

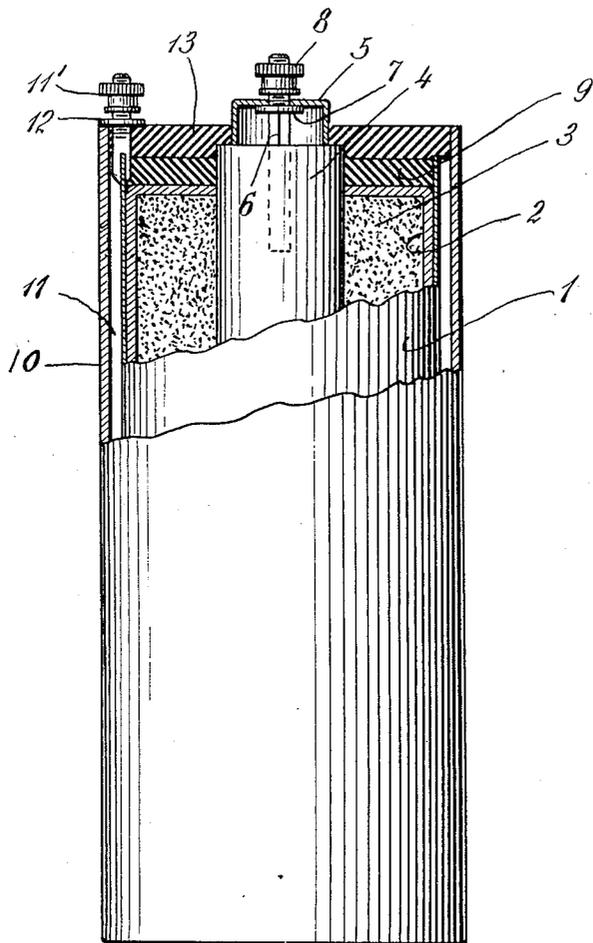
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DRY BATTERY

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INVENTOR

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UNITED STATES PATENT OFFICE.

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DRY BATTERY.

Application filed August 1, 1922. Serial No. 578,891.

To all whom it may concern:

Be it known that I, HENRY E. WARNCKE, a citizen of the United States, residing at Norwalk, in the county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Dry Batteries; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

It is an object of the present invention to control the leakage of moisture from the interior of a dry cell and to protect the cell from the harmful effect of such leakage by directing the moisture into a compartment where it can do no harm. To attain this object I provide the dry cell with a waterproofed carton spaced from the sides of the usual zinc container to form an annular receptacle into which moisture and salts may pass from the cell when forced out by gas pressure, this carton being sealed at the top in such manner as to control and direct the leaking moisture into this annular receptacle.

The details of the invention will become clear from the following description taken in conjunction with the accompanying drawing.

The dry cell illustrated in the drawing comprises a zinc container 1 lined with a layer of pulp board 2 folded over at its top to envelop a galvanically active mixture 3 of carbonaceous material, manganese-dioxide, chlorides and water. At the center of this mixture is a carbon rod 4 surmounted by a brass cap 5 centrally positioned on a brass post 6. This post is fixed tightly in the drilled upper end of the carbon rod and has an integral flange 7 on which the cap 5 rests, and is also provided with a threaded nut 8 by which a wire can be readily connected to an external circuit.

Immediately above the inturned edge of the pulp board lining 2 and substantially flush with the upper edge of container 1 is a layer of sealing compound 9. This sealing compound may consist essentially of a mixture of rosin and a filler such as talc, poured in while in a hot molten conditions to form a relatively tight joint with the zinc container and with the sides of the carbon rod 4. Preferably the top level of

said compound is somewhat below the top edge of the carbon rod.

A dry cell constructed as above described can be slipped into a snugly fitting pasteboard carton and is serviceable for use either singly or when connected up in series with other cells. It has the disadvantage, however, that when subjected to heavy service with resultant liberation of gas beneath the layer 9 of sealing compound, leaks are likely to develop around the edge of the layer of sealing compound through which the gases will escape. This passage of gas is accompanied by a seepage of moisture and ultimately by a creepage of crystals through the leak. It often happens that these leaks develop at the joints between the sealing compound and the zinc, but they sometimes develop adjacent to the carbon rod. In either instance the leakage of moisture and the resultant formation of crystalline deposits of chlorides give to the cell an unsightly appearance and is likely to result in corroded terminals. However, the greatest disadvantage is that the active material leaking from the container will wet the pasteboard carton, thereby impairing its insulating qualities and offering easy opportunity for leakage of the electric current from the dry cell. If, as is common, the dry cell is placed side by side with others electrically connected to it in series relation, the moist carton or cartons will form an easy path for leakage from one dry cell to the next with resultant loss of electrical energy and ultimate destruction of one or both of the cells through the short circuit. The crystalline deposits of chloride are hygroscopic in character and keep the pasteboard cartons damp even after the original moisture has been evaporated.

