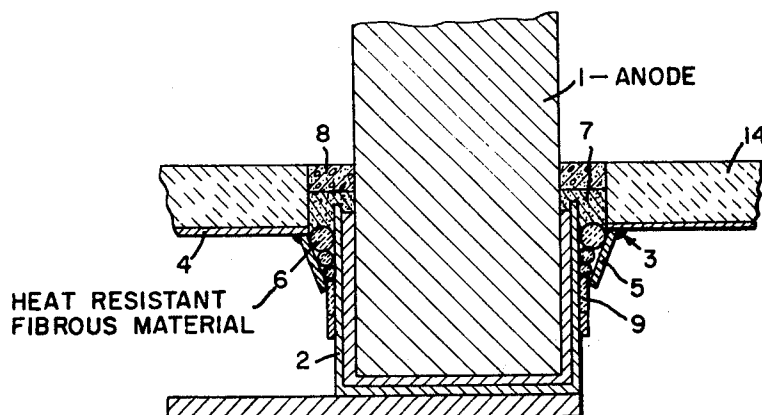


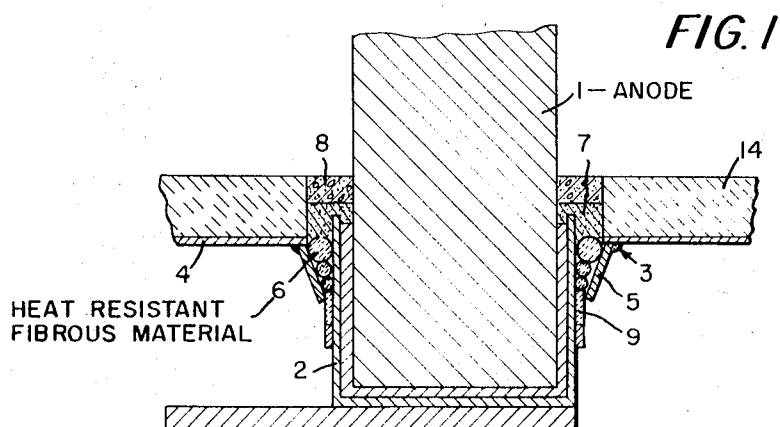
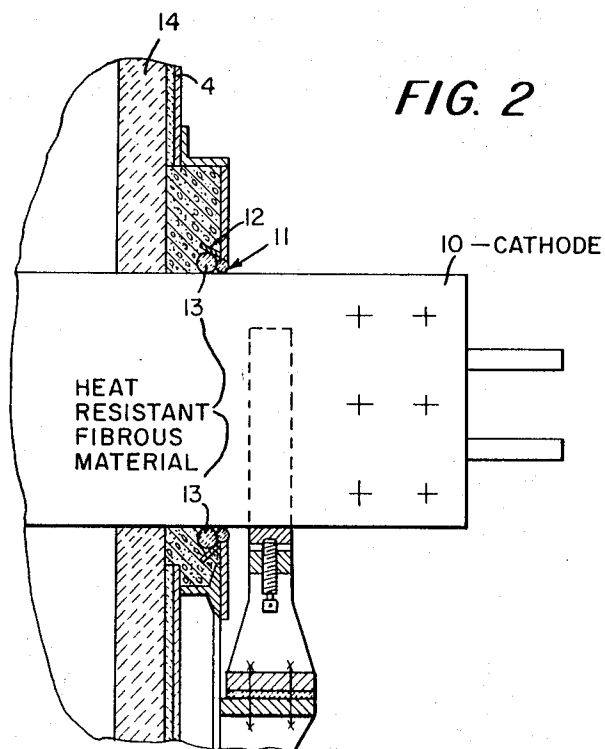
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- [21] Appl. No. **818,633**
- [22] Filed **Apr. 23, 1969**
- [45] Patented **Oct. 12, 1971**

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- [54] SEALING OF CURRENT-CARRYING LEAD FOR
ELECTRODE OF ELECTROLYZER
4 Claims, 2 Drawing Figs.**
- [52] U.S. Cl.**..... **174/151,**
13/17, 204/243, 204/286
- [51] Int. Cl.**..... **B01k 3/02,**
H05b 7/12
- [50] Field of Search**..... **174/50.56,**
151; 204/243, 280, 286, 287, 297; 313/281, 292;
13/14, 15, 16, 17, 20

ABSTRACT: Several types of seals for current-carrying leads of electrolyzers are disclosed. A funnel-shaped member is attached to the housing of the electrolyzer in such a manner that it surrounds the lead as it emerges from the electrolyzer. The annular space between the lead and the funnel-shaped member is sealed with a thermally and chemically resistant packing which is confined therein. Suitable packing materials include slag cotton, asbestos cord and asbestos fluff and fibrous glass.





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SEALING OF CURRENT-CARRYING LEAD FOR ELECTRODE OF ELECTROLYZER

BACKGROUND OF THE INVENTION

The present invention relates to electrolyzers employed in chemistry and metallurgy and, more particularly, the invention relates to seals for current-carrying leads for the electrodes employed in apparatus for producing sodium and chlorine by means of electrolysis of sodium chloride from molten halogenated electrolytes.

