C. W. HAZELETT.

DRY CELL.

APPLICATION FILED MAY 9, 1919.

1,403,410. Patented Jan. 10, 1922.

Fig. 1

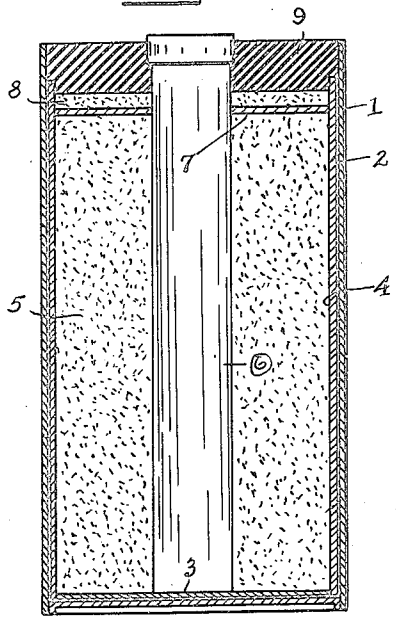


Fig. 2

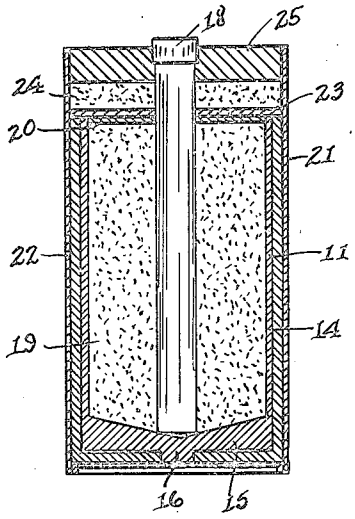


Fig. 3

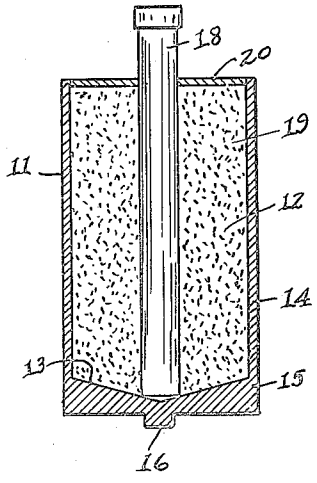
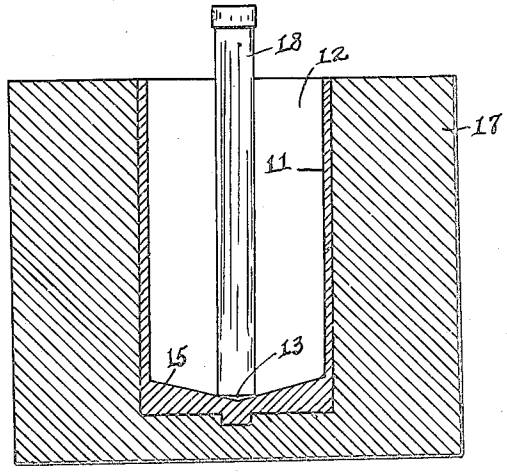


Fig. 4



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DRY CELL.

1,403,410. Specification of Letters Patent. Patented Jan. 10, 1922.

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To all whom it may concern:

Be it known that I, CLARENCE W. HAZELETT, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Dry Cells, of which the following is a full, clear, and exact description.

This invention relates to dry cells of the so-called Leclanché type having a lining between the zinc electrode and the mix surrounding the carbon electrode.

The ordinary sizes of dry cells consist of a zinc container electrode having a coating of flour, or farinaceous starch paste. Within the container a lining is fitted adjacent the inside of the pasted zinc and a disk is fitted in the bottom. The mix of manganese peroxide and carbon moistened with an electrolyte of zinc chloride and ammonium chloride is then tamped in around a central carbon electrode. The cell is then sealed by pouring hard pitch over the mix after turning a portion of the lining down over the mix.

