

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in Electric Secondary Batteries

I, CHARLES GEORGE SMITH, a British Subject, of "Yeoveney," Roxburgh Road, Westgate-on-Sea, in the County of Kent, do hereby declare the nature of this invention to be as follows:—

This invention relates to secondary batteries of the kind wherein the negative plates are made of zinc or the surfaces of the negative plates which are immersed in the electrolyte are coated with zinc and the positive plates are of the lead type, such as lead grids loaded with lead peroxide.

Lead-zinc batteries, as this kind is commonly called, are found to be on the whole more efficient electrically than the well known lead-lead type, but they are subject to the disadvantage that lead from the positive plate tends to pass through the electrolyte and come into contact with the zinc negative. When this happens "local-action" occurs at the negative plate and seriously affects the efficiency of the battery.

The object of the present invention is to overcome this disadvantage.

According to the present invention the positive and negative plates are immersed in free electrolyte and a diaphragm containing jelly acid is disposed between the positive and negative plates so as to completely isolate the one from the other as far as communication through the electrolyte is concerned.

The separate diaphragm may comprise a housing of porous material, or perforated material with the jelly acid filling the inner space.

In my prior application No. 17319/46 (Serial No. 612,931) Cognate No. 24748/46 a construction is described in which jelly acid completely surrounds and encloses the positive plate and is in direct contact with the positive plate.

This has been found to be subject to the disadvantage that gases escaping from the plate tend to blow through the jelly

and make holes and cracks in it, thus reducing its efficiency.

In accordance with the present invention however, the positive and negative plate are surrounded by free electrolyte and the separating diaphragm of jelly acid is spaced away from the plates so that there is no obstruction to prevent gases leaving the plates and escaping to atmosphere through the electrolyte.

Further, it is found in practice that this present arrangement produces a cell having a smaller internal resistance than the previous construction in which the jelly was in direct contact with the positive plate.

In one construction according to the present invention as applied to the box type accumulator the positive and negative plates are supported in spaced parallel planes in an outer casing and immersed in the electrolyte which consists of a solution of dilute sulphuric acid.

The supporting diaphragms are disposed approximately midway between each positive and negative plate and these diaphragms extend from end to end of the battery casing and also project above the free surface of the electrolyte so that each positive plate is isolated effectively from the adjacent negative plates as far as any communication through the electrolyte is concerned.

The supporting diaphragms may be made as independent items and may comprise a housing of porous material such as wood or porcelain or any suitable non-porous material with perforations and the jelly acid is poured into the inside of the housing so as to set and form a jelly diaphragm. The jelly acid may consist of a mixture of dilute sulphuric acid and silicate of soda.

With this construction it is found in practice that the thickness of the jelly can be reduced to relatively small dimen-

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sions of the order of one sixteenth of an inch so that the internal resistance of the cell is correspondingly reduced.

The secondary battery constructed in accordance with the present invention is found in practice to be free from the above mentioned disadvantage of "local-action" owing to the presence of the jelly diaphragm which effectively prevents any passage of lead from the posi-

tive to the negative plates whilst at the same time allowing the electrolytic action of the cell to proceed unhindered.

Dated the 15th day of October, 1948.
FORRESTER, KETLEY & CO.,
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COMPLETE SPECIFICATION

Improvements in Electric Secondary Batteries

I, CHARLES GEORGE SMITH, a British Subject, of "Yeolveney," Roxburgh Road, Westgate-on-Sea, in the County of Kent, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to secondary batteries of the kind wherein the negative plates are made of zinc or the surfaces of the negative plates which are immersed in the electrolyte are coated with zinc and the positive plates are of the lead type, such as lead grids loaded with lead peroxide.

Lead-zinc batteries, as this kind is commonly called, are found to be on the whole more efficient electrically than the well known lead-lead type, but they are subject to the disadvantage that lead from the positive plate tends to pass through the electrolyte and come into contact with the zinc negative. When this happens "local-action" occurs at the negative plate and seriously affects the efficiency of the battery.

The object of the present invention is to overcome this disadvantage.

According to the present invention the positive and negative plates are immersed in free electrolyte and a diaphragm containing jelly acid is disposed between each positive and negative plate so as to completely isolate the one from the other as far as communication through the electrolyte is concerned.

The separating diaphragm may comprise a housing of porous material, or perforated material with the jelly acid filling the inner space, or the plates may be immersed in electrolyte within porous housings with the jelly acid filling the space between the porous housings.

In my prior application No. 17319/46 (Serial No. 612,931) Cognate No. 24748/46 a construction is described in which a jelly acid completely surrounds and

encloses the positive plate and is in direct contact with the positive plate. This has been found to be subject to the disadvantage that gases escaping from the plate tend to blow through the jelly and make holes and cracks in it, thus reducing its efficiency.

In accordance with the present invention however, the positive and negative plates are surrounded by free electrolyte and the separating diaphragm of jelly acid is spaced away from the plates so that there is no obstruction to prevent gases leaving the plates and escaping to atmosphere through the electrolyte.

Further, it is found in practice that this present arrangement produces a cell having a smaller internal resistance than the previous construction in which the jelly was in direct contact with the positive plate.

The invention is illustrated in the accompanying drawings wherein:

Figure 1 is a section through one form of battery constructed in accordance with the present invention.

Figure 2 is a section through an alternative form of battery.