Known in the prior art are electrolyzers employed for the above purpose in which the current-carrying leads for an anode are passed through the aperture in the bottom, while the current-carrying leads of the cathode pass through an aperture in the walls of the bath with the surfaces of such apertures being lined with concrete. However, the concrete lining of the apertures does not ensure reliable sealing of the current-carrying leads because during the heating of the electrolyzer, the current-carrying leads are elongated by 10-15 mm. which results in the formation of gaps between the leads and the concrete lining through which the electrolyte can leak.

Attempts have been made to prevent the formation of these gaps by means of cooling the electrodes but this measure is not wholly satisfactory. Another proposed solution has been to provide sealing devices made in the form of metal labyrinths welded to the current-carrying leads at their outlet from the lining. These devices also do not prevent the formation of the gaps and, furthermore, are unreliable in operation. In addition, the sealing labyrinths hinder mounting and operations and, while preventing the electrodes from elongation during the heating, result in the development of high stresses, breakdown of the electrodes and damage to the lining.

SUMMARY OF THE INVENTION

An object of the present invention is to eliminate the above-mentioned disadvantages. Other objects and advantages of the invention will be apparent from the description thereof.

The main object of the invention is to provide a simple and reliable sealing device for the current-carrying leads which device ensures permanent sealing of the gap formed between the electrode and the lining in case of displacement of the current-carrying leads due to the thermal expansion.

These objects are accomplished by providing a sealing device for the current-carrying leads for the electrodes comprising a heat-resistant filler confined in the outlet aperture in the electrolyzer casing for each current-carrying lead, wherein, according to the invention, there is provided a funneled member secured to the casing in the aperture, which member encircles the current-carrying lead and faces the output side of the leads with its necked portion. A heat-resistant fibrous material is placed as filler or packing in the gap formed between said member and the current-carrying lead.

The heat-resistant fibrous material is preferably confined by ceramic plates near the smallest peripheral portion of the member.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described by way of example with reference to the accompanying drawings, in which FIG. 1 represents the anode lead seal; FIG. 2 represents the cathode lead seal.

DETAILED DESCRIPTION OF THE INVENTION

Anode lead seal

Example 1. An anode 1 (FIG. 1) is disposed in the middle

part of the electrolyzer bath (shown in the drawing is a part of the bottom). The lower part of the anode 1 is within a current-carrying lead 2 (metal cylinder) passed through an aperture 3 in the bottom of a steel casing 4 provided with a lining 14. The sealing of the output of the current-carrying lead 2 of the anode 1 is made in the form of a funneled member 5 welded to the casing 4 in such a manner that a narrow slot is formed between the member 5 and current-carrying lead 2, with the lower part of the slot being filled with a heat-resistant fibrous material 6 (slag cotton). The remaining space above the material 6 is filled with a heat-resistant material 7 and provided with concrete 8 filled up to the level of the pit bottom.

The fibrous material 6 is supported from below by ceramic plates 9 preventing this material from falling out.

Cathode Lead Case

Example 2.

The cathode is made in the form of a perforated steel cylinder (not shown in the drawing) surrounding the anode. A current-carrying lead 10 (FIG. 2) of the cathode is made in the form of a steel plate passing through an aperture 11 in the walls of the casing 4 and lining 14 of the electrolyzer.

The seal of the current-carrying lead 10 is made in the form of a funneled member 12, the necked part of which is welded to the wall of the casing 4 so that a narrowed slot is formed between the member 12 and the current-carrying lead 10. Placed into the slot is a chlorine-resistant and heat-resistant fibrous material 13 (e.g. asbestos cord) sealing the slot and insulating the current-carrying lead 10 from the casing 4. The material 12 wedges the gap formed during the thermal elongation of the current-carrying lead.

The material 13 may be composed of asbestos fluff and fibrous glass.

The tests of the proposed sealing have shown that thermal expansion of the current-carrying leads is not accompanied by any deformation of the lining and electrodes, nor by any leakage of the electrolyte through the seal because the melt is stopped by the fibrous packing material which, when hardened reliably plugs the gap.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same, and various changes and modifications in the constructions and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

What we claim is:

1. A seal for a current-carrying lead of an anode of an electrolyzer containing diluted electrolyte comprising in combination a casing having a lining and an aperture in the lining forming an outlet for the current-carrying lead of the anode; a current-carrying lead positioned within the aperture in the casing; said anode and said lining being arranged to provide a space therebetween; a funneled member secured to the casing and facing the output side of the lead with its necked portion, heat-resistant fibrous material filling the space between the necked portion and the lead, and a heat-resistant concrete filling the space between the anode and the lining protecting the fibrous material from direct contact with the electrolyte.

2. The seal of claim 1 wherein said aperture is in the bottom of the electrolyzer, and further comprising a support plate surrounding said anode and positioned below said funneled member serving to prevent said heat-resistant fibrous material falling out of said funneled member.

3. The seal as claimed in claim 2 wherein said support plate is made of ceramic and is attached to said anode.

4. The seal of claim 1 wherein the heat-resistant fibrous material is selected from the group consisting of slag cotton, asbestos cord, asbestos fluff and fibrous glass.