As far as I am aware, the only material which has been used for this purpose in dry cells is thick paper commonly known as pulpboard. On account of its porosity, capacity for absorbing electrolyte, and inertness, this material has always been considered most satisfactory for dry cell linings. I have now discovered that wood veneer may be substituted for the paper lining with decidedly improved results. Before using the veneer in a dry cell it is treated with dilute alkali or acid solutions to remove the resinous constituents and thus increase its porosity and flexibility. In this condition it has been found that the wood is capable of absorbing more electrolyte than the paper previously used. This is a decided advantage as it reduces the amount of inert material in the cell and increases the quantity of electrolyte contained in the lining which is used as a carrying medium for the electrolyte.

The exact figures for the increase in quantity of electrolyte carried by the wood will vary depending on the kind of wood and its treatment. The use of wood as set forth in the following description, also produces a more uniform corrosion of the zinc electrode.

In the drawings:—

Fig. 1 is a cross section of a standard size dry cell embodying the improvement.

Fig. 2 is a cross section of a dry cell embodying my invention as applied to small cells commonly known as "midget" cells.

Fig. 3 is cross section of the bobbin used in the midget cells.

Fig. 4 is a cross section of the wooden cylinder holding the mix of the bobbin.

Referring to Fig. 1, reference character 1 indicates the zinc container electrode and 2 is the layer of paste thereon. A wood disk 3 is inserted in the bottom of the can and the wood veneer lining 4 is then fitted in the can by coiling a sheet of the veneer to a diameter small enough to fit the can. The veneer soaked with electrolyte coils readily and after insertion springs out sufficiently to closely fit the can. The mix 5 is then tamped around the carbon electrode 6 to the proper height and a wooden disk 7 fitted over the carbon electrode to cover the mix. In tamping a cell having a paper lining the paper is occasionally torn by the tamping sticks, but this difficulty is entirely eliminated with the wood veneer lining which on account of its flexibility closely fits the can. A layer of sand 8 and a seal of pitch 9 are then applied to properly seal the cell in a well known manner.

In applying the invention to "midget" cells of small diameter, a considerably different construction is desirable on account of the difficulty of coiling wood into the small cylinders of the cans.

The usual method pursued in making these small cells consists in forming or molding a mix consisting of manganese peroxide and carbon or graphite, moistened with electrolyte around a carbon rod. The molded "bobbin," as it is usually called, is then removed from the mold. Considerable care must be exercised in doing this and in subsequent handling of the bobbin, as the mix is easily loosened and knocked off. The bobbin is then wrapped in thin cheesecloth which is bound thereto by means of string or thread wrapped around the cartridge, or by means of rubber bands. The wrapped bobbin is

then inserted in a zinc can having a small amount of flour paste in the bottom. As the electrode is pushed into the can the paste is forced up around the bobbin to fill the space between the can and bobbin. The cell is then sealed at the upper end by applying successively a pulpboard collar, a layer of sand and a pitch or other seal.

The cheese cloth is used for the purpose of retaining the mix to prevent it from reaching the zinc can, which would cause short circuits, local action and poor shelf life. With this construction a relatively thick paste layer is necessary in order to secure satisfactory distribution, and the size of the cartridge must be correspondingly smaller.

The object of the invention, as it relates to the "midget" cells, is to eliminate the cheesecloth wrapping and the disadvantages incident to its use.

According to the invention, I use a wood cylinder 11 as a retainer for the mix of the cell. The cylinder is preferably made from a square rod of a porous grained wood such as lynn wood, cypress, cedar or yucca, which has been treated in acid or alkali to remove the resinous constituents and render the wood porous. Such cylinders are readily and cheaply made on an automatic screw machine which first bores out a hollow space 12, leaving a conical depression 13 due to the point of the drill. A solid rotating arbor is then inserted and the outside turned down to the proper size, the method permitting a wall 14 to be made as thin as desired. The cylinder is then cut off beyond the depression 13 to provide a bottom 15 and a small projecting tip 16. On account of the cylindrical shape and the presence of the bottom member, the cylinders are quite strong and will withstand considerable handling. It will also be understood that the acid or alkali treatment may be carried on when the cylinders are completed if desired, instead of treating the wood rods from which the cylinders are made.