In the construction shown in Figure 1 as applied to a box-type battery the positive plates 10 and negative plates 11 are supported in spaced parallel planes in an outer casing 12 and immersed in the electrolyte 13 which consists of a solution of dilute sulphuric acid, filling the spaces around the plates.

The separating diaphragms 14 are disposed approximately midway between each positive and negative plate and these diaphragms extend from end to end of the battery casing and also project above the free surface of the electrolyte so that each positive plate is isolated effectively from the adjacent negative plates as far as any communication through the electrolyte is concerned.

The separating diaphragms 14 may be made as independent items and as shown

comprise a housing 15 of porous material such as wood or porcelain or any suitable non-porous material with perforations and the jelly acid is poured

5 into the inside of the housing so as to set and form a jelly diaphragm 16. The jelly acid may consist of a mixture of dilute sulphuric acid and silicate of soda.

10 The battery is sealed at the top by means of strips 17 which are provided with the usual vent holes and filling aperture.

In the alternative construction shown

15 in figure 2 the positive plates 18 and negative plates 19 are supported in a casing 20 and each plate is enclosed in a porous housing 21 with the electrolyte 22 filling the space within the housings.

20 In this construction the jelly acid 23 is disposed in the spaces between adjacent housings 21, and formed by a thickness of jelly acid bounded on each side by the wall of porous housing..

25 The battery is sealed at the top by means of strips 24 as in the previous construction.

With this construction it is found in practice that the thickness of the jelly

30 can be reduced to relatively small dimensions of the order of one sixteenth of an inch so that the internal resistance of the cell is correspondingly reduced.

The secondary battery constructed in

35 accordance with the present invention is found in practice to be free from the above mentioned disadvantage of "local-action" owing to the presence of the jelly diaphragm which effectively

40 prevents any passage of lead from the

positive to the negative plates whilst at the same time allowing the electrolytic action of the cell to proceed unhindered.

Having now particularly described and ascertained the nature of my said inven- 45 tion, and in what manner the same is to be performed, I declare that what I claim is:—

1. Secondary batteries of the kind specified having the positive and nega- 50 tive plates immersed in free electrolyte and a diaphragm containing jelly acid disposed between each positive and negative plate so as to completely isolate the positive plates from the negative plates, 55 as far as communication through the electrolyte is concerned.

2. Secondary batteries according to Claim 1 wherein the/or each diaphragm is formed as a housing of porous material 60 having the jelly acid contained therein.

3. Secondary batteries according to Claim 1 wherein each plate is contained in a housing of porous material and the 65 jelly acid occupies the space between the walls of adjacent housings thereby forming diaphragms which isolate the positive plates from the negative plates.

4. A secondary battery substantially as described with reference to and as 70 shown in Figure 1 or in Figure 2 of the accompanying drawings.

Dated this 6th day of October, 1949.

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FIG. 1.

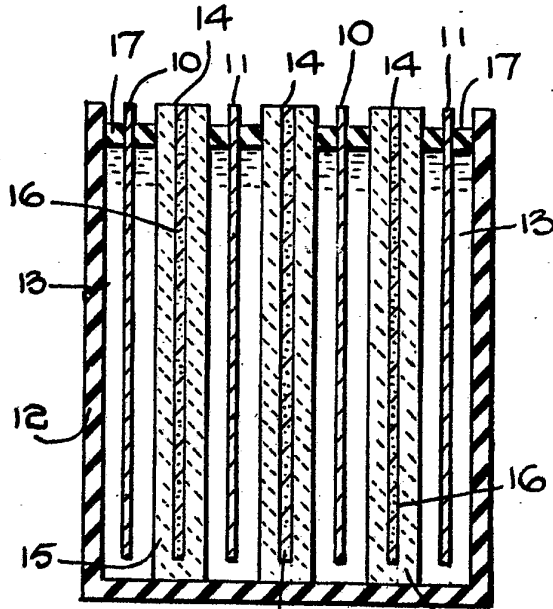
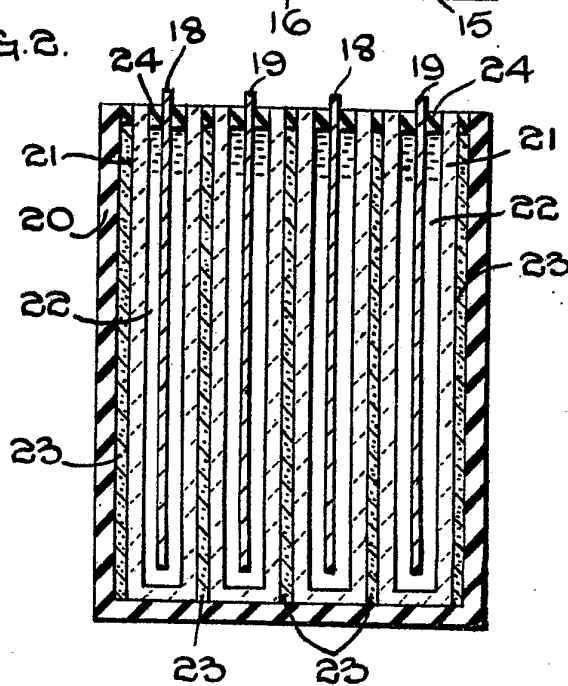


FIG. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]