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PRIMARY CELL

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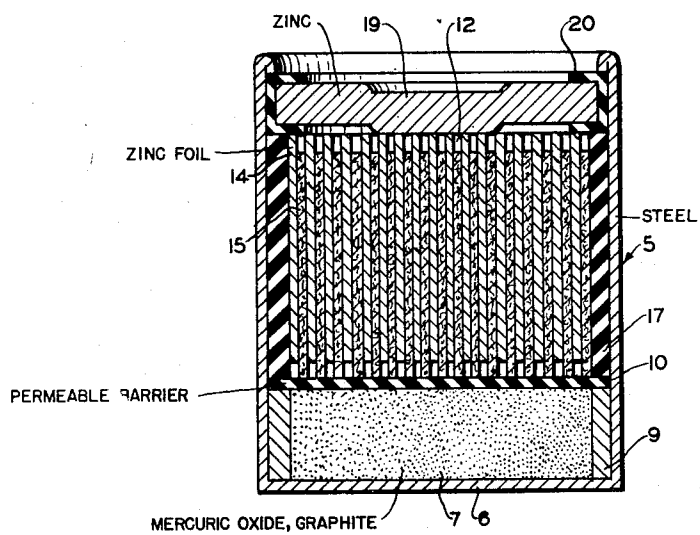


FIG. 1.

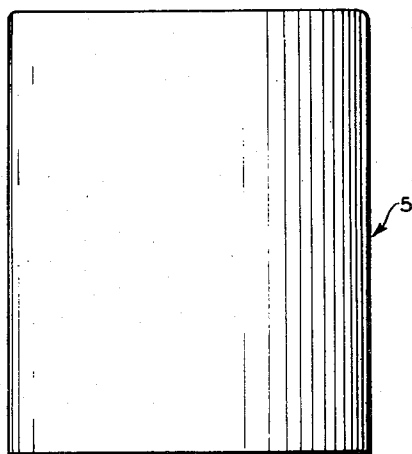


FIG. 2.

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PRIMARY CELL

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Application November 6, 1945, Serial No. 627,078

1 Claim. (Cl. 136—107)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

1 The invention described herein may be manu-
factured and used by or for the Government for
governmental purposes, without the payment to
me of any royalty thereon.

This invention relates to primary alkaline dry
cells of the zinc-mercuric oxide type.

An object of the invention is to improve the
shelf life of such primary alkaline dry cell and
to provide a cell structure affording better in-
sulation between the anode and the cell con-
tainer and also between the anode and the cath-
ode of the cell.

A further object is to provide a cell structure
which will avoid the transfer of material from
the cathode to the anode and vice versa, such
transfer causing internal short circuits.

A still further object is to provide a construc-
tion which will allow the use of a simpler, and
therefore more economical, form of cell container
than that heretofore employed.

The invention is embodied in a primary cell
having a container, an anode and a cathode in
the container, an insulator around the cathode,
a barrier between the two electrodes, which bar-
rier has its peripheral margin lying on the men-
tioned insulator and pressed thereagainst to
form an effective seal for the purpose of prevent-
ing the transfer of material from one electrode
to the other, such transfer being deleterious to
the cell by causing internal shorts with a conse-
quent shortening of the cell's shelf life. Other
features will be described below which further
increase the effectiveness of the mentioned seal
and provide improved insulation between the
electrodes and between these and the container.

The drawings illustrate one form of the in-
vention.

In the drawings:

Figure 1 is a central vertical section of a pri-
mary cell; and

Figure 2 is an elevational view.

Referring to the drawings for a more detailed
description thereof, the numeral 5 indicates a
cylindrical steel container having a bottom 6. A
circular depolarizing cathode 7 lies on the bot-
tom of the container and may be a body made by
compressing a mixture of mercuric oxide and
graphite, both in comminuted form, as under-
stood in the art.

