May 27, 1930. L. J. SEITZ, JR 1,760,178

WESTON STANDARD CELL

Filed Oct. 3, 1928

Fig. 1.

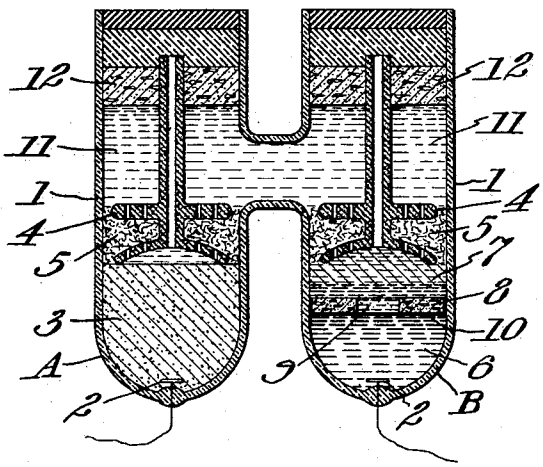


Fig. 2.



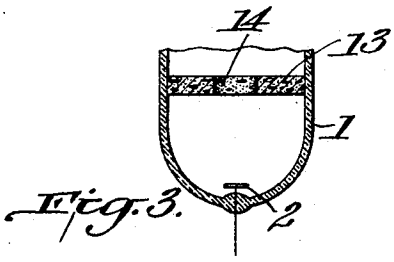


Fig. 3.

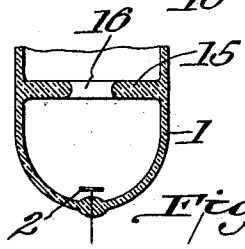


Fig. 4.

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UNITED STATES PATENT OFFICE

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WESTON STANDARD CELL

Application filed October 3, 1928. Serial No. 310,169.

In the type of Weston standard cell as now manufactured, containing cadmium sulphate solution as an electrolyte and poles of cadmium amalgam and mercury, it is the usual practice to employ a depolarizing agent such as mercurous sulphate paste directly in contact with the mercury. The mercury and mercurous sulphate gradually become mixed one with the other after a time due to vibration and jarring of the cell in shipping and handling, and eventually the mercurous sulphate comes into contact with the platinum terminal provided for exterior connection.

Such contact of the mercurous sulphate and the platinum terminal has a detrimental effect upon the cell, the result being a much lowered and variable E. M. F. as well as a great increase in the internal resistance of the cell, and a materially shortened useful life.

An object of my invention is to improve the cells of this type so that in their operation drop in E. M. F. and increase in internal resistance are prevented and the useful life of such cells is greatly prolonged, and to accomplish these results without altering in any way the value of the cell as a standard of E. M. F.

My improvement consists in the provision of means for preventing the mercurous sulphate from contacting with the metal terminal and from passing downwardly into and mixing with the mercury in the vicinity of the terminal, but which means will permit the mercury and the mercurous sulphate to contact and to mix freely above and removed from the terminal.

The invention is illustrated in the accompanying drawing wherein:

Fig. 1 is a sectional view through a Weston standard cell of the H-type showing one embodiment of the invention;

Fig. 2 is an enlarged sectional view of the barrier shown in Fig. 1, and

Figs. 3 and 4 are sectional views showing modified forms of the barrier.

This application is a continuation in part of my application Serial No. 122,464, filed July 14, 1926.

Referring to Fig. 1, the cell comprises the usual glass container 1 of H-shape having platinum terminals 2 therein. In the left leg A of the container is shown the amalgam of cadmium 3, and a porcelain retainer 4 having a porous packing 5. The right leg B of the container has a similar porcelain retainer 4 with a porous packing 5. The mercury electrode 6 lies in contact with the platinum terminal 2 at the bottom of the leg. To insure uninterrupted and efficient action of the cell, it is necessary to use a depolarizing agent, mercurous sulphate, adjacent the mercury electrode 6. This mercurous sulphate is indicated by numeral 7 on the drawing and is of the usual paste form.

