicon, about 1.00% tin, and about 0.25% manganese.

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