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LEAD BASE COATING ALLOY

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This invention relates to lead alloys suitable for coating sheet metal or other articles of a different metal base.

The principle of protecting ferrous metal bases from corrosion by the application of another metal or alloy thereto is well recognized and underlies the usual galvanizing and tinning practices. However, the life of galvanized sheeting is materially shortened by sulphur compounds and the like commonly occurring in industrial atmospheres and the relatively high percentage of tin (commonly 15% to 25%) in the usualterne-plate constitutes a serious economic threat to its extended use.

Various proposals have been made to employ lead alloys of much lower tin content than those ordinarily found interne-plate but so far as is known none has proved entirely satisfactory. Thus, a lead-base alloy, containing only a few per cent of tin with an approximately equal amount of copper and lesser amounts of antimony and zinc, has been suggested. While such alloy is considerably cheaper than the high tin alloy, it is disadvantageous from the standpoints of composition stability, fluidity temperature, etc.

The present invention provides an alloy composition admirably suited for application to ferrous-base sheets or other articles as a corrosion-resistant coating; the resulting products being fully comparable toterne-plate for use in deep stamping operations, roofing, etc., but considerably cheaper thanterne-plate from the standpoint of manufacturing cost.

Briefly, the invention contemplates the production of a lead-base alloy containing from 1-10% tin, 0.2-5% zinc and 0.2-3% antimony, the tin and zinc totalling not less than 3%, and the application of such composition to a ferrous base such as, e. g., sheet steel. Smooth, continuous coatings are readily applied using a typical composition of 5% tin, 2% zinc, 1% antimony, balance lead and coating compositions containing only 2% tin have been successfully used. In general the tin content of the particular composition used should be about twice the zinc content to insure a homogeneous liquid just above the melting point (approximately 700° F.) of the alloy but the tin:zinc ratio can be much lower if a higher operating temperature (say 800° F.) is employed.

The following table offers a comparison, respecting hardness, between certain compositions falling within the limits hereinbefore specified,

on the one hand, and commercial lead and a 15% Sn alloy of lead on the other:

Alloy	Brinell hardness
Commercial lead	4.0
5% Sn, 1% Zn, 1% Sb, balance Pb	10.1
5% Sn, 2% Zn, 1% Sb, balance Pb	11.4
15% Sn, balance Pb	10.7

Various procedures may, of course, be employed in applying the alloy coating to the sheets or other articles. Thus, the base may be immersed into a bath of the desired coating composition through a suitable flux and then withdrawn by suitable rolls, the thickness and character of the coating being controlled by the bath temperature, rate of travel of the base being coated, the position of the driving rolls with respect to the surface of the bath, and various other operating conditions and factors known to those skilled in the art.

Further, the application of the alloy may be varied to produce a variety of coatings. For example, bright, spangled coatings similar to those of zinc on steel have been produced by rapidly cooling steel sheets with an air stream just as they emerge from a typical bath containing one per cent zinc. For extremely smooth coatings, it has been found beneficial to employ alloys whose zinc content is in the upper part of the range. Obviously, various other modifications and changes in operation may be indulged in by those skilled in the art without departing from the scope of the invention.

What is claimed is:

1. An alloy consisting of 0.2-3% antimony, 0.2-5% zinc, 2-7% tin, and balance lead.

2. An alloy for coating a ferrous metal base consisting of the following approximate composition: tin 5%, zinc 2%, antimony 1%, balance lead.

3. An article of manufacture comprising a ferrous base and a coating bonded thereto, said coating consisting of 0.2-3% antimony, 0.2-5% zinc, 1-10% tin, and balance lead, the zinc and tin totalling not less than 3%.

4. An article of manufacture comprising a ferrous base of sheet metal and a coating bonded thereto, said coating consisting of 2-7% tin, 0.2-5% zinc, 0.2-3% antimony, and balance lead.

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