The cathode 7 is laterally surrounded by a ring
9, which fills the space between the periphery of
the cathode and the inner surface of the con-
tainer, and is flush with the upper surface of the
cathode. Said ring may be of either metallic or
insulating material.

2 The ring 9 supports a permeable or porous
barrier 10, which is about 0.003 inch thick and
allows the passage of inter-electrode current.
The provision of a solid support for the barrier,
as afforded by the ring 9, is necessary, due to
the fact that the cathode becomes soft. Such a
support within the cell also allows the use of
a plain cylindrical container, in lieu of a form
previously employed, which was formed with a
ledge for supporting the barrier and the elements
above it hereinafter described. Said barrier has
a diameter equal to the internal diameter of the
container, its peripheral margin lying on the ring
9, while its inner part of the lower surface rests
on the cathode 7. It will thus be seen that the
ring 9 and the barrier 10 form an effective seal
to prevent material from being transferred to
and from the cathode. The barrier may be made
of any suitable material such as, for example, a
sheet of polyvinyl alcohol.

An anode 12 is disposed in the upper part of
the container, and is of substantially the same
diameter as the cathode 7, and rests on the bar-
rier 10. This anode is shown as comprising a
roll or spiral formed by winding contacting strips,
14 and 15, of zinc foil and paper respectively.
The paper is adapted to absorb the electrolyte,
with which it is subsequently saturated, as known
to the art. It will be noted that the paper and
the foil are in lapped or offset relation to each
other, the foil extending above the paper while
the latter extends below the foil and contacts
the barrier 10.

Surrounding the anode, and filling the space
between it and the inner surface of the upper
part of the container, is an insulating compo-
nent 17, which rests on, and presses against, the
marginal portion of the barrier. The insulator
17 therefore not only serves to insulate the anode
from the inner wall of the container, but, by fill-
ing the space mentioned, and also by pressing
on the marginal portion of the barrier, functions
to assist in making the barrier a more effective
seal to prevent the movement of material from
each electrode to the other.

A metallic top or closure 19, preferably of zinc,
is provided for the cell. This top has a centrally
depressed area which contacts the upper surface
of the anode 12, while the relatively elevated
peripheral margin fits into a channelled insulat-
ing grommet 20. The grommet is pressed onto
both sides of the marginal portion of the top 19
to form a tight seal, in combination with the
upper edge of the container. This upper edge is
turned inwardly and downwardly to exert pres-

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sure on the grommet 20 and the top 18, so that the anode 12 and the insulator 17, by transmitted pressure, bear down on the barrier 10, whereby the latter forms the desired effective seal for the purpose previously mentioned.

The nature of the electrolyte for this type of cell is known, being an aqueous solution of an alkali hydroxide, substantially saturated with zinc oxide when the anode is zinc. For convenience, it is stated here that the electrolyte may be made by dissolving 75 grams of potassium hydroxide in 100 grams of water, to which solution 12 grams of zinc oxide are added and dissolved therein.

What is claimed is:

In a hermetically sealed primary alkaline dry cell of the zinc-mercuric oxide type, a container, a cathode of plain upper surface pressed into the bottom of said container, a first cylindrical ring surrounding the periphery of said cathode and in contact with the wall of said container, an ionically permeable barrier in contact with the upper surface of said cathode and extending entirely across said container with its periphery in contact with the wall of said container, said ionically permeable barrier being supported at its peripheral margin by said first cylindrical ring, an anode-spacer positioned above and in contact with said barrier, a second cylindrical

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ring of insulating material surrounding the periphery of said anode-spacer in contact with the wall of said container and in contact with the peripheral margin of the ionically permeable barrier, both said cylindrical rings being substantially the same heights as the respective electrodes, a metal top disc positioned above the anode-spacer, the marginal portions of said disc being insulated from the container and the center portion of said top disc being in pressure contact with the upper end of the anode-spacer structure, and means formed on said container pressing the insulated marginal portion of said top disc against the upper end of said second cylindrical ring.

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