

[54] **APPARATUS FOR THE RECOVERY OF LEAKAGES OF BRINE IN THE METALLIC BOTTOMS OF DIAPHRAGM CELLS**

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204/286, 258

[56] **References Cited**

UNITED STATES PATENTS

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FOREIGN PATENTS OR APPLICATIONS

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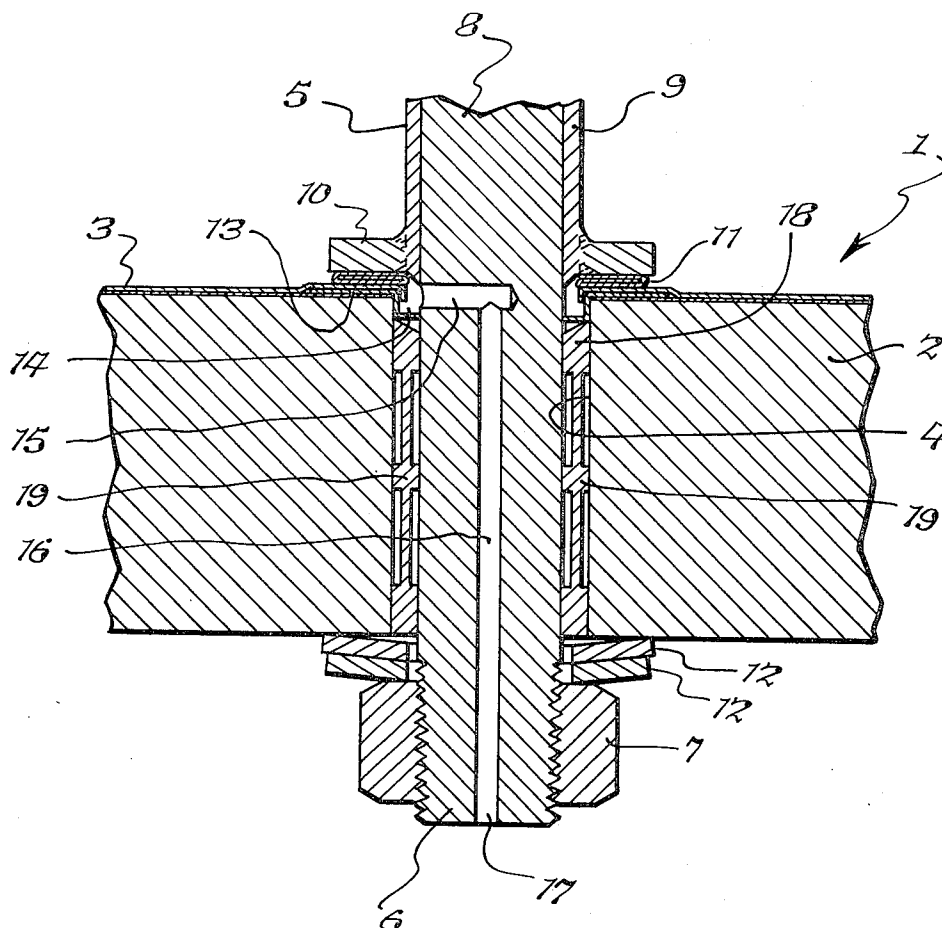
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[57] **ABSTRACT**

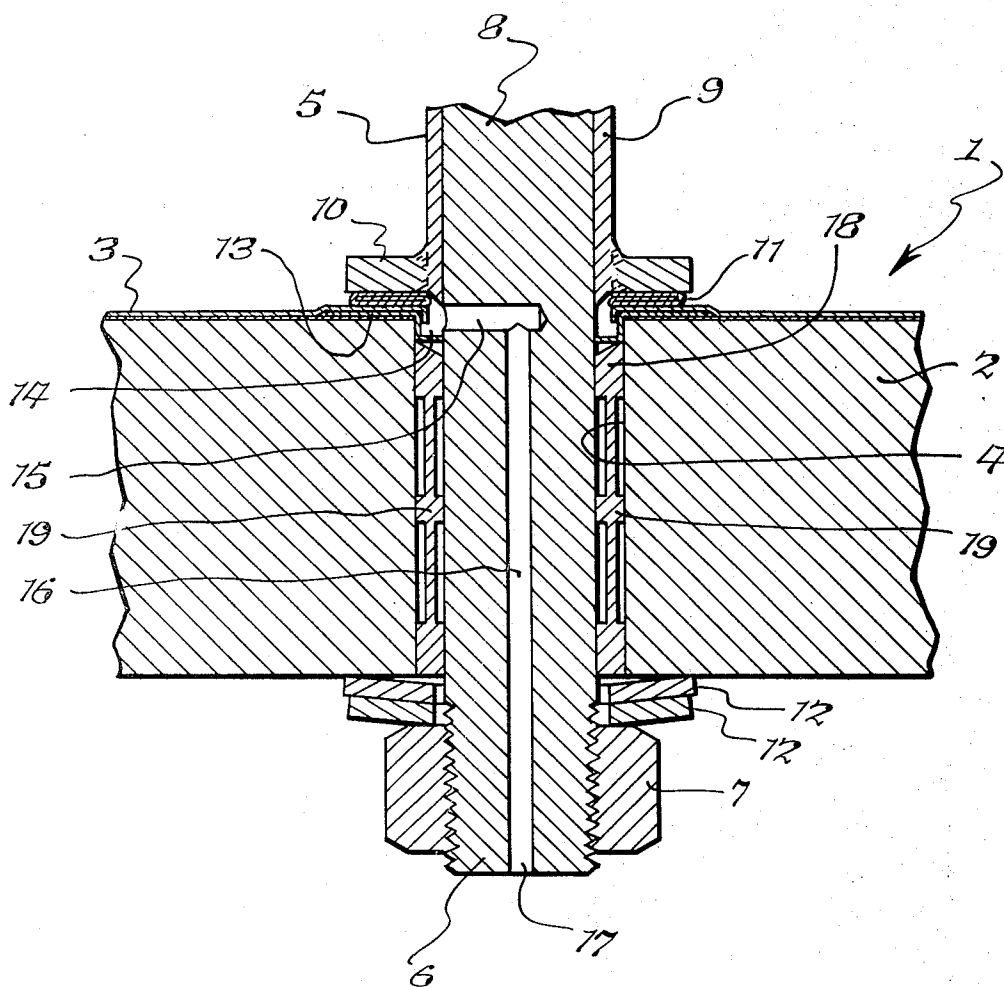
Apparatus for the recovery and discharge of electrolyte leakage in diaphragm type electrolytic cells, whereby openings in the anodic bottoms which accommodate anode shafts are provided sealing means and with duct means channeling electrolyte leakage through the hollow shafts of the anodes.

