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"A NEW ANODE DESIGN FOR USE IN PRIMARY WET CELLS"

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

This is an invention by MHADEV GOVIND POTDAR Scientist, of the Central Electrochemical Research
Institute, Karaikudi-3, INDIA, Indian citizen.

PROVISIONAL

The following Specification describes the nature of this invention.

This invention relates to a new anode design for use in primary wet cells.

Hitherto it has been proposed to use the anode i.e., the metal electrode in the primary wet cells in the form of a cylindrical sheet or a rod with proper provision for electrical contacts.

This is open to the objection that the life of such an electrode is limited by the heavy corrosion of the electrode at the top during drain and during idle period. The electrode gets cut at the interface of solution and air and much of the active metal remains unused and goes as waste. This leads to a lessening of the utilization of metal.

The object of this invention is to obviate these disadvantages by using a new form of the anode in the place of existing sheet or rod forms.

To these ends the invention broadly consists in making the electrode out of the usual metals used in wet cells as anodes, in the form of a cone tapering downwards and ending in a small disc at the bottom end. The dia at the shoulder i.e., at the top is approx. 1" and above the shoulder it is reduced to $\frac{1}{2}$ " for giving electrical connections either by binding screw or by welding/soldering lead. The

diameter at the bottom is $\frac{1}{4}$ " to $\frac{1}{2}$ " and the disc is of $\frac{3}{4}$ " dia. with a thickness of $\frac{1}{8}$ ". The height of such an electrode depends upon the counter electrode. For example, for Sac S1, the height of the zinc rod from a disc to shoulder will be 6" and the connecting rod above shoulder protrudes by 1", making the total height 7".

The shape is indicated in the Figure 1 of the accompanying drawings.

The following example illustrates the invention:

| Conventional Electrode | New Design. |
|--|---|
| 1. Metal utilised approx. 50% | Metal utilised more than 90% |
| 2. The electrode has to be rejected in about 40 days because of solution line corrosion. | Large dia. at top takes care of the solution line corrosion resulting in much better utilisation. |

The following are the main advantages:

1. Better utilisation of metal.
2. Reduction in maintenance.
3. Saving in the expenditure.

COMPLETE

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

1. Title of the invention:

A new anode design for use in Primary Wet cells.

2. Full name, address and nationality of the inventor:

Mahadev Govind Potdar, Scientist, Central Electrochemical Research Institute, Karaikudi-3, Indian.

3. The annotated title of the invention:

A new anode design for use in primary wet cells.

4. Prior knowledge:

Normally the anode or the metal electrode used in primary wet cells is in the form of a cylindrical sheet or rod of suitable dimensions with proper provision for electrical contacts.

5. Drawbacks connected with hitherto known process/device:

The life of such an electrode is limited on account of heavy corrosion of the electrode at the top during drain and also during idle period. The electrode gets cut at the solution level and much of the active metal remains unused and goes as waste. This leads to a lessening of the utilization of the metal.

6. The main object of the invention, other objects if any:

The above mentioned disadvantages can be surmounted or avoided by using the new form of the anode.

7. The main finding (the new principle) underlying the invention:

In the new anode design the normal form which is either cylindrical sheet or rod is changed to a form of tapering cone ending in a small disc shown in the attached sheet.

The dia at the shoulder i.e. at the top is larger i.e., approx. 2 to 2.5 cms. Above the shoulder the dia is reduced to 1 to 1.5 cms for giving electrical connections either by binding screw as shown in the attached sheet or in the normal way by soldering a lead.

The dia. at the bottom is smaller i.e. approx. 1 to 1.5 cms and the disc is of 2 cms dia. with a thickness of 3 to 5 mm. The height of such an electrode depends on the counter electrode. For example for counter electrode of sac S1 the height of the anode from disc to the shoulder will be approx. 15 cms. and the connecting rod above shoulder will be protruding

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by 2.5 cms. to 3 cms. making the total height approx. 18 cms. The shape of such a rod is shown in the attached sheet.

8. The new result flowing from the new finding:

Using the new form of anode in a primary wet cell of the Leclanche' type and having sac S1 as the counter electrode it was observed that the useful utilisation of this new form anode was more than 90% whereas in the normal rod it was approx. 50%. The table illustrates the finding.

TABLE

Comparative performance of the two forms of anodes

| Conventional | New Design |
|--|---|
| 1. Metal utilised approx. 50% | Metal utilised more than 90% |
| 2. The electrode has to be rejected in about 40 days because of solution line corrosion. | Larger dia. at the top takes care of the solution line corrosion resulting in longer duration and better utilization. |

According to the present invention, the electrode for use as an anode in primary wet cells comprises a rod characterised in that that the rod tapers downwards and ends in a disc form at the lower end and has provision for electrical connections at the upper end whereby the larger diameter at the upper end serves as a reservoir of metal used up due to solution line corrosion and increases the life of the electrode.

Thus the electrode has a binding screw at the top for electrical connections as shown in the drawing.

A connecting lead may be soldered to the rod at the top in place of the binding screw.

11. Subsidiary novel features if any:

The novelty lies in the fact that the slightly modifying the existing mode of making the electrodes one gets a better electrode with higher utilisation.

12. Details description with reference to drawings accompanying the provisional specification.

The said attached sheet of drawings shows the form invented. Its nominal dimension are indicated under item 7.

13. What are the main advantages of the invention:

1. Better utilisation of the metal.
2. Reduction in maintenance.
3. Saving in expenditure.

14. Summary:

The invention has made it possible to increase the utilization of metal in the anode by just incorporating a change in the design of the anode.

The normal form of anode in vogue is a cylindrical rod which has limited life controlled by the solu-

tion line corrosion. This leads to lesser utilisation of the metal. The new form designed i.e. a conical electrode tapering downwards ending in a disc gives better utilisation of the metal because of the larger dia. at the top which takes care of the solution line corrosion.

We Claim:

1. An electrode for use as an anode in primary wet cells which comprises a rod characterised in that the rod tapers downwards and ends in a disc form at the lower end and has provision for electrical connections at the upper end whereby the larger diameter at the upper end serves as a reservoir of metal used up due to solution line corrosion and increases the life of the electrode.
2. An electrode as claimed in claim 1 and having a binding screw at the top for electrical connections as shown in the drawing.
3. An electrode as claimed in claim 1 or 2 and having a connecting lead soldered to the rod at the top in place of the binding screw.
4. An anode as claimed in any of the preceding claims wherein the anode i.e. metal electrode used in primary wet cells, has the following dimensions:
the dia. at the shoulder i.e. at the top is larger i.e., approx. 2 to 2.5 cms., above the shoulder the dia. is reduced to 1 to 1.5 cms. for giving electrical connections either by binding screw as shown in the attached sheet or in the normal way by soldering a lead.
5. An anode as claimed in any of the preceding claims wherein the dia. at bottom is smaller i.e. approx. 1 to 1.5 cms. and the disc is of 2 cms. dia. with a thickness of 3 to 5 mm.
6. An anode as claimed in any of the preceding claims wherein the height of such an electrode depends on the counter electrode, for example for counter electrode of sac S1 the height of the anode from disc to the shoulder is approx. 15 cms. and the connecting rod above shoulder protruding by 2.5 cms. to 3 cms. making the total height approx. 18 cms.
7. An electrode, substantially as hereinbefore described when used as an anode in primary wet cells.

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COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

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