I have found that wooden cylinders made in this manner may be turned out with walls as thin as two one-hundredths of an inch, and that with this thickness the wood is impervious to the mix and sufficiently porous to contain considerable electrolyte for conducting the current. The space within the cell is economically utilized.

In order to fill the cylinder with mix it will be fitted in a suitable hollow cylindrical mold 17. The electrode 18 will be held in the cylinder and the mix 19 will then be tamped around the carbon rod in the usual manner. The depression 13 in the bottom of the cylinder serves as a means for properly centering the lower end of the electrode. A paper disk 20 is then fitted over the mix and the bobbin is removed from the mold. On account of the mix being enclosed in the wooden cylinder, it is not necessary to handle the bobbin so carefully, as the mix cannot be accidentally knocked off the cartridge. The bobbin formed in this manner is then inserted in a zinc can 21 having a quantity of paste in the bottom. The paste is forced up around the cylinder, providing a layer 22 filling the space therebetween. The cell is then completed by fitting a pulpboard collar 23 in the can over the bobbin and applying a layer of sand 24 and a pitch seal 25 over the pulpboard collar in the usual manner.

The tamping of the mix in a wooden cylinder eliminates the tedious and troublesome operation of wrapping the bobbins in cheesecloth and at all times holds the mix so that it will not be knocked off.

Having described my invention, what I claim is:

1. In dry cells, a zinc electrode, a mix of manganese peroxide and carbon and a thin sheet of porous wood veneer located between the mix and the zinc electrode.

2. In dry cells, a zinc electrode, a mix of manganese peroxide and carbon moistened with an electrolyte and a thin sheet of porous wood veneer deprived of its resinous constituents located between the mix and the zinc electrode.

3. In dry cells, a zinc container, a mix of manganese peroxide and carbon in said container, a chloride electrolyte in said mix and a thin sheet of porous wood veneer deprived of its resinous constituents located between said mix and zinc container.

4. In dry cells, a zinc electrode, a mix of manganese peroxide and carbon, a chloride electrolyte in said mix, a thin sheet of porous wood veneer, and a thin layer of paste between the zinc and wood veneer.

5. In dry cells, a zinc container, a mix of manganese peroxide and carbon, moistened with electrolyte and a seamless porous wood tube adapted to retain the mix.

6. In dry cells, a cylindrical zinc container, a mix of manganese peroxide and carbon, an electrolyte in said mix, a seamless wood cylinder adapted to retain the mix, said wood cylinder being deprived of its resinous constituents and in a porous condition.

7. In dry cells of the midget type, a cylindrical zinc container, a mix of manganese peroxide and carbon, an electrolyte in said mix and a seamless wood cylinder having a bottom integral therewith adapted to retain the mix, said wood cylinder being deprived of its resinous constituents and in a porous condition.

8. In dry cells of the midget type, a cylindrical zinc container, a carbon electrode, a mix of manganese peroxide and carbon around said carbon electrode, an electrolyte in said mix and a seamless wood cylinder having a bottom integral therewith, adapted

to retain the mix, said bottom having a depression in the center thereof for the carbon electrode.

9. In dry cells of the midget type, a cylindrical zinc container, a mix of manganese peroxide and carbon, an electrolyte in said mix, a seamless wood cylinder having a bottom integral therewith adapted to retain the mix, said wood cylinder being deprived of its resinous constituents and in a porous condition, and a layer of paste between the wood cylinder and the zinc container.

In testimony whereof I hereunto affix my signature.

C. W. HAZELETT.