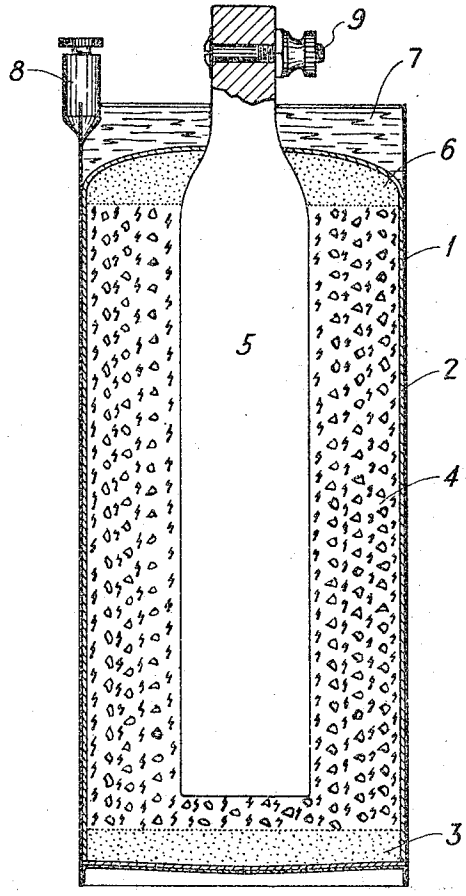
L. J. SCHATZEL.

DRY BATTERY.

APPLICATION FILED DEC. 19, 1910. RENEWED JAN. 2, 1915.

**1,147,753.** Patented July 27, 1915.




*WITNESSES*

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# UNITED STATES PATENT OFFICE.

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## DRY BATTERY.

1,147,753. Specification of Letters Patent. Patented July 27, 1915.

Application filed December 19, 1910, Serial No. 598,183. Renewed January 2, 1915. Serial No. 307.

*To all whom it may concern:*

Be it known that I, LEO J. SCHATZEL, a citizen of the United States, residing at Fostoria, in the county of Seneca and State of Ohio, have invented a certain new and useful Improvement in Dry Batteries, of which the following is a clear, full, and exact description.

The present invention relates to an improvement in dry batteries and has to do more particularly with the materials in the battery rather than with the specific arrangement of the elements.

The object of the invention has been to provide an improved depolarizer, giving the battery a high voltage, which shall be sustained throughout a great period of time. It will be seen that this object is attained by the means more particularly set forth in the following specification.

There being nothing in the structure of the battery which I desire to claim herein, I have shown in the accompanying drawing merely a somewhat diagrammatic sectional view of a dry cell of well known commercial type.

In the drawing, 1 is the usual zinc casing forming the exterior of the cell, "prepared" as usual, and 2 is the usual lining of "prepared" blotting paper. The material 3 is a layer of sand such as is frequently placed in the bottom of the cell, and 4 is a packing such as is hereinafter described arranged in the usual manner within the lining 2 on top of the layer of sand 3 around the usual carbon electrode 5. The material 6 is a layer of sand arranged according to common practice above the packing material 4 beneath the upper portion of the blotting paper lining 2, and 7 is the usual seal of wax or other suitable material poured into the top of the zinc casing 2 to seal up the cell and retain its contents in place.

8 is the ordinary binding post attached to the zinc casing 2, and 9 is the ordinary binding post attached to the upper end of the carbon electrode 5.

The sheet zinc 1 forming the battery casing and bottom of the cell is cleaned and coated with any one of the following pastes:

Paste No. 1: Wheat flour or common starch boiled to a paste, with the following solution: (*a*) zinc chlorid solution in which ammonium chlorid has been dissolved, the proportions being zinc chlorid, granular, one pound, ammonium chlorid, granular, one pound.

Paste No. 2: Gelatin, dissolved to a paste, with solution marked (*a*) above.

Paste No. 3: Glucose, dissolved to a paste, with the solution marked (*a*) above.

Paste No. 4: Zinc chlorid solution in which blotting paper has been dissolved until a thick, slimy paste results.

Ordinary blotting paper or any absorbent paper is then coated on one side with one of the above-mentioned pastes and applied to the casing 1 in the usual manner. This absorbent lining 2 is then caused to absorb as much of a solution of equal parts of zinc chlorid and ammonium chlorid as possible. The usual carbon electrode 5 is then put in place and preferably one or the other of the following mixtures, or their chemical equivalents, is packed inside the casing and around the carbon electrode.

Mixture No. 1: Carbon flour and manganese dioxid are mixed in equal parts, and to each pound of this mixture two and three quarter ounces of potassium persulfate ($K_2S_2O_8$) are added. When thoroughly mixed, the ingredients are moistened with enough of a solution of zinc chlorid and ammonium chlorid to allow the mixture to be packed firmly.

Mixture No. 2: Carbon flour or graphite, one pound, and potassium persulfate, four to eight ounces or more, are mixed and moistened with the above mentioned solution of zinc chlorid and ammonium chlorid.

After the packing of the cell, a fine, dry glass sand 6 is poured over it and on top of this melted wax 7 is poured to seal the cell. The usual connectors 8 and 9 are then added.

Potassium persulfate has comparatively high conductive and dissociative qualities, and this fact, taken together with its high oxidizing capacity, causes rapid depolarization, giving an initial E. M. F. of two volts, and this voltage drops much more gradually than does the voltage of the ordinary dry cell, even though the latter be initially lower. Furthermore, a cell having the potassium persulfate applied in the manner described has a capacity for rapid recuperation, even though the voltage may have dropped quite low through continuous use of the cell. I have found that the persulfates of the following metals are valuable for use in this connection:—barium, strontium, ammonium,

copper, manganese, calcium, sodium, lithium and potassium. Of these, however, potassium persulfate is the salt of persulfuric acid which produces the most marked results, and which I prefer to use.

Having thus described my invention, what I claim is:

1. In a dry battery, a depolarizing compound comprising a depolarizing salt of persulfuric acid.

2. In a dry battery, a depolarizing compound comprising carbon and a depolarizing persulfate.

3. In a dry battery, a depolarizing compound comprising carbon, manganese dioxid and a depolarizing persulfate.

4. In a dry battery, a depolarizing compound comprising potassium persulfate.

5. In a dry battery, a depolarizing compound comprising carbon, manganese dioxid, and potassium persulfate.

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

LEO J. SCHATZEL.

Witnesses:
SAMUEL WADE,
ORA R. WADE.