

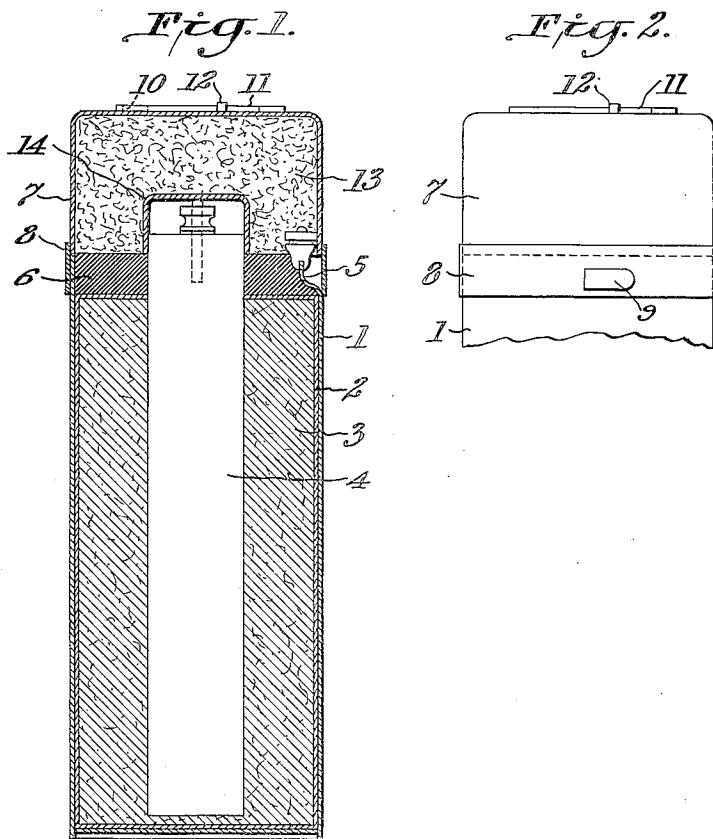
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H. D. BATCHELOR

HERMETICALLY SEALED DRY CELL

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Inventor:

Harry D. Batchelor,

J. Byrnes, Townsend & Bruckenstein,

Attorneys.

UNITED STATES PATENT OFFICE.

HARRY D. BATCHELOR, OF NEW YORK, N. Y., ASSIGNOR TO NATIONAL CARBON COMPANY, INC., A CORPORATION OF NEW YORK.

HERMETICALLY-SEALED DRY CELL.

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To all whom it may concern:

Be it known that I, HARRY D. BATCHELOR, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Hermetically-Sealed Dry Cells, of which the following is a specification.

This invention relates to dry cells and has particular reference to means for sealing such cells in a manner to prevent the passage of water vapor or gases, together with means for dissipating gaseous pressure within the cell.

It is generally accepted that the deterioration which dry cells undergo during the period before they are put into use is due in part to the slow escape of moisture through crevices between the seal and the electrodes, or through the pores of the carbon pole. This results in a progressive diminishing of the quantity of electrolyte solution and in shrinkage of the mix bobbin or bibulous lining, thus materially increasing the internal resistance of the cell and eventually rendering it inoperative. It is probably true, also, that wasteful electrolytic action in the cell is facilitated by the entrance of air through the openings referred to. Due to the alternating contraction and expansion of the gaseous contents of the cell under varying atmospheric temperature conditions, appreciable amounts of air may be caused to enter the cell. The oxygen so introduced may depolarize the minute voltaic couples set up between the zinc and its impurities in the presence of electrolyte, and so permit the destructive electrochemical action to continue.

For these and other reasons, the desirability of hermetically sealing dry cells has been recognized, but it has heretofore been regarded as impractical because of internal gaseous pressure. It is well known that gases produced by local action, decomposition of the mix or other causes, collect within the cell and may eventually attain sufficient pressure to bulge and rupture the seal or zinc cup, unless an opening of some sort is provided for their escape.

