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PROVISIONAL SPECIFICATION.

IMPROVEMENTS IN OR RELATING TO PRIMARY WET CELLS, PARTICULARLY, ALKALINE MANGANESE
 DIOXIDE CELLS AND TO SAC ELEMENTS THEREFOR.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAFI MARG, NEW DELHI-1, INDIA, AN INDIAN REGISTERED
 BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT (ACT XXI OF 1860).

The following specification describes the nature of this invention.

This is an invention by HANDADY VENKATAKRISHNA UDUPA, Scientist and MAHADEV GOVIND POTDAR,
 Scientist, both of the Central Electrochemical Research Institute, Karaikudi-3, Madras State, India both Indian
 citizens.

This invention relates to improvements in or relating to
 alkaline manganese dioxide cells for telecommunication and
 like purposes.

Hitherto it has been proposed to make sac elements
 for Leclanche type wet cells for telecommunication purposes
 using manganese dioxide ores, carbon black, ammonium
 chloride etc. and use a solution 15% w/v of ammonium
 chloride as electrolyte.

This is open to objection in that the utilisation of
 manganese dioxide is not complete and is of the order of
 only 70 to 80 per cent on the basis of a change of one
 Faraday of electricity per mole of manganese dioxide.

The object of this invention is to obviate these dis-
 advantages by using (1) indigenously available manganese
 ores, (2) an alkaline electrolyte, (3) a suitable alkali resistant
 diaphragm material for wrapping the bobbin and (4) alkali
 resistant sealing compound in the place of pitch composition
 normally used, all other aspects remaining the same as in
 Leclanche type sac elements.

To these ends, the invention broadly consists in making
 the bobbin of the sac element in the normal way as per
 IS-Specification and wrapping it in alkali resistant cloth,
 sealing the bottom and top ends with alkali resistant plastic
 material.

A 15 to 30% caustic soda solution, preferably 20%
 solution, containing 5 to 10% sodium zincate is used as
 electrolyte for the cell using the above mentioned sac
 element, the other electrode being amalgamated zinc in the
 form of either rod or sheet.

The mix for making the bobbins could have the following
 composition: Ore, 65 to 80%, acetylene black 8 to 12%,
 zinc chloride 2 to 3%; Water 16 to 20%.

The following typical example is given to illustrate the
 invention:

EXAMPLE

Bobbins are made having the following composition:

Ore	70%
Acetylene black	10.7%
Zinc chloride	2.3%
Water	17.0%

Pressure employed for making the bobbin	100 lb/sq.in.
Height of bobbin	6" or 150 mm
Diameter —do—	3" or 75 mm
Weight —do—	1200 g.
Diaphragm	Nylon cloth
Top & bottom covered by a paste of plastic in suitable solvent, such as perspex in trichloroethylene.	
Total hours of discharge obtained through 10 ohms to 0.75V as per IS Specification	2976 Hours

Normal Leclanche type sac element with the same com-
 position in 15% ammonium chloride solution as electrolyte
 gives a performance of 2184 hours.

IS Specification for Leclanche sac cells expects 1440 hours.

The following are among the main advantages of the
 invention:

1. Weight for weight of the sac element used, the dura-
 tion of discharge under IS specification conditions is twice
 the requirement given in the specification.

2. At any instant during the discharge as above, the
 closed circuit voltage (CCV) is higher in this system than
 in the Leclanche cell.

3. Maintenance is simplified, as the replacement of
 electrolyte in this case not as frequent as in the Laclanche
 sac cell.

4. The overall advantage of the cell in view of the (1)
 above will reduce the replacement cost of sac elements by
 more than half.

5. The sac elements required for this invention could
 be made by conventional equipments already being employed
 for the manufacture of Leclanche type sac elements.

R. BHASKAR PAI

Patents Officer,

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH.

Dated this 7th day of May 1965.

COMPLETE SPECIFICATION.

IMPROVEMENTS IN OR RELATING TO PRIMARY WET CELLS, PARTICULARLY ALKALINE MANGANESE
 DIOXIDE CELLS AND TO SAC ELEMENTS THEREFOR.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAFI MARG, NEW DELHI-1, INDIA, AN INDIAN REGISTERED
 BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT (ACT XXI OF 1860).

*The following specification particularly describes and ascertains the nature of this invention and the manner
 in which it is to be performed.*

This is an invention by HANDADY VENKATAKRISHNA UDUPA, Scientist and MAHADEV GOVIND POTDAR,
 Scientist, both of Central Electrochemical Research Institute, Karaikudi-3, Madras State, India, both Indian
 citizens.