The principal element of novelty is the provision in the leg B of means, hereinafter referred to as a barrier, for maintaining the mercurous sulphate out of contact with the metal terminal and away from the mercury in proximity thereto, without however, interfering with the mixing freely of the mercury and the depolarizer at and above the barrier. One form of such barrier is shown in Figs. 1 and 2 and comprises a cork disk 8 having a relatively large opening 9 in its center, a piece of cloth 10, such as silk, muslin or the like, being stretched across the opening and around the edges of the disk.

The disk 8 with its cloth covering 10 is designed to fit tightly within the leg of the casing in proper position, well above the terminal 2 but below the mercurous sulphate. It may even be slightly below the top of the mercury 6, as indicated in Fig. 1. In any event, the barrier must be arranged to withhold all of the mercurous sulphate away from the vicinity of the terminal 2, and yet allow free mixing of the mercury and the mercurous sulphate. It has been found that a barrier such as shown in Figs. 1 and 2 accomplishes this result, as the mercury freely passes through the disk and the mesh of the cloth to mix with the mercurous sulphate above the same, but the mercurous sulphate cannot pass downwardly below the separator.

The cell has the usual electrolyte 11 therein, consisting of a cadmium sulphate solution, and the upper ends of the legs of the con-

tainer are sealed as at 12, in the customary manner.

Figs. 3 and 4 show other forms of barriers suitable for attaining the results described. According to the embodiment illustrated in Fig. 3 a cork disk 13 having an enlarged hole 14 therein is secured in the casing 1, the cloth covering being, however, omitted. It has been found that this form of barrier successfully maintains the mercurous sulphate above it, and yet the necessary mixing of the mercury with the mercurous sulphate is permitted by the medium of the opening 14.

The same result may be obtained by the arrangement shown in Fig. 4 wherein the casing 1 is formed with an annular internal flange 15, providing an opening 16. It will be understood that the barrier may be formed upon the casing wall as shown in Fig. 4, or it may be provided by the wall of the casing itself by suitable indentation thereof.

The forms of separator shown in all of the figures provide barriers along the sides of the casing 1 and successfully maintain the mercurous sulphate above them, even under most severe vibrations of the cell.

Each of the modifications described comes within the purview of the expression "means extending inwardly from the wall of the casing," as used in certain of the appended claims, and in all forms shown, creepage of the mercurous sulphate directly downward along the wall of the casing is prevented.

This invention has been shown in connection with an H-type standard Weston cell, but it will be understood that it is not limited to the shape of the casing. Also, other forms of barriers may be used, the only essential being that good electrical and chemical contact between the mercury electrode and the mercurous sulphate occurs, while the mercurous sulphate and the cadmium sulphate are held above and away from the metal terminal 2.

I claim:

1. In a standard cell of the Weston type, having an electrode consisting of mercury, a depolarizer of mercurous sulphate and a metal terminal in contact with said electrode, means for excluding the mercurous sulphate from the vicinity of said terminal.

2. The structure as in claim 1 wherein the said means comprises an apertured disk secured in the cell below said mercurous sulplate.

3. The structure as in claim 1 wherein the said means comprises an apertured cork disk secured in the cell below said mercurous sulphate and having a covering of fine mesh cloth.

4. In a standard cell of the Weston type, having an electrode consisting of mercury, a depolarizer of mercurous sulphate and a metal terminal in contact with said electrode, means for preventing the mercurous sulphate from contacting with said terminal.

5. In a standard cell of the Weston type, having an electrode consisting of mercury, a metal terminal contacting with said electrode and mercurous sulphate above said electrode, means for excluding the mercurous sulphate from the vicinity of said terminal but permitting contact between the mercury and the supernatant mercuous sulphate and free mixing of the two above and remote from said terminal.

6. In a standard cell of the Weston type, having a casing, a metal terminal extending therein, an electrode of mercury in contact with said terminal and mercurous sulphate above said mercury, means extending inwardly from the wall of said casing and defining an opening for permitting intimate electrical and chemical contact of said mercury and said mercurous sulphate but maintaining said mercurous sulphate spaced from said metal terminal.

In testimony whereof, I affix my signature.

LOUIS J. SEITZ, JR.