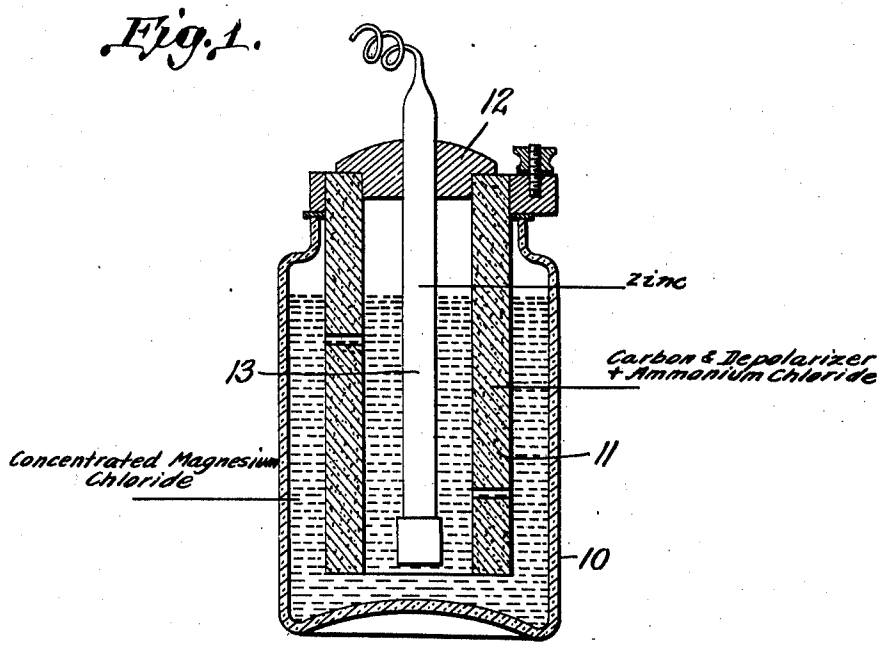
Oct. 30, 1934. H. COLLOSEUS 1,978,624

PRIMARY CELL

Filed July 14, 1932

Fig. 1.



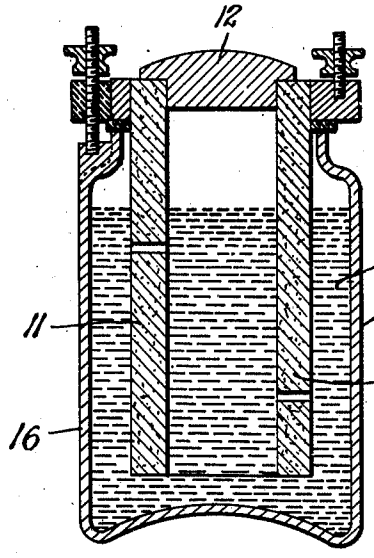


Fig. 2.

Concentrated Magnesium Chloride

Zinc

Carbon & Depolarizer + Ammonium Chloride

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PRIMARY CELL

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3 Claims. (Cl. 136—103)

Galvanic dry-cells of the Leclanché type are generally provided with an electrolyte of ammonium chloride which not only fills the intermediate space between the zinc anode and the depolarizing material but also impregnates the depolarizing material, an addition of solid ammonium chloride being sometimes made to the depolarizing material. These cells possess a good electrical capacity, but their capacity for being stored is restricted, this being due to the fact that the zinc is attacked by the ammonium chloride solution even when the cell is at rest. It has also been proposed to use solutions of magnesium chloride or manganous chloride or a mixture thereof as the electrolyte, the said salts serving, to the exclusion of ammonium chloride, both for impregnating the depolarizing material and for filling the intermediate space between the latter and the zinc vessel-like anode. Such cells have a good capacity for being stored on account of the zinc being less rapidly attacked by the said salts. On the other hand they exhibit a somewhat lower electrical capacity, which is chiefly to be ascribed to the precipitation of hydroxides of magnesium or manganese on or in the depolarizing material during discharge.

The present invention has for its object to provide a cell of the Leclanché type which possesses a good capacity for being stored and a large initial electrical capacity. This is achieved by using concentrated magnesium chloride solution, with or without an addition of manganous chloride solution, as the electrolyte between the zinc and the depolarizing material, and by adding ammonium chloride in solid or dissolved form to the depolarizing material.

The manner in which the invention may be applied is illustrated in the accompanying drawing, in which

Figure 1 is a vertical sectional view of one form of cell constructed in accordance with the principles of the invention; and

Figure 2 is a similar view illustrating a modified type of cell.

In the form of the invention shown in Figure 1, a suitable container 10 of vitreous or other inert material constitutes a support for the carbon electrode 11, this electrode including a depolarizer and ammonium chloride. The container is partly filled with a solution of concentrated magnesium chloride and is closed by a centrally disposed cap 12 fitting within the carbon electrode and supporting a zinc electrode 13.

In the arrangement shown in Figure 2, the outer container 16 is formed of zinc to constitute one of the electrodes, the construction being otherwise generally similar to that shown in Figure 1.

It has proved that cells so constituted have not only a very good initial electrical capacity but also good powers of sustaining storage and of recovery. The danger of the formation of complex zinc compounds which immediately set the cell out of action is largely avoided, as experience has shown, because diffusion of the sal ammoniac from the depolarizing material into the electrolyte takes place very slowly only and during use of the cell only. This phenomenon is due to the fact that sal ammoniac is practically completely insoluble in concentrated magnesium chloride solution, so that there is no tendency at all for the sal ammoniac to pass in substantial quantities from the depolarizing material into the external electrolyte. In this manner it is possible to combine the advantage of the sal ammoniac cell in respect of large initial electrical capacity with the considerable powers of sustaining storage and of recovery of cells whereof the external electrolyte consists essentially of concentrated magnesium chloride solution.

On the other hand, as compared with cells not containing sal ammoniac, the advantage is also achieved that precipitation of hydroxides of the metals dissolved as salts in the electrolyte cannot occur during the operation of the cell in the presence of the sal ammoniac.

Experiments have shown that the electrical capacity of such cells on continuous discharge is considerably increased, as compared with otherwise equal magnesium chloride cells not containing sal ammoniac, without the capacity for sustaining storage being materially impaired.

I claim:—

1. Primary cell of the Leclanché type, comprising electrodes, an electrolyte consisting of a concentrated solution of magnesium chloride, and a depolarizing material containing ammonium chloride.

2. Primary cell of the Leclanché type, comprising electrodes, an electrolyte consisting of a concentrated solution of magnesium chloride with an addition of manganous chloride solution, and a depolarizing material containing ammonium chloride.

3. Primary dry-cell of the Leclanché type, comprising electrodes including a zinc anode in the form of a vessel, a depolarizing material containing an addition of ammonium chloride and an external electrolyte free from ammonium chloride and consisting of a concentrated solution of magnesium chloride.

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