

UNITED STATES PATENT OFFICE

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LEAD ALLOY

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This invention has for its object to obviate the defects and disadvantages attendant upon the use of pure lead for cable sheathing, pipe, sheeting and the like, chief of which is that the metal is liable to fail by inter-crystalline chemical attack and also by a peculiar type of inter-crystalline disintegration due to the action of alternating stresses.

It is found that if a certain proportion of cadmium be added to lead improved mechanical properties are obtained including a marked increase in resistance to failure under fatigue or alternating stresses while the resistance of certain types of lead to sulphuric acid corrosion is also considerably improved.

Antimony may also be employed to improve the mechanical properties of lead but approximately twice as much antimony as cadmium is needed in order to produce the same effect, the improvement achieved by the use of antimony extending also to the resistance of certain types of corrosion.

Tin improves the mechanical and corrosion-resisting properties of lead but considerably more tin is required in order to produce the same effect than either cadmium or antimony. Tin, however, increases the resistance of lead to atmospheric and other types of corrosion, particularly acetic acid corrosion.

The present invention is based upon the observation that the above defects attendant upon the use of pure lead may be eliminated by the addition of other metals to the lead, the resultant alloy being also of greatly increased strength as compared with lead itself.

The invention consists in an alloy containing lead and cadmium, and one or both of the metals tin and antimony in the proportions up to 5 per cent. and 3 per cent. respectively.

The invention further consists in a lead alloy containing cadmium up to 2 per cent., antimony up to 3 per cent. and tin up to 5 per cent.

The invention still further consists in a lead alloy containing two or more of the

metals cadmium, antimony and tin in which the mechanical properties are improved by heating to a temperature exceeding 150° C. followed by quenching in water, or any other form of rapid cooling.

The invention also consists in other details hereinafter described or illustrated.

In carrying our invention into effect we produce an alloy of lead and cadmium containing other metals as hereinbefore stated and we have found that the advantages of the various metals can be combined so that the lead cadmium alloy used in conjunction with tin gives an alloy which possesses the improved mechanical properties imparted by the cadmium together with the characteristic resistance to corrosion imparted by the tin, while similarly antimony alloys show improved mechanical and corrosion-resisting properties as compared with alloys in which antimony is not employed. A quaternary alloy may be similarly produced to combine the properties of the various constituent metals.

The ternary and quaternary alloys produced in accordance with the invention are susceptible to heat treatment and if heated to a temperature exceeding 150° C. and then quenched in water or rapidly cooled in any other way the hardness and tensile strength increase with time up to a maximum value depending upon the proportions of alloying metals used. Further, such ternary and quaternary alloys show a marked freedom from oxidation during melting while greater uniformity in composition is possible than with the binary alloys.

We have found that when producing lead alloys for use as cable sheathing, pipe and sheeting very satisfactory results may be obtained by using cadmium up to 2 per cent., antimony up to 3 per cent. and tin up to 5 per cent.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. A cable sheathing formed from a lead alloy containing cadmium and tin in proportions not exceeding 2 per cent and 5 per

cent respectively and not less than 0.10 per cent of cadmium and 0.25 per cent of tin.

2. A lead alloy containing 0.10 per cent to 2 per cent cadmium and 0.25 per cent to 5 per cent metal from the group consisting of tin and antimony.

3. A cable sheathing formed from a lead alloy containing from 0.10 per cent to 2 per cent cadmium and 0.25 per cent to 5 per cent metal from the group consisting of tin and antimony.

In testimony whereof we have signed our names to this specification.

SYDNEY BECKINSALE.

HERBERT WATERHOUSE.

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