March 17, 1953 G. A. F. WINCKLER 2,632,032

AIR CELL VENT

Filed July 23, 1949

FIG. 1

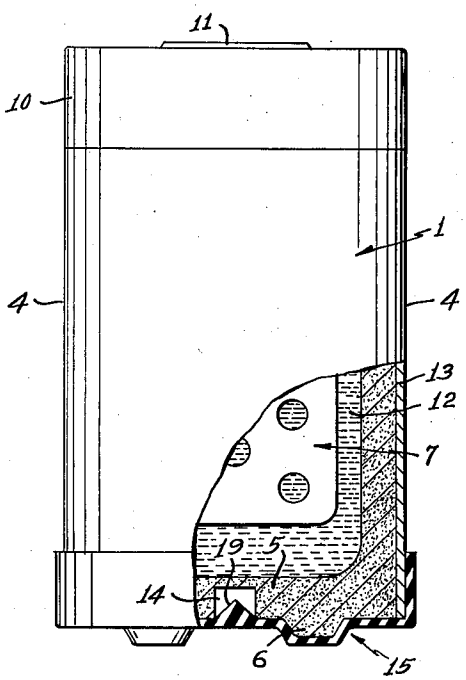


FIG. 2

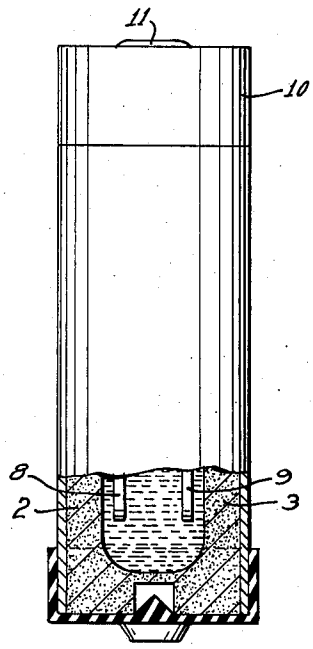
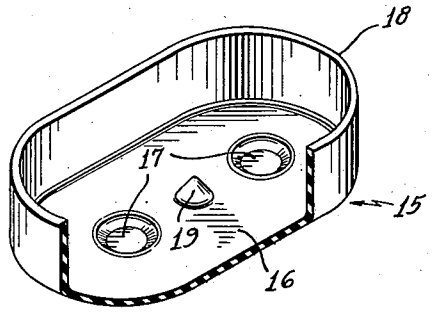


FIG. 3



INVENTOR.
Gunnar A.F. Winckler
BY
Pennie, Edmonds, Morton and Barrows
ATTORNEYS

Patented Mar. 17, 1953 2,632,032

UNITED STATES PATENT OFFICE

2,632,032

AIR CELL VENT

Gunnar A. F. Winckler, Milford, Conn., assignor to Olin Industries, Inc., New Haven, Conn., a corporation of Delaware

Application July 23, 1949, Serial No. 106,458

5 Claims. (Cl. 136—133)

1

This invention relates to improvements in primary cells and generally to improvements in primary cells using an air depolarized cathode with a suitable electrolyte and a metal anode. More particularly the invention relates to improvements in cells functioning by the zinc-alkali-carbon-oxygen electro-chemical system.

Cells of the air depolarized type, particularly the zinc-alkali-carbon-oxygen type, possess many advantages over primary cells of other types for certain uses. One disadvantage of such cells is that they must be sealed during shelf life and at times when they are inactive when on intermittent operation. Otherwise the utility of the cell is destroyed by contamination of carbon dioxide from the air or by evaporation of water from the electrolyte.

It has been proposed to provide a cell of this type in which the cathode is provided with an outer casing or covering having an opening therein for the admission of air. During shelf life, or when the cell is not in use, this opening is covered by a tape having an adhesive coating on one side. While the provision of such a tape overcomes the disadvantage mentioned above, its use is open to several objections. The adhesive coated tape is sticky and not easy to handle and is not readily replaceable when the cell is not in use. It frequently leaves a sticky residue on the case of the cell and it does not lend itself to mechanical application.

In the present invention I provide an air depolarized cell in which the cathode is in the form of a cup and may serve as the outer casing. Throughout most of its surface the cathode is covered by an outer casing, or is otherwise treated to prevent passage of air. On one of the surfaces I provide a suitable vent through which air may be admitted to the cell. I also provide a seal or cover member adapted to fit over the surface of the cathode in which the vent is provided. The cover or seal is made of rubber, synthetic rubber or one of the elastic plastic compositions, such as polyethylene, polyvinyl chloride or the like. It may be provided with a projection on its inner surface to be received in the vent opening in the electrode to form a more complete seal.

In the accompanying drawing I have shown one embodiment of the invention. In this showing:

Fig. 1 is a front elevation of a cell, the lower part being shown in section to illustrate the construction of the seal;

Fig. 2 is an end elevation, the lower part being shown in section; and

Fig. 3 is a perspective view of the seal removed from the cell.

2

Referring to the drawing the reference numeral 1 designates generally the carbon cup. This cup is formed of a suitable moldable mixture of activated carbon and a plastic binder which will produce an electrode having the desired characteristics. It must be permeable to air to permit the oxygen from the air to reach the interface between the carbon electrode and the contained electrolyte. It must also be impermeable to the electrolyte solution as otherwise the pores or spaces in the carbon will become filled with electrolyte and thus block off the admission of air.

