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LEAD OF HIGH RESISTANCE AGAINST THE ACTION OF HOT SULPHURIC ACID

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1 Claim. (Cl. 75—1)

Our present invention relates to new alloys of lead. One of its objects is to provide a lead of high resistance against the action of hot sulphuric acid and more particularly it relates to a lead containing nickel and selenium in a distinct proportion. It is a continuation-in-part of our co-pending application Serial No. 361,248, filed May 7, 1929.

The whole crux of our invention can well be exemplified by brief discussion of the prior art and by the table following hereafter and showing the superiority of our new alloys over others known in the art.

It is well known that the resistance of lead against the action of hot sulphuric acid may be improved by addition of copper or silver, a fact which may be explained by reference to the higher degree of fineness of the crystalline structure and to the prevention of recrystallization by formation of an eutectic mixture. As found by many researches, for this purpose in case of copper the quantity of added metal amounts to 0.06 to 0.1 per cent; in the case of silver, essentially greater quantities are required. When adding these commensurably great quantities of additional metals to the lead, the hardness and therewith the brittleness is increased which is undesired in the case of soft lead.

Now we have found that instead of copper preferably nickel and selenium may be used.

In contradistinction to the lead alloys mentioned above and containing copper or silver, our lead alloys do not shown an increased brittleness, the melting point of our mixtures lying only slightly below that of pure lead. The higher resistance against the action of sulphuric acid of different commercial lead brands improved according to our invention, may well be seen from the following table showing the action of boiling concentrated sulphuric acid on balls of lead of about 20 grams weight and of 7 square centimeters surface. The tests were carried out in such a manner that the sulphuric acid was kept in a continuous circulation for 30 minutes. Under these conditions unimproved brands of lead were rapidly attached and completely dissolved.

The following table shows the resistance of lead alloyed according to our invention in comparison to lead alloys containing only nickel. The decrease in weight of the test balls given by percentage is the average of a plurality of tests indicated in the last column.

Table

Alloy containing	Percentage decrease in weight after 30 minutes	Number of tests
	Percent	
Commercial lead without addition	100.0	3
Commercial lead+0.03% Ni	55.0	5
Commercial lead+0.03% Ni	55.0	3
Commercial lead+0.01% Ni+0.02% Se	14.0	2
Commercial lead+0.02% Ni+0.1% Se	7.5	4

The quantity of nickel and selenium, which is necessary to obtain an unobjectionable result is dependent from the variety and quantity of the impurities contained in the lead serving as starting material. It does not surpass 0.05 per cent of nickel and 0.1 per cent of selenium. The selection of the improving material is influenced by the temperature, by the concentration and in some cases by the impurities contained in the sulphuric acid which is allowed to come in contact with our new lead alloys. The optimal result may be found in each case by a simple experiment.

The alloying process is carried out in the known manner. Thus, for instance, previously, a lead-nickel alloy may be made containing 2 to 3 per cent of nickel, from which alloy the calculated quantity is added to the fused lead to be improved.

What we claim is:—

Soft lead alloy of high resistance against the action of hot concentrated sulphuric acid containing nickel in an amount of about 0.01 to about 0.05 per cent and selenium in an amount from 0.01 to 0.1 per cent, the balance consisting of commercial soft lead.

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