4 Claims, 1 Drawing Figure



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APPARATUS FOR THE RECOVERY OF LEAKAGES OF BRINE IN THE METALLIC BOTTOMS OF DIAPHRAGM CELLS

BACKGROUND OF THE INVENTION

The present invention relates to an apparatus for the recovery and discharge of leakage of brine in the tails of metallic anodes, used more particularly in diaphragm or membrane cells for the electrolysis of aqueous solutions of alkali metal halides.

In the classical diaphragm or membrane electrolysis cells, the bottoms comprising graphitic anodes, the lower part of which is fixed by a layer of lead metallic which permits supply of current to the anodes from copper bars, which copper bars are sealed in lead, the anode assembly is placed in a concrete tank. So as to effect the protection and tightness of the anodic bottom, an asphalt layer of a sufficient thickness is then poured inside this concrete bottom to cover at the same time the layer of lead and the lower part of the anodes. This prevents the electrical conductors from attack by penetration of very corrosive brines during the electrolysis process.

In recent years, metallic anodes have replaced the use of graphite anodes, the surface of the metal anodes being covered with a coating made of precious metal. The metal anode assembly is subjected to an activation treatment. These metal anodes provide very good resistance to corrosion by the anolyte, they are dimensionally stable, and do not present the disadvantages of wear inherent in the graphitic anodes. Such anodes present therefore advantages resulting from their chemical nature, and their utilization has allowed improvements and simplifications in the preparation and assembly of the anodic bottom of the diaphragm cells.

Different possibilities for such improvements have already been described. Among them, French Pat. No. 1,600,249 of Dec. 31, 1968, has claimed a kind of flat and hollow anode, with at least one of the parallel sides being constituted of a perforated sheet or a grid made of one of the metals having the anodic properties of titanium, etc., or an alloy of such a metal.

In an improvement of the above-mentioned French Pat., namely U.S. Pat. application, Ser. No. 316,515, filed Dec. 19, 1972, the applicants Pierre Bouy et al., have provided that this kind of anode is fitted with a core made of a highly electrically conductive metal, coated with a casing made of a metal resisting corrosion by the electrolyte, in such a way that the electrical connection is perfectly ensured between this casing and the core. Lengthening or extensions of anode tail or shaft is provided so that it goes through or extends through the horizontal base which constitutes the bottom of the cell, and which includes the current supply lines. It is thereby fixed to the base with a nut which tightens the anode and holds it to the base. As a practical matter, depending on the dimensions of the anodes and their electrical characteristics, one or several lengthenings or extensions of the anode shafts can be used; but the use of a single length is most suitable, in that the anode shafts do not undergo the strains caused by the dilatation of the anode elements.

These lengthenings of the anode shafts or tails are preferably made from pieces having a cylindrical shape which allows various machinings permitting current supply to the anode shaft lengthenings.

The present invention is not limited to these hereinabove described improvements. The present invention can be applied at any anode having a lengthening which goes through the horizontal base constituting the cell bottom. However, even with such hereinabove improvements, there is always a possibility that the protection is inadequate of this base constituting the anodic bottom, against the corrosion by the anolyte in the openings made in this bottom, which openings have the same axis that the anode lengthenings have.

So as to effect protection against anolyte, the tightness at this level is generally realized by a composite joint having a casing of polytetrafluoroethylene, the pressure of which is obtained by screwing the nut which serves to fix the lengthening or extension of the anode or its shaft on the anodic bottom, this nut being screwed underneath the bottom, on the threaded end of the lengthening of the anode shaft.

