Jan. 10, 1939. C. R. LINES 2,143,245

DRY CELL

Filed Oct. 2, 1931

Fig. 1.

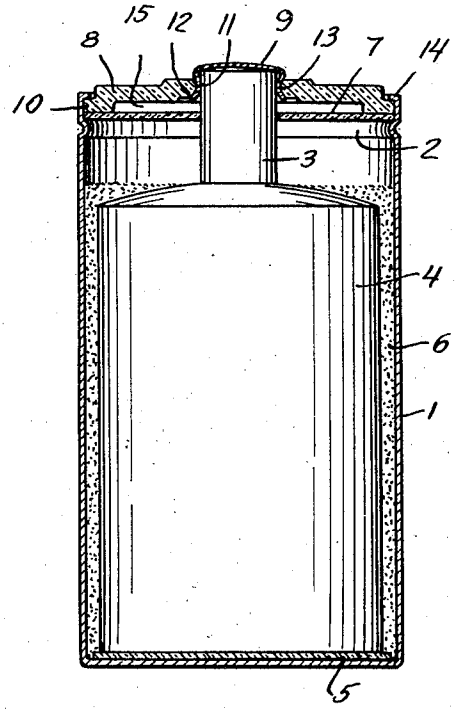
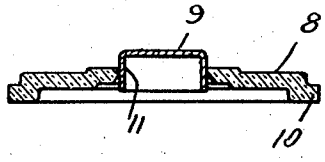


Fig. 2.



INVENTOR
C. R. Lines
BY
Pennie, Davis, Marvin & Edmonds
ATTORNEYS

Patented Jan. 10, 1939 2,143,245

UNITED STATES PATENT OFFICE

2,143,245

DRY CELL

Clifford R. Lines, New Haven, Conn., assignor, by mesne assignments, to Winchester Repeating Arms Company, a corporation of Maryland

Application October 2, 1931, Serial No. 566,414

7 Claim. (Cl. 136—133)

This invention relates to dry cells and more particularly to an improved end closure therefor.

In carrying out my invention I provide an end closure disc of insulating material having a metal contact cap permanently secured thereto. The disc may be molded from plastic or resinous materials, such as phenolic condensation products or the like with the cap incorporated in the disc at the time of molding, or the disc may be stamped from sheet material and the cap inserted in a central opening and spun or pressed into place.

The disc is employed in conjunction with a washer adapted to be seated on a circumferential ridge or bead arranged close to the mouth of the can. The disc is placed over the washer and the edges of the can crimped or spun over the periphery of the disc to hold it in place. Adjacent the periphery the disc is offset so that the central portion thereof is spaced from the adjacent washer. The contour of the surface of the disc produces a cell having a pleasing appearance and it also provides a construction in which a straight edge or plane surface arranged on one of the cell terminals is prevented from contacting with the other terminal of the cell. This tends to prevent accidental short-circuiting of the cell.

In the accompanying drawing I have shown one form of the invention. In the drawing,

Fig. 1 is a central, longitudinal, sectional view of a cell constructed in accordance with my invention; and

Fig. 2 is a similar view of the closure disc with the contact cap placed in the disc prior to pressing or spinning it into integral relation with the disc.

Referring to the drawing, the reference numeral 1 designates a zinc can which forms one of the electrodes of the cell and which may be formed of seamless drawn zinc in the usual manner. Adjacent the top the can is provided with an inwardly projecting circumferential bead or ridge 2. The cell is provided with the usual core consisting of a carbon pencil 3 and a surrounding depolarizing mixture 4, preferably formed of carbonaceous material and manganese dioxide as is usual in cell constructions. An insulating disc or washer 5 is placed on the bottom of the core to insulate the positive terminal from the zinc can. A suitable electrolytic paste 6 surrounds the core and extends slightly above the top of the core in the usual manner. In assembling the cell the electrolyte solution is poured in the empty zinc can and the preformed core then placed in the can causing the solution to rise to the proper level. A flat insulating washer 7 is then placed on the bead or ridge 2. This washer is provided with a central opening through which the carbon pencil 3 is adapted to project. The washer serves to centralize the core and to retard evaporation of the electrolyte solution during the period in which the solution sets to form a paste.