The cell may be of any desired size and shape and I have illustrated a cell which is oval in cross section consisting of front and back walls 2 and 3 and rounded ends 4. The walls are joined by a bottom 5 on which buttons 6, serving as terminals, may be molded.

An anode 7 formed of a strip of zinc which is bent into U-shape forming two legs 8 and 9 (see Fig. 2) is arranged in the carbon cup being molded into a plastic cap 10 which snugly fits on the top of the carbon cup. The electrode is provided with a portion 11 extending through the plastic cap to serve as a terminal.

Any of the usual electrolytes may be employed. In actual use I have employed a 25 percent sodium hydroxide solution. The electrolyte is placed in the cup, as indicated at 12. The electrolyte may be immobilized by known means, for example, by the addition of a suitable absorbent or by the addition of a suitable starch or gum.

To prevent contamination of the cell by carbon dioxide from the air while the cell is on shelf life or during periods of inactivity when the cell is in intermittent use, the cathode may be provided with an outer casing or a portion of the interior surface of the electrode may be coated with a plastic binder impermeable to air. In the drawing I have illustrated an outer casing 13. This may be formed by electroplating the exterior of a portion of the carbon cup with metal. The casing may be formed in any other manner as by spraying a metal coating, or a thin metal shell in which the carbon electrode is snugly received may be employed. To obtain optimum electrical contact it is desirable that there be intimate contact between the metal coating and the cup, such as is obtained by electroplating.

As shown, the coating 13 extends downwardly from the bottom of the plastic cap 10 to a point adjacent the bottom of the cell. The bottom wall 5 of the cell is provided with a recess 14 forming a vent. When the cell is in use air for depolarization enters through the vent 14.

At any time the cell is not in use, the admission of air is prevented by a cover or seal 15. As shown, the seal consists of a main portion 16 fitting over the bottom of the cell having depressions 17 in its surface to receive the buttons 6 and having a flange 18 which is received on the bottom of the walls of the cell when the seal is in place. It may also be provided with a conical teat 19 of a size to be received within the vent 14 to effectively seal the vent.

As stated, the seal 15 is formed of rubber, synthetic rubber, polyethylene, polyvinyl chloride or other suitable elastic material. It fits tightly on the bottom of the cup 1 and is held in place by the flange 18. When it is in place, entrance of air to the cell is prevented and the life of the cell is preserved. Being flexible, it is distended by accumulation of gases within the cell, and permits such gases to escape. When the cell is to be used, the seal is removed and if the cell is to be inactive for any period of time, the seal may be replaced.

It will be apparent that a removable seal of this type possesses many advantages over the expedients heretofore employed for preserving the life of an air depolarized cell during periods of inactivity.

I claim:

1. An air depolarized cell having vents for admission of air in one surface of the cell, means for preventing admission of air through the remainder of the exterior of the cell, and a flexible seal removably and replaceably mounted on the surface in which the vent is arranged, the seal having a flange engaging adjacent surfaces of the cell to retain it in position the seal being capable of distending to permit escape of gases from the cell.

2. An air depolarized cell comprising a carbon cup forming a cathode, a metal anode in the cup, an electrolyte solution therein, the walls of the cup being provided with means to prevent admission of air throughout most of the exterior of the cup, and being provided with a vent opening in the remaining portion, and an elastic seal removably and replaceably mounted on the cup over the vent opening the seal being capable of distending to permit escape of gases from the cell.

3. An air depolarized cell comprising a carbon cup forming a cathode, a metal anode in the cup, an electrolyte solution therein, the walls of the cup being provided with means to prevent admission of air, the bottom of the cup being provided with a vent for admission of air, and an elastic seal removably and replaceably mounted over the bottom of the cup the seal being capable of distending to permit escape of gases from the cell.

4. An air depolarized cell comprising a carbon cup forming a cathode, a metal anode in the cup, an electrolyte solution therein, the walls of the cup being provided with means to prevent admission of air, the bottom of the cup being provided with a vent for admission of air, and an elastic seal removably and replaceably mounted over the bottom of the cup, the seal being provided with a flange engaging the walls of the cup to retain it in place the seal being capable of distending to permit escape of gases from the cell.

5. An air depolarized cell comprising a carbon cup forming a cathode, a metal anode mounted therein, an electrolyte in the cup, a metal casing arranged over the walls of the cup to prevent admission of air through the walls of the cup, and an elastic seal removably and replaceably mounted over the bottom of the cup, the seal being provided with a flange engaging the walls of the cup to retain it in position and being provided with a projection on its inner face to be received in the vent in the bottom of the cup the seal being capable of distending to permit escape of gases from the cell.

GUNNAR A. F. WINCKLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
406,223	Lee	July 2, 1889
686,642	Wayte	Nov. 12, 1901
1,184,135	Rudolphs	May 23, 1916
1,196,611	Tassin	Aug. 29, 1916
1,484,779	Heise	Feb. 26, 1924
1,549,851	Benner	Aug. 18, 1925
1,650,319	Briggs	Nov. 22, 1927
1,865,764	Keenan	July 5, 1932
2,074,506	Heise	Mar. 23, 1937
2,124,648	Brennan	July 26, 1938

FOREIGN PATENTS

Number	Country	Date
5,081	Great Britain	May 7, 1903