

# UNITED STATES PATENT OFFICE.

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## SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 302,783, dated July 29, 1884.

Application filed August 16, 1882. (No specimens.) Patented in England July 8, 1882, No. 3,240; in France July 17, 1882, No. 150,146;  
in Germany July 19, 1882, No. 25,155, and in Canada September 7, 1882, No. 15,414.

*To all whom it may concern:*

Be it known that we, THOMAS SEXTON SARNEY, of Camberwell, in the county of Surrey, in the kingdom of Great Britain, and JOHN MONTAGUE ALPROVIDGE, of Herne Hill, in said county and Kingdom, have invented certain new and useful Improvements in Secondary Batteries; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture and formation of plates which are suitable for use in electric accumulators or secondary batteries.

The invention consists in making said plates of thin laminated metallic sheets, in or with which are intimately commingled amalgamated or impregnated lead or other suitable metallic oxides, peroxides, or sulphates, or other suitable substances, all as hereinafter described, the object being to expose the largest possible amount of surface (with a given weight of material) to the action of the bath.

Various methods may be employed for carrying this invention into effect—as, for example, by rolling down to a thin sheet a thick metal plate, which has been previously coated with a paste or mixture of lead or other metallic oxides, peroxides, or sulphates, after which the plate is again coated with the paste or mixture, and is doubled back on itself, passed through the rolls, again coated, doubled, and rolled until the size, quantity, and degree of impregnation required have been obtained.

Instead of rolling the plates, they may be made by puddling the molten metal with the

metallic oxides, peroxides, sulphates, or other suitable material—such as carbon, coke, or manganese—the mixture being subsequently cast or molded, coated, rolled, and laminated, as above described.

Instead of puddling, the ingredients may be blown into or upon the molten metal in a manner analogous to that which has been proposed for the treatment of steel in the Bessemer or other converter or furnace. Whatever the method employed, it is intended that the metal should be coated and laminated by rolling or by other suitable methods until a large amount of surface is exposed, with but comparatively a small weight of combined and thoroughly impregnated or inclosed material.

In order to keep the thin sheets from absolutely touching, paper, felt, or other suitable porous material is interposed.

The laminated plates or masses described may be formed into electric accumulators or secondary batteries, either alone or in combination with plain plates, such as now employed.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

The method of manufacturing and preparing plates for electric accumulators or secondary batteries, hereinbefore described, consisting in alternately coating and reducing said plates by rolling until the desired thickness is obtained, substantially as set forth.

THOS. S. SARNEY.

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