This invention relates to improvements in or relating
 to primary wet cells, particularly, alkaline manganese dioxide
 cells, and to sac elements therefor.

Normally the sac elements for wet cells of the Leclanche
 type are made using manganese dioxide, carbon black, zinc
 chloride, ammonium chloride and water. These raw materials

are thoroughly mixed together and pressed round a central
 conducting carbon rod in the conventional manner. These
 sac elements are used for making wet cells and batteries in
 conjugation with an aqueous solution of 15% w/v of
 ammonium chloride as electrolyte zinc rod as the other
 electrode.

Price: TWO RUPEES.

The performance of these sac elements indicates that the utilization of manganese dioxide is low.

The object of this invention is to obviate the low utilization of manganese dioxide.

This invented alkaline manganese dioxide cell consists of zinc as one electrode, alkali metal hydroxide solution as an electrolyte and a sac element prepared by mixing manganese dioxide ore and other normal ingredients mentioned hereinabove as the other electrode.

The sac element is wrapped in a diaphragm of alkali resistant porous material, and is sealed with alkali resistant sealing composition at the top and bottom of the sac element. It is provided with a central rod made out of carbon or alkali resistant metallic rods such as nickel plated iron.

The bobbin of the sac element is made in the normal way as per IS specification and wrapped in alkali resistant cloth, sealing the bottom and top ends with alkali resistant plastic material.

A 15 to 30% caustic soda solution, preferably 20% containing 5 to 10% sodium zincate is used as electrolyte for the cell, using above mentioned sac element, the other electrode being amalgamated zinc rod or sheet.

The mix for making the bobbins could have the following compositions :

Ore	65 to 80%
Carbon black	8 to 12%
Zinc chloride	2 to 3%
Water	16 to 20%

The sac elements made by the said method give a total performance of 3000 hours as against the specifications for a prototype of normal Leclanche' type cell which expects only 1440 hours.

The substitution of plastic sealing compound reduces the overall weight of the sac element by 150 to 200 grams.

The present invention consists of a process for making sac elements which comprises of mixing the normal ingredients mentioned hereinabove wherein the diaphragm is replaced by alkali resistant cloth and sealing compound is replaced by plastic material which is also alkali resistant using carbon rods.

The following typical examples are given to illustrate the invention :

Bobbins are made with the following compositions :

Ore	70%
Carbon black	10.7%
Zinc chloride	2.3%
Water	17.0%
Pressure employed for making bobbins :	100 lb/in ²
Height of bobbins	150 mm
Diameter of bobbin	75 mm
Weight of bobbin	1200 g

Diaphragm	Nylon cloth
Total hours of discharge through 10 ohms to 0.75V in alkaline electrolyte	3000 hours
IS specification for normal sac element in aqueous ammonium chloride electrolyte	1440 hours.

Advantages :

1. Weight per weight of the sac elements used, the duration of discharge under IS specification is more than twice.

2. At any instant during discharge, the closed circuit voltage is higher than the normal Leclanche system.

3. Maintenance is simplified as the replacement of electrolyte in this case is not as frequent as in the normal cell.

4. Overall advantage of the cell in view of the (1) above will reduce the replacement cost of sac element by more than half.

5. The sac elements required for this invention could be made by conventional equipment already being employed for manufacture of Leclanche type sac elements.

Summary :

This invention is an improvement over the conventional Leclanche wet cells. This incorporates greater utilization of the ingredients of the sac element, higher potentials during working, less frequency of changing of the electrolyte, lowering in maintenance cost, longer life and no extra investment for its manufacture by existing industry.

We claim :

1. An alkaline manganese dioxide cell which consists of zinc as one electrode, alkali metal hydroxide solution as an electrolyte and a sac element prepared by mixing manganese dioxide ore and other normal ingredients mentioned hereinabove as the other electrode.

2. An alkaline manganese dioxide cell as claimed in Claim 1 wherein the sac element is wrapped in a diaphragm of alkali resistant porous material.

3. An alkaline manganese dioxide cell as claimed in Claim 1 or 2 wherein the sac element is sealed with alkali resistant sealing composition at the top and bottom of the sac element.

4. An alkaline manganese dioxide cell as claimed in any of the preceding claims wherein the sac element is provided with a central rod made out of carbon or alkali resistant metallic rods such as nickel plated iron.

5. An alkaline manganese dioxide cell substantially as hereinbefore described.

R. BHASKAR PAI

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Dated this 23rd day of February 1966.