In the event a partial or temporary lack of tightness of the seal occurs, it is necessary to provide or have available a suitable apparatus for the recovery, in the event of anolyte leakage, to recover the brine and discharge it in an opening made in the anode tail, and which leads outside the cell. This recovery apparatus, which at the same time permits detection and extinguishing of the leakages of electrolyte, is very important, for it conditions the resistance and the good working of the anodic set. Since the technology of the assembled cell is really based on the interchangeability of the anodes and electrical contacts, it is necessary to test for any imperfection of assembling.

It is, accordingly, an object of the present invention to provide an apparatus for the recovery and discharge of leakages of electrolyte at every opening made in the metallic anodic bottom, including the current supply conductors.

It is also an object of the present invention to provide an apparatus which reduces the damage inherent in electrolyte leakage.

Other objects will be apparent to those skilled in the art from the present description, taken in conjunction with the appended drawing, in which:

The FIGURE is an elevational view of the apparatus of the invention.

GENERAL DESCRIPTION OF THE INVENTION

In the apparatus of the invention, means are provided for the recovery and discharge of electrolyte leakage which might occur in any opening in the metallic anode bottom. The openings, which allow for the passage and holding of the lengthened or extended anodes or their shafts, provide for normal tightness at a joint placed between this anodic bottom and a disc bound up with the casing. The disc and the casing are made of a metal resistant to corrosion and the existence of the joint is obtained by screwing of a nut which is used to fix the lengthening or extension on the lower part of the anodic bottom.

The apparatus of the present invention for the recovery and discharge of electrolyte is characterized in that the leakage of electrolyte is first recovered in a duct made of a material inert towards the electrolyte, located around the opening made in the anodic bottom, the electrolyte is then discharged by a conduit which is made laterally through the lengthening or extension of anode, at the level of the duct, and extended down-

wards to the end of this lengthening, the leaking of electrolyte being finally recovered outside the cell.

DETAILED DESCRIPTION OF THE INVENTION

The attached FIGURE of drawing describes the details of a portion of anodic assembly of a diaphragm electrolysis cell. A metallic anodic bottom (1) of an electrolysis cell, made of a copper or aluminum bar (2) for the supply of electrical current, is coated with a thin protective sheet (3) made of titanium. This bottom (1) is pierced by an opening (4) in which the lengthening or extension (5) of the anode is put, the lower part (6) of which, below and outside the bottom, is long enough to hold a nut (7). This lengthening is made of a copper core (8) which supplies the current, covered on the part which is in contact with the electrolyte by a protective titanium casing (9), on which a titanium flange (10) is fixed.

The composite joint forms a duct which is cased with polytetrafluoroethylene (11) which ensures tightness between the anode lengthening or extension (5) and the metallic bottom (1) of the cell, by screwing the nut (7) located underneath this bottom, the stress of which is tensionally constant, for it is limited by flexibility of the non-corrosive metal discs (12). These discs (12) bear differential dilatations when the cell is started or stopped.

So as to overcome a lack of tightness of the composite joint (11), whether partial or temporary, disc (13) also made of polytetrafluoroethylene is placed under the protective titanium sheet (3) in the part which is adjacent to the opening (4). This apparatus permits the insertion of a volume-providing or space element (14), which recovers any eventual leakage of electrolyte. The leakage of electrolyte is then discharged by a conduit or duct (15) made laterally in the core of the lengthening or extension (5) of the anode at the level of the space of volume-providing element (14), and extended downwards by the vertical conduit (16) made in the lengthwise part of the lengthening or extension (5) of the anode passing out at the end (17).

The dimension of the opening (4) made in the bottom of the cell is calculated in such a way that a space is provided between the copper or aluminum bar (2) of

bottom (1) and the lengthening or extension (5) of the anode which is sufficient to place discs (18) with flexible conductive metal contacts (19) ensuring the electrical connection between the conducting part of the cell bottom (2) and the conducting part (8) of the lengthening of the anode. The apparatus which is the object of the invention allows moreover the protection of this electrical contact towards the electrolyte.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. Apparatus for the recovery and the discharge of leakages of electrolyte occurring on the metallic anodic bottom of a diaphragm type electrolysis cell, said metallic anodic bottom being provided with openings to hold and accommodate the stems of anodes which make up the anodic portion of the cell, said apparatus being characterized in that an electrolyte leakage recovery duct made of a material which is inert towards the electrolyte is provided in the joint formed by the anodic bottom and the anode stem, said duct being placed around the opening made through the anodic bottom and communicating with a conduit made laterally in the anode shaft at the level of said duct, said conduit communicating downwards in the anode shaft to the outside of the metallic anodic bottom.

2. Apparatus according to claim 1, wherein normal tightness between said metallic anodic bottom and said anode stems are provided by a joint tensioned by means applied to said anode stems below said metallic anodic bottom.

3. Apparatus according to claim 1, characterized in that the duct made of an inert material is comprised of polytetrafluoroethylene.

4. Apparatus according to claim 1, characterized in that electrical connection is made between the anodic bottom and the anode stems.

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