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ALLOY

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1 Claim. (Cl. 75—175)

The present invention relates to an alloy of tin having improved characteristics and properties of fatigue limit and resistance, toughness, corrosion resistance, creep resistance and fluidity.

The general object and nature of the invention is to add an alloying metal, specifically tellurium, to tin metal, in order to obtain substantial improvements in the above named characteristics and properties of the tin metal itself. The alloy embodying the principle of our invention is particularly adapted to be employed for the uses, purposes, and environment wherein tin metal such as pure or commercial tin has heretofore been used in the art.

Due to the improvement of such physical properties of tin metal, such as fatigue resistance, toughness, creep and corrosion resistance and fluidity, resulting from our invention, it is particularly applicable to the manufacture of tin, tubing, pipes, collapsible tubes, coils and tin plate.

We have found that the addition of relatively small and minute amounts of tellurium to tin metal, either in its pure or several available commercial forms, substantially increases the fatigue resistance and fatigue limit of the metal, in some cases as high as 300%. The amount of tellurium added to the tin metal may range from .01% to 3%. Addition of such amount of tellurium to tin metal also increases the resistance to corrosion, creep resistance and toughness. The improvement in these latter properties and characteristics is particularly desirable where the tin metal is used for tin pipe, tubing and tin plate.

Pure tin of course theoretically is composed of 100% pure tin metal. But the tin metal available on the market in commercial form contains small amounts of such inclusions and impurities such as lead, arsenic, antimony, copper, bismuth and iron. The amount of pure tin present in such commercially available form will vary from 95 to slightly less than 100%, depending upon its source and degree of refinement. The addition or alloying of up to 3% of tellurium to tin metal also results in marked increase in the fluidity of the metal during melting and pouring. Such improvement in fluidity is of particular advantage in the manufacture of tin plate and in the extrusion of tin pipes and tubing. The increased fluidity of the alloy embodying the principle of our invention produces a better coating of tin plate on a base metal due to the fact that better coverage and distribution of the tin alloy are obtained. The increased fluidity of our tin metal alloy permits the more rapid escape of entrapped and occluded gases and flotation particles, during the molten state, and therefore results in decreasing the porosity and occlusion in the metal in its solidified state.

Selenium may be substituted for tellurium as an equivalent element in the alloy embodying the principle of our invention. The resultant properties and characteristics of the tin alloy in which selenium has been substituted for tellurium will be substantially the same as those hereinabove described.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the materials employed, provided the ingredients stated by any of the following claims or the equivalent of such stated ingredients be employed.

We therefore particularly point out and distinctly claim as our invention:—

An alloy containing from .01% to 3% of tellurium and the remainder tin, said alloy being characterized by increased resistance to corrosion, increased creep resistance, and increased toughness as compared to the corresponding properties of tin alone.

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