

UNITED STATES PATENT OFFICE.

WILHELM ALEXANDER BOESE, OF BERLIN, GERMANY.

PROCESS OF MANUFACTURING ACTIVE MATERIAL FOR SECONDARY ELECTRIC BATTERIES.

SPECIFICATION forming part of Letters Patent No. 517,427, dated April 3, 1894.

Application filed June 27, 1893. Serial No. 478,968. (No specimens.) Patented in England July 6, 1892, No. 11,532; in France October 11, 1892, No. 211,658, and in Belgium October 11, 1892, No. 101,693.

To all whom it may concern:

Be it known that I, WILHELM ALEXANDER BOESE, a subject of the Emperor of Germany, and a resident of Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in the Process for Manufacturing Active Mass for Secondary Electric Batteries, (for which Letters Patent have been obtained in Belgium, No. 101,693, dated October 11, 1892; in Great Britain, No. 11,532, dated July 6, 1892, and in France, No. 211,658, dated October 11, 1892,) of which the following is a full, clear, and exact specification.

The present invention relates to a process for manufacturing active mass for secondary electric batteries. Its main feature consists in replacing the numerous materials hitherto employed for aggregating the oxides of lead (red lead, &c.) by the sulphuric acids obtained by the reaction of sulphuric acid upon anthracene and analogous compounds. Such compounds are for instance: monosulphonic acid of anthracene, disulphonic acid of anthracene, monosulphonic acid of anthrachinone, disulphonic acid of anthrachinone. The sulphonic acids mentioned are especially fit for the purpose set forth, because they combine with metallic oxides and form salts, which on the one hand act as a strong aggregating agent and give the battery plate a great hardness, while, on the other hand, they are by far more easily decomposed by the electric current than the lead sulphate which is generally obtained in forming battery plates.

For carrying out my process, I proceed in the following manner: Raw materials containing anthracene or its equivalent compounds before specified fit for the production of sulphonic acid are treated with suitable dissolving agents according to the processes commonly known in chemistry in order to obtain a solution of anthracene. This solution is directly mixed with the metallic oxide (red lead) and sulphuric acid. I prefer to use as raw material the residues obtained in the distillation of tar. The raw dissolved anthracene is heated with sulphuric acid and the sulphonic acid of anthracene obtained in this

way is mixed with metallic oxides to form a paste and is then put into molds and heated again. The formation of the sulphonic acid is hereby completed and by the combination of it with the lead oxide and in consequence of the binding properties of the salt obtained a great solidity is given to the battery plate.

The extraction of the anthracene from the residues of the distillation of coal may be effected for instance by treating such residues with naphtha or benzol. I prefer, however, to employ for this purpose alcohol which dissolves only anthracene, but leaves in the residue a number of other compounds unfit for the formation of battery plates. In mixing this alcoholic solution with the metallic oxides employed for the formation of the battery plates and with the sulphuric acid I have observed that the heat which is developed by the reaction of the sulphuric acid upon the alcohol is sufficient by itself to form the salts of the sulphonic acid. A separate heating-source may therefore be dispensed with, although for facilitating the reaction I may also employ such separate source of heat. The raw electrodes of a combination of red lead and sulphonic acid of anthracene are then heated in the usual manner by the electric current in employing sulphuric acid of suitable concentration as electrolyte. In this process the combination of red lead and sulphonic acid of anthracene in the positive electrode is changed into lead peroxide and that of the negative electrode into metallic lead. The sulphonic acid of anthracene is more or less decomposed in this process forming sulphuric acid which is dissolved in the electrolyte, whereas the anthracene is converted into other combinations by the active oxygen and hydrogen. The so-formed electrodes therefore essentially consist of metallic lead and lead peroxide and the anthracene compounds are totally removed from them. Nevertheless, they show as great a solidity as the raw electrodes which consist of the combination of red lead with sulphonic acid of anthracene, because the solidity of this sulphonic acid compound is transferred to the positive and negative electrodes obtained from them.

Having now particularly described the nature of my said invention and the manner in which the same is to be performed, I declare that what I claim and desire to secure by Letters Patent of the United States, is—

1. The process for manufacturing active material for secondary batteries, which consists in mixing a metallic oxide with a sulphonic acid of anthracene or its analogues and simultaneously removing electrolytically-soluble compounds.

2. The process for manufacturing active material for secondary batteries, which consists in treating the residues of coal-tar with a suitable solvent, and mixing the resulting

solution with a metallic oxide and sulphuric acid.

3. The process for manufacturing active material for secondary batteries, which consists in treating the residues of the distillation of coal-tar with alcohol, and mixing the resulting solution with a metallic oxide and sulphuric acid.

In witness whereof I hereunto set my hand in presence of two witnesses.

WILHELM ALEXANDER BOESE.

Witnesses:

EMIL KOLLINER,
CHAPMAN COLEMAN.