UNITED STATES PATENT OFFICE.

ANSON G. BETTS, OF TROY, NEW YORK.

ELECTROLYTIC DIAPHRAGM AND METHOD OF MAKING THE SAME.

No. 928,276. Specification of Letters Patent. Patented July 27, 1909.

Application filed January 7, 1909. Serial No. 471,119.

To all whom it may concern:

Be it known that I, ANSON G. BETTS, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Electrolytic Diaphragms and Methods of Making the Same, of which the following is a full, clear, and exact description.

As is well known, considerable difficulty has heretofore been experienced in finding a diaphragm for use in aqueous solutions in electrolytic work, for separating the anolyte and the catholyte, which possesses the required strength and durability without high resistance to the flow of the electrolyzing current. Of the materials which have been employed for the purpose cement is not suitable for acid solutions and asbestos becomes soft and pulpy when wet, while porous earthenware is liable to disintegrate and is also difficult to prepare in large sheets or plates. I have therefore been led to devise my present invention, which has for its object to provide a durable and effective diaphragm of low resistance.

In carrying out my process in the preferred manner I take a sheet of asbestos board and sprinkle it with flowers of sulfur and then heat the whole, so that the finely divided sulfur will be melted and in consequence permeate the surface of the board. Both sides of the board may be, and preferably are, treated alike. The diaphragm thus produced is not materially affected by being wet, in fact will remain stiff and strong for many months in that condition, and will remain intact in non-alkaline solutions indefinitely. Nor is the resistance of the article increased to any impracticable extent by the sulfur treatment. Another, though analogous way, of preparing the diaphragm is to soak the asbestos board in carbon bisulfid containing sulfur in solution, after which most of the bisulfid absorbed by the board is allowed to evaporate. The remaining portion is ignited, and in burning off melts the sulfur deposited from the solution. I have also obtained good results by exposing the asbestos board to vapor of sulfur, which, permeating the surface of the board, condensed therein in sufficient amount to produce the properties described. However, I prefer to employ the methods first explained. Other materials, such as paraffin and asphaltum, may be used, which will have the effect of cementing the surface particles or fibers of the asbestos together, but for use in acid solutions sulfur is more suitable.

Of course the article may be in the form of a board, or a hollow cylinder, or any other shape desired.

What I claim is:

1. The herein described method of preparing asbestos board for use as a diaphragm in aqueous electrolysis, which consists in cementing together the fibers of the board by means of an easily fusible substance insoluble in the solution in which the diaphragm is to be used, as set forth.

2. The herein described method of preparing asbestos board for use as a diaphragm in aqueous electrolytes, which consists in treating the board with powdered sulfur, and then heating the board to melt the sulfur, as set forth.

3. As a new article of manufacture, a diaphragm for use in aqueous electrolytes, composed of asbestos having its fibers cemented together by an easily fusible substance insoluble in the electrolyte, as set forth.

4. As a new article of manufacture, a diaphragm for use in aqueous electrolytes, composed of asbestos having its fibers cemented together with sulfur, as set forth.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

ANSON G. BETTS.

Witnesses:

BENJAMIN STARBUCK,

AUDLEY A. MCQUIDE.