Cl. 204

Published May 18, 1943

Serial No. 321,349

ALIEN PROPERTY CUSTODIAN

POROUS PARTITIONS FOR STORAGE BATTERIES AND ELECTRIC CELLS

Gustave Lequerler, Paris, France; vested in the Alien Property Custodian

No Drawing. Application filed February 28, 1940

This invention relates to porous partitions for use in electric storage batteries to separate the electrodes of the same element. These partitions may vary greatly in shape according to circumstances, consisting, for example, of flat, or ribbed or undulated plates, or of containers or tubes of the Ironclad type of electrodes, containing the active material, etc.

These porous partitions are also used in cells, wherein they often have the shape of containers for an electrolyte or an agglomerate depolarizer.

It has already been proposed to make these partitions of clay, crockery or asbestos porcelain, but none of these has given complete satisfaction, either on account of insufficient porosity or because of obstruction of the pores during operation of the element or cell or for lack of sufficient resistance to the electrolyte.

The present invention overcomes these objections by providing porous partitions of any desired shape for use in electric cells and storage batteries, at least a part of which partitions is made of a novel porous material made up of grains of a suitable ceramic substance, heaped up and baked until said grains adhere to one another without deformation thereof.

Said novel material is particularly advantageous for making the partitions of the present invention owing to the fact that the grains may be made of a material that will not be attacked by the electrolyte and of a size that will provide any predetermined degree of porosity desired. The degree of porosity may thus be predeterminately varied in different parts of the partition, a greater porosity being provided, for example, at or adjacent the surface of the partition than at the central portion thereof, by using grains of the required difference in size at the surface portion and at the central portion of said partition, respectively.

The grains used in accordance with my invention may be made entirely of any suitable self-enamelling ceramic paste or simply covered with such a paste, the adherence of said grains to one another being effected in either case by baking at the self-enamelling temperature.

My novel partition may be made in different ways. One convenient illustrative way is to pile up the grains in their raw state in a container of the shape it is desired to give to said partition and the walls of which may or may not be porous or perforated, said container being itself preferably made of a self-enamelling ceramic paste or made of ceramic material coated with such a paste. On baking a porous ceramic partition will result which is welded to the walls of said container.

Another illustrative way of making partitions embodying my invention omits the use of a container, the mass of ceramic grains being moulded to the final shape desired, any suitable combustible plastic material being mixed therewith which is eliminated in the baking of said molded ceramic mass, thus leaving a porous ceramic partition in the final shape desired.

When a container is used it is only necessary to remove the bottom thereof in order to extract the finished partition.

I will now describe more in detail one of said illustrative ways of making partitions embodying my invention. Grains are made from a self-enamelling ceramic paste, the diameter of said grains being chosen according to the degree of porosity that it is desired the partition shall have. In general the diameter of the raw grains will be approximately 0.01 m. m. to 3 m. m. Said grains are preliminarily baked in a commercial furnace at a temperature of 1200° to 1300° C., after which said grains separate very readily. A plastic paste composed of said baked grains and a combustible binder, such as sulphated lignin or casein is then prepared and moulded to the desired shape, whereupon it is allowed to dry, care being taken that when dry the cohesion is excellent. The partition thus obtained is then baked at a temperature of about 1350° C. which is the self-enamelling temperature. This second baking may also be effected in an ordinary industrial furnace and upon its termination said binder will have completely disappeared and a partition embodying my invention and having the predetermined porosity and the shape desired will remain. The temperature need not be regulated with great precision, a temperature of from 1320° to 1380° C. giving good results. There need be no fear of deformation at these temperatures as said grains will not begin to soften at a temperature below 1450° C.

GUSTAVE LEQUERLER.