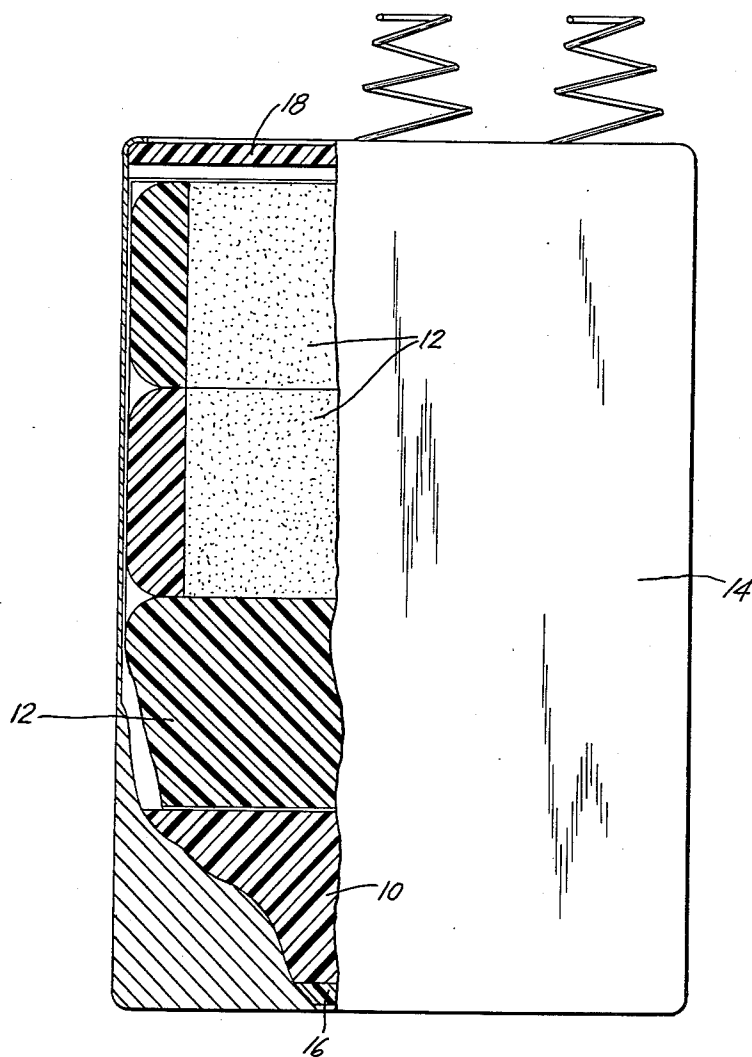


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BATTERY CONSTRUCTION
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BATTERY CONSTRUCTION

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3 Claims. (Cl. 136—110)

This invention relates to an improved battery construction, and more specifically, it relates to a battery construction for flat type galvanic cells which employ a magnesium anode.

An inherent property of a magnesium anode cell is expansion of the cell as it is being discharged. This is due to the fact that the volume of the reaction products formed during discharge of such cells is greater than the volume of the unreacted materials. This property must be kept in mind and in some manner be compensated for when providing a battery container for such cells. It has been suggested to cope with this volume expansion by providing a heavy duty steel container to withstand any pressure built up by expansion. Unfortunately, this method is expensive due to the cost of the rugged container required, and also an additional disadvantage of increased weight is present. Furthermore, the problem of cell expansion is compounded by the fact that it is desirable to maintain some degree of pressure on a stack of flat type cells at all times to insure low resistance electrical connection between the adjacent cells. In the absence of a heavy duty container, this pressure must not be allowed to build up uncontrollably.

The principal object of this invention is to provide means for applying a constant pressure on a stack of flat type magnesium anode dry cells which will not increase as the cells expand upon discharge.

The object of the invention is accomplished by placing a compressible substantially non-resilient material in line with the cell stack.

The invention will be more readily understood by reference to the accompanying drawing wherein the single FIGURE is a front elevational view, partially in section, of a lantern battery embodying the principles of the invention.

The use of a compressible but substantially non-resilient material in line with the cell stack, permits a pressure to be applied to the cell stack upon initial assembly of the battery to aid in the maintenance of good inter-cell electrical contact. As the battery is discharged, the cells expand as explained above, and due to the provision of the compressible material between the container and the cell stack, the cells are free to expand without any significant pressure build up within the cell. To insure the

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absence of any pressure build up, it is important that the compressible material employed be substantially non-resilient. Suitable compressible materials which have been employed include, a building board such as fiber board, and polyurethane foam.

As mentioned above and shown in the drawing, the compressible non-resilient material 10, is placed in line with one or more flat cells 12, within a metallic container shell 14. When the cell is assembled, the compression member 10 is positioned against a bottom plate 16 for container shell 14 and is of such an initial height that when the plurality of cells 12 are stacked on top of it and the container shell 14 is crimped over onto a top plate 18, a pressure is imposed on the stack to insure good electrical inter-connection. During discharge when the cells expand, a force will be exerted against the top plate 18 and against the compressible but substantially non-resilient member 10, which will slowly and steadily give way under the increased volume, thus insuring the maintenance of a pressure sufficient for good inter-cell electrical contact while preventing the build-up of a dangerous pressure. In the alternative, the stack of cells may be tied with a metal strap to offer a firm support for the cells to expand against in order to compress the substantially non-resilient material.

We claim:

1. A galvanic battery comprising a closed container; a plurality of flat galvanic cells arranged in stacked relation within said container; and a compression member between said stacked cells and an end of said container, said stacked cells and said member being maintained in compression within said container; said member being of a non-resiliently yieldable material which will slowly and steadily give way under a volume expansion of said stacked cells without a pressure build-up in order to accommodate expansion of said stacked cells upon discharge of said battery, thereby preventing distortion of said container while maintaining said stacked cells in compression.

2. The galvanic battery of claim 1 wherein said compression member is fiber board.

3. The galvanic battery of claim 1 wherein said compression member is polyurethane foam.

References Cited in the file of this patent

UNITED STATES PATENTS

1,606,286	Zook	Nov. 9, 1926
2,346,695	Miller	Apr. 18, 1944
2,780,350	Simon et al.	Feb. 5, 1957
2,895,603	Freeman	July 21, 1959

FOREIGN PATENTS

769,680	Great Britain	Mar. 13, 1957
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