In accordance with the present invention the foregoing disadvantages are overcome in simple and efficient manner. The dry cell, instead of being provided with a snugly fitting pasteboard carton, is provided with a carton 10 having an internal diameter large enough to provide an annular space 11 between the carton and the zinc container. The carton is waterproofed as by treatment with an asphaltum compound or a petroleum compound and is of a height somewhat greater than that of zinc container 1. The negative binding post 11'

of the cell is of unusual length, as shown in the drawing, and has a threaded collar 12 resting on the upper edge of the carton but not projecting substantially beyond the periphery of the carton.

In the assembly of the structure, the sealed zinc container is lowered into the carton and centered therein and then a layer of sealing compound 13 is poured in to close the end of the carton and thus seal up the annular receptacle which envelops the zinc container. This sealing compound may consist of rosin and an inert filler such as talc, about in the proportions of half and half, and is so regulated as to composition and temperature of pouring that it does not run down appreciably into the end of the receptacle, but on the contrary has its lower level substantially flush with the top of the zinc container and its upper level substantially flush with the top edge of the carton. The result is a very strong and stepped or offset joint at the inner edge of the layer 13 of sealing compound and a much weaker joint around the upper edge of the zinc container. Consequently when an excessive gas pressure is developed within the zinc container, as, for instance, when the battery is being very rapidly discharged, the gas will force itself upward, not around the carbon rod where the path is long and tortuous, but out over the edge of the zinc container and into the annular receptacle within the waterproofed carton. The seepage of moisture through a leak so developed or the creepage of salt through such a leak will do no harm, for the moisture and salt will be held within the waterproofed carton through which it cannot pass. Further moisture is not gathered up by the salt from the atmosphere and the top of the dry cell remains clean and without signs of the leakage that has actually occurred.

The structure above described is rugged in character and adapted for relatively rough handling during transportation and while in use. The waterproofed character of the structure renders it particularly suited for use in boats and where the moisture conditions are severe. The cells may be placed side by side in close contact without danger of the leakage of electricity from one to the other. In this connection there is advantage in having terminal 11 positioned within the periphery of the carton.

Changes in the details of the dry cell may be made without departing from the spirit of this invention, as defined by the appended claims.

I claim:

1. In a dry cell, the combination with a zinc container having active galvanic materials sealed therein, of a waterproofed carton enveloping said container and spaced therefrom to form an annular receptacle ex-

tending up to the top of the zinc container, whereby moisture may escape over the edge of the zinc container into said receptacle, and sealing compound closing the end of said carton; substantially as described.

2. In a dry cell, the combination with a zinc container having active galvanic materials sealed therein, of a waterproofed carton enveloping said container and having a height somewhat greater than said container, said carton being spaced from said container to form an annular receptacle extending up to the top of the zinc container, whereby moisture may escape over the edge of the zinc container into said receptacle, and sealing compound in contact with and closing the end of said carton, said sealing compound being in contact with the top of said zinc container and the upper level of said sealing compound being in contact with the upper edge of said carton.

3. In a dry cell, the combination of a zinc container, a carbon rod and active galvanic materials therein, a layer of sealing compound closing the end of said container and forming a substantially watertight joint at said rod, a waterproofed carton enveloping said container and extending above the top thereof, said carton being spaced from the sides of said container to form an annular receptacle extending up to the top of the zinc container, whereby moisture may escape over the edge of the zinc container into said annular receptacle, and sealing compound in contact with the upper edge of said carton and closing the top of said annular receptacle; substantially as described.

4. In a dry cell, the combination of a zinc container, a carbon rod and active galvanic materials in said container, a brass cap on said carbon rod, a layer of sealing compound closing the end of said container and forming a substantially watertight joint at said carbon rod, a waterproofed carton enveloping said container and extending above the top thereof, said carton being spaced from the sides of said container to form an annular receptacle, and a layer of sealing compound, the upper level of which is substantially flush with the upper edge of said carton and the lower level of which is substantially flush with the upper edge of said container, said compound closing the top of said annular receptacle, but without seriously interfering with the passage of moisture over the upper edge of said zinc container into said annular receptacle.

5. In a dry cell, the combination of a zinc container, a carbon rod and active galvanic materials therein, a brass cap on said carbon rod, a layer of sealing compound closing the end of said container and forming a substantially watertight joint at said rod below the top thereof, a waterproofed carton enveloping said container and extending above the

top thereof, said carton being spaced from the sides of said container to form an annular receptacle and sealing compound poured in substantially flush with the upper edge of said carton and closing the top of said annular receptacle, said compound making a relatively long stepped joint with the sides and end of said rod and with the sides of said brass cap whereby moisture driven from said container by gas pressure will find easiest escape over the edge of said zinc container and into said annular receptacle.

6. The combination of a dry cell comprising a zinc container having active galvanic

materials sealed therein, and a carbon electrode surmounted by a metallic cap; and an outer casing enveloping said container and forming an annular receptacle extending to the top of the container, the top of said casing being sealed so as to form moisture proof joints around said carbon electrode and cap and around the edge of the said outer casing, whereby any moisture escaping from the dry cell is confined in said annular receptacle.

In testimony whereof I affix my signature.

HENRY E. WARNCKE.