SECONDARY OR STORAGE BATTERY

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INVENTOR

Witness:

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By

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Attorney.
To all whom it may concern:

Be it known that I, Edward W. Smith, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Secondary or Storage Batteries, of which the following is a specification.

This invention applies especially to that form of storage battery plate which consists of a number of perforated tubes containing the active material and metallic cores which act as conductors, and of a frame to unite the various tubes into a single unit. However the invention is confined to such plates in which the tubes consist of hard rubber, and in which the necessary porosity is secured by a large number of saw slots placed very close together.

It is found in practice that, though far more durable than other types, such a slotted rubber plate is subject to wear chiefly in the slow oxidation of the rubber tube from within, so that in time it becomes thinner and thinner, and eventually fails entirely.

The present invention has for its object the virtual elimination of that source of failure, and this is accomplished by means of a lining of asbestos in the form of paper within the slotted rubber tube. The thin asbestos in the form of paper may conveniently be formed into a tube and slipped into the slotted rubber tube, or may be deposited from a water emulsion in a thin layer, directly upon the inner surface of the slotted tube.

The invention may be more readily understood by reference to the accompanying drawings in which—

Figures 1, 2 and 3 represent respectively side views and an end view of a tube forming one unit of a battery plate, and

Figs. 4 and 5 represent respectively side and end views of a modified tube unit.

Referring more especially to Figs. 1 to 3, 6 is a central metallic conducting and supporting core, by means of which the whole unit is united to the rest of the plate, in a manner well known to those versed in the art, 5 is the active material, consisting of lead peroxide in the usual type of lead battery, while 2 is the encircling slotted rubber tube, which acts as a retainer for the active material which in itself is possessed of but little cohesion. The tube, as illustrated, consists of solid, uncut, longitudinal strips or ribs 3 and semi-circular rings 2 formed by making a number of saw cuts through the wall of the original solid walled tube. Between the active material 5 and the rings of the tube 2, is the thin layer or tube of asbestos in the form of paper 1, finely porous throughout, but without the saw cuts, and therefore constituting a continuous tube the whole length of the unit.

In Figs. 1 and 2 the asbestos protecting layer in the form of paper is shown turned back slightly over the end of the tube at 7 for the purpose of insuring that none of the rubber tube at its end shall be left unprotected.

In Figs. 4 and 5 the unit differs in that the longitudinal strips are entirely lacking, and the retaining tube consists merely of a number of thin rings 2, placed close together, and surrounding the protecting layer 1 of asbestos in the form of paper and the active material 5.

It will be remarked that the selection of asbestos in the form of paper and rubber in the form of slotted tubes prevents contact between the active material and the small retaining portions of the tube between the slots, and thus protects those small portions of the tube from the chemical action of the active material, which tends to disintegrate them from the interior of the tube while at the same time the asbestos in paper form bridges across the minute openings of the saw slots thus very perfectly retaining the active material in place.

It will be readily understood that the invention involves in the combination not only the selection of particular materials, asbestos and rubber, from among other materials heretofore used or suggested but also the selection of the form of paper and the form of a slotted tube in which to embody those materials and it will be also understood that by the described selection of form and ma-
terial a long existing defect arising from the chemical action of the active material on the bars between the slots is corrected.

I claim:

5 In a storage battery plate of tubular type the combination of rubber in the form of a slotted tube and of asbestos in the form of paper arranged inside of and lining said tube with active material and a metallic central supporting core also arranged in the tube, whereby rubber in the form stated is protected by the asbestos in the form set forth from the chemical action of the active material.

EWARD W. SMITH.