The object of my invention is to provide a hermetic seal containing a material capable of taking up the gases evolved during the pre-service life of the cell. This object is attained by enclosing the upper end of the cell in an impervious cap sealed to the zinc

container in such manner as to be easily removable when the cell is to be used, and packed with a material capable of fixing the gases evolved. The material may be an absorbent or adsorbent substance and is preferably activated carbon.

The invention will be described in detail in connection with the accompanying drawing, in which—

Fig. 1 is a vertical longitudinal section through a dry cell provided with a hermetically sealed cap packed with an adsorbent, and

Fig. 2 is a fragmentary side elevation showing the removable sealing means.

Reference numeral 1 denotes a zinc container, 2 a lining of bibulous material and 3 a mix bobbin containing a carbon rod 4. The zinc container has a marginal depression 5 to which a binding post may be attached so as to lie wholly within the outline of the container. A plastic seal 6 of the usual type is provided. This seal is non-hermetic but is sufficiently close fitting to prevent undue evaporation of moisture after the removal of the absolutely air-tight closure now to be described.

The hermetic seal comprises a cap 7, of metal or other impervious material, having a cross section corresponding to that of the container 1. The cap and container, placed with their margins in abutting relation, are secured together by means of a band 8 overlying their junction. The band 8 may be attached in any manner which will give a secure and air-tight joint, as, for example, by soldering it to both the cap and container. A tongue 9 is provided on the band 8 and is adapted to be passed through an opening 10 in key 11. When it is desired to remove the hermetic sealing cap 7, the band may be severed by engaging the tongue in the key and rotating the latter to tear the metal along the lines of the sides of the tongue extended, in a well known manner. A clip 12 may be provided on the top of cap 7, or elsewhere on the cell, for holding the key in handy position.

The cap 7 contains a body of absorptive material 13, such as activated charcoal, spaced from the carbon electrode and its binding post by an inverted cupped insulating sheet 14, of paper or the like. The charcoal may be prepared in any well known or suitable way and will of course be

filled into the cap 7 and placed in operative position without undue contact with the air. Gases evolved within the cell may pass through crevices between the plastic seal 6 and the electrodes, or through pores in the carbon rod and insulating sheet 14, into contact with the absorbent.

Unactivated charcoal and numerous other materials, as well as activated charcoal, are known to have the power to absorb relatively large volumes of gas. For the purposes of this invention, the mechanism of this action is relatively unimportant and the term "absorption" will be understood to be generic to adsorption, occlusion or the like. Any efficient absorbing material may be used. I prefer, however, to use activated charcoal, as the highly absorbent character of this substance makes it possible to supply sufficient material for taking up substantially all of the gas generated in the cell without unduly adding to its bulk, even where the cell is allowed to retain its hermetic seal for long periods. When the cell is to be put into service, the cap 7 will be removed as described, together with the insulating sheet 14. The service characteristics of cells so protected from the deleterious effects of loss of moisture, access of oxygen, or other causes due to incomplete isolation from the atmosphere, will be found substantially equal to those of freshly prepared cells.

It would of course be possible to supply sufficient absorbent to take up gases generated also during the active period of the

cell's life, and in such case the hermetic seal would be retained, the connecting wires being brought out in any suitable air-tight manner. The shape and mode of attachment of the sealing cap may also be modified to fit it for use with cells of non-cylindrical type, and various other changes in construction and relative arrangement of parts may be made within the scope of the appended claims.

I claim:

1. In a dry cell, means independent of the depolarizer for fixing gases evolved in said cell.
2. A hermetically sealed dry cell containing a material capable of absorbing gases evolved in said cell.
3. A hermetically sealed dry cell containing a carbonaceous material capable of absorbing gases evolved in said cell.
4. A hermetically sealed dry cell containing activated carbon disposed so as to take up gases evolved in said cell.
5. In a dry cell, a seal adapted to permit the passage of gases generated in the cell, a body of gas absorbing material upon said seal, and an air-tight cap about said material and engaging the wall of the cell.
6. In a dry cell, a cap hermetically sealing the cell and containing a gas-absorbing material, and means for removing the cap.

In testimony whereof, I affix my signature.

HARRY D. BATCHELOR.