GRID FOR ACCUMULATOR PLATES

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1 Claim. (Cl. 136--65)

The present invention relates to a lead-accumulator and more particularly to an improved grid for accumulator plates, said grid being composed of a lead-mercury alloy.

In the accumulator industry attempts have been made repeatedly to eliminate the undesirable side-effects resulting from the use of antimony for hardening the lead composing the grids of accumulators, by using alloy constituents other than antimony. Mercury has been suggested as such alloy constituent. For instance, a lead-mercury alloy with an approximate ratio of 97% lead and 3% mercury is known. Allegedly such an alloy permits the production of a satisfactory grid which is said to be of sufficient hardness to expand less than pure lead.

Experiments which have been carried out regarding the hardness and the behavior of such lead-mercury grids in a lead accumulator have shown, however, that the hardness of a grid with a mercury content of 3% does not meet the requirements of the accumulator industry. The resistance to corrosion during the operation of accumulators provided with grids of such a mercury content has also been found to be unsatisfactory. Determination of the hardness of such grids has shown that a Brinell hardness of only 6.5 kg./sq. mm. is achieved.

It is one object of the present invention to provide grids for accumulator plates, which grids are composed of a lead-mercury alloy that does not have the disadvantages of the known lead-mercury alloys, the hardness of which is sufficient for use in the manufacture of accumulator grids, and the resistance to corrosion of which not only surpasses that of the known lead-mercury grids but also that of the known lead-antimony grids.

Other objects of the present invention and advantageous features thereof will become apparent as the description proceeds.

In principle, the present invention consists in providing accumulator grids composed of a lead-mercury alloy having a mercury content between about 6% and about 3%. It was found that the Brinell hardness of a lead-mercury alloy with a mercury content of 6% is 8.3 kg./sq. mm., i.e. about 25% higher than that of the known lead-mercury alloy with 3% mercury. Up to a mercury content of 8% only a slight increase of the Brinell hardness to 8.5 kg./sq. mm. is observed.

A further increase of the mercury content is highly uneconomical since it does not impart to the alloy a proportionate increase in hardness. Furthermore, an alloy with a mercury content above about 8% exhibits increasing brittleness. A material of such a high mercury content can no longer be processed satisfactorily to accumulator grids.

Comparative corrosion tests carried out with accumulators having grids made of a lead-mercury alloy with about 3% mercury, of a lead-mercury alloy according to the present invention with 6% mercury, and of a lead-antimony alloy as it is conventionally used in grid plates for lead accumulators, show that grids with a mercury content of 3% have only 87% of the durability of the usual lead-antimony alloy, whereas the grids produced according to the present invention with a lead-mercury alloy with 6% mercury have a durability which exceeds that of the usual lead-antimony alloy by 53%.

The advantages achieved by the present invention and in particular the considerably increased durability of the grids are achieved only with a mercury content between about 6% and about 8%.

It has been found that ordinarily it is sufficient to make only the positive plates of lead accumulators of the lead-mercury alloy according to the present invention. In special cases in which particular importance is placed on a slight self-discharge, the negative plates may also be made of the same lead-mercury alloy as the positive plates.

The following examples serve to illustrate the present invention without, however, limiting the same thereto.

Example 1

An alloy is prepared by melting lead and admixing thereto 6% of mercury. The resulting lead-mercury alloy of a Brinell hardness of 8.3 kg./sq. mm. is cast to a grid plate of a thickness of 1.8 mm. The active paste is then pasted in a manner known to the art into the grid, the pasted plates are dried and formed.

Example 2

An alloy is prepared by melting lead and admixing thereto 8% of mercury. The resulting lead-mercury alloy of a Brinell hardness of 8.5 kg./sq. mm. is cast to a grid plate of a thickness of 2.3 mm. and is then pasted and formed as described in Example 1.

What is claimed is:

A pasted electrode plate for storage batteries comprising a grid serving as support for the active material and being composed of a lead-mercury alloy containing between about 6% and about 8% of mercury, the remainder being lead, and active material carried by said grid.

References Cited in the file of this patent

UNITED STATES PATENTS

645,261 Irving --------------- Mar. 13, 1900

FOREIGN PATENTS

483,562 Great Britain -------- Apr. 19, 1938