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UNITED STATES PATENT OFFICE

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LEAD ALLOY, PARTICULARLY FOR CABLE SHEATHINGS

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Sheathings for cables, especially for communication purposes, are generally made from lead, either alone or in alloy with other substances which serve to give the lead a certain hardness and make the sheathing sufficiently resistant against chemical corrosion and against so-called intra-crystalline corrosion caused by vibrations. As hardening substance, tin in a quantity of about 1–3% has been used since long time, and later on also antimony in a quantity of about 1% was used. It has also been proposed to employ magnesium in small quantities. The advantage of using antimony or magnesium lies primarily in the fact that the alloys thus formed will be substantially cheaper than lead-tin alloys; further an alloy of lead and antimony is for instance stated to be more resistant against intra-crystalline corrosion than the lead-tin alloy.

My investigations have however proved that the production of a suitable sheathing from lead-antimony alloy meets with certain difficulties, so that such a sheathing often becomes uneven and brittle so as to burst in bending. A close investigation of the fracture shows sometimes a finely crystalline aspect and a stratified structure of the material. These circumstances are supposed to be due partly to an inappropriate distribution of the antimony in the lead, partly to an inappropriate mechanical or thermical treatment of the alloy in course of production, and partly also to impurities present.

I have further found that an alloy which is very suitable for the aforesaid purpose is obtained by adding to the lead-antimony alloy a small quantity of bismuth which acts to increase the solubility of antimony in lead. I have found that such an alloy possesses a greater uniformity, stability, and tenacity than the usual lead-antimony alloy. The quantity of bismuth added should however be very small, generally not more than two tenths of a percent, although under certain circumstances appropriate sheathings can be made from alloys holding a higher percentage of bismuth (up to about one-half percent).

The addition of bismuth can be made in the sheathing press together with other substances, but it is preferable to produce in advance an alloy of lead, antimony and bismuth in suitable proportions.

An addition of bismuth is also advantageous for other reasons, because the sheathing will thereby be still more resistant against chemical and intra-crystalline corrosion.

The alloy described is in the first line intended for cable sheathings but may also be used in other cases where corresponding mechanical properties are required.

I claim as my invention:—

1. An alloy consisting of about 99% of lead, 1% of antimony and a small quantity of bismuth.

2. An alloy consisting of between 98 and 99% of lead, about 1% of antimony and one half percent or less of bismuth.

In testimony whereof I have signed my name to this specification.

MARTIN THIELERS.