In completing the cell construction I employ an end closure disc 8 which, as stated, may be molded of suitable plastic material or stamped from sheet material. The closure disc is provided with a central opening adapted to receive a metal contact cap 9 which engages the carbon pencil when the closure disc is in position as shown in Fig. 1 of the drawing. Adjacent the periphery of the disc it is provided with an off-set or flange 10 arranged in a plane below the body portion. When the disc is formed of sheet material, the cap 9 is inserted in a central opening as shown in Fig. 2 of the drawing and the skirt 11 of the cap is then spun or pressed to produce an outwardly flared lower end 12 shown in Fig. 1 of the drawing which forms an integral structure of the closure disc and cap. This also bulges or mushrooms the upper portion of the cap forming a constricted central portion 13 which frictionally engages the carbon pencil and securely anchors said cap to the insulating disc. When the closure member 8 is molded from plastic material, the skirt 11 of the cap is preformed into the shape shown in Fig. 1 of the drawing to provide the flared end 12 and the constricted central portion 13. The preformed disc is placed in the cell with the carbon pencil 3 arranged in the metal contact cap 9 as shown and the upper edge of the can is then crimped over the flange 10 of the disc as indicated at 14. This provides a space 15 between the body portion 8 of the closure member and the washer 7. As the washer 7 does not form a gas tight fit around the carbon pencil 3, the space 15 communicates with and forms an enlargement of the usual gas space at the top of the cell.

The advantages of the described construction will be apparent to those skilled in the art. The provision of the integral end closure member and metal contact cap permits ease of assembly and the construction of the cap resists separation from either the end closure disc or the carbon pencil after assembly. The tightly contacting connection between the carbon pencil and the contact cap insures perfect electrical conductivity. The shape of the end closure member 8 with the offset peripheral flange 10 over which the edge of the zinc can is crimped as at 14 provides an end

structure for the cell which prevents a straight edge or plane surface lying over the cell from contacting with the two cell terminals and thus short-circuiting the cell. It will be seen from an inspection of Fig. 1 of the drawing that anything lying on the cell so as to engage the cap 9 will contact with the closure member adjacent the outer edge of the body portion 8 but will not be in contact with the zinc can. Similarly a straight edge touching the zinc can will engage the outer portion of the body member 8 of the closure disc and will extend over the cap 9 out of contact therewith.

I claim:

1. A dry cell comprising a zinc can, a carbon pencil located in said can and projecting slightly above the upper edge of said can and an end closure comprising a disc of insulating material of substantially the same diameter as said can and secured to the upper edge of said can, said disc having a central opening through which the carbon pencil extends, and a sheet metal contact cap arranged in said opening and engaging the upper end of said carbon pencil, said cap having a flaring skirt forming a constricted central portion engaging said carbon pencil, said skirt forming an exterior groove embracing said insulating disc.

2. A dry cell having a carbon electrode, and an end closure comprising a disc of insulating material having a central opening, and a sheet-metal contact cap having a depending skirt, the skirt being shaped to form an inner constricted portion and an external groove, the central opening of said disc being received in said groove to form a unitary closure member, and the carbon electrode being received in said constricted portion of said skirt to anchor said closure member to said electrode.

3. A dry cell comprising a zinc can, a carbon electrode arranged in said can, and an end closure comprising a preformed disc of insulating material, having a peripheral flange arranged in a plane below the central portion of said disc, the upper edge of said can being crimped over the periphery of said flange, and a contact cap carried by the central portion of said disc and engaging said carbon electrode, the upper edge of said can being below the surface of the central portion of said disc whereby a straight line connecting the cap and the edge of said can passes through said disc.

4. A dry cell comprising a zinc can, a carbon electrode arranged in said can, an inwardly extending circumferential bead formed adjacent the top of said can, a washer seated on said bead, and an end closure comprising a preformed disc of insulating material, having a peripheral flange arranged in a plane below the central portion of said disc the upper edge of said can being crimped over the periphery of said flange, and a contact cap carried by the central portion of said disc and engaging said carbon electrode, the upper edge of said can being below the surface of the central portion of said disc whereby a straight line connecting the cap and the edge of said can passes through said disc.

5. In a dry cell having a metallic cup whereof the edge is exposed and a cartridge therein having an upwardly projecting central electrode, in combination, a preformed closure formed with an aperture to receive the projecting end of the central electrode, said closure being so formed that a line tangent to the electrode and the upper edge of the cup passes through the closure, whereby simultaneous contact of said electrode and cup by a plane surface is prevented.

6. In a dry cell having a metallic cup whereof the edge is exposed and a cartridge therein having an upwardly projecting central electrode, in combination, a preformed non-metallic closure formed with an aperture to receive the projecting end of the central electrode, said closure being so formed that a line tangent to the electrode and the upper edge of the cup passes through the closure, whereby simultaneous contact of said electrode and cup by a plane surface is prevented.

7. In a dry cell, in combination, a closure formed with a central aperture, a metallic cup whereof the edge is exposed and whereof the wall extends upwardly at least to the plane of the upper surface of the marginal portion of the closure, a cartridge in the cup having a central electrode projecting upwardly through the aperture of the closure and material of the closure between the marginal portion thereof and the aperture being disposed sufficiently above the plane of the marginal portion that a line tangent to the electrode and the upper edge of the cup passes through material of the closure whereby simultaneous contact of said electrode and cup by a plane surface is prevented.

CLIFFORD R. LINES.