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Mosé

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[54] **SEAL FOR ANODE STEMS IN AN ELECTROLYSIS CELL**

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[51] **Int. Cl.**[2] **C25B 11/12**; B01K 1/00

[58] **Field of Search** 204/279, 286, 294, 280, 204/219

[56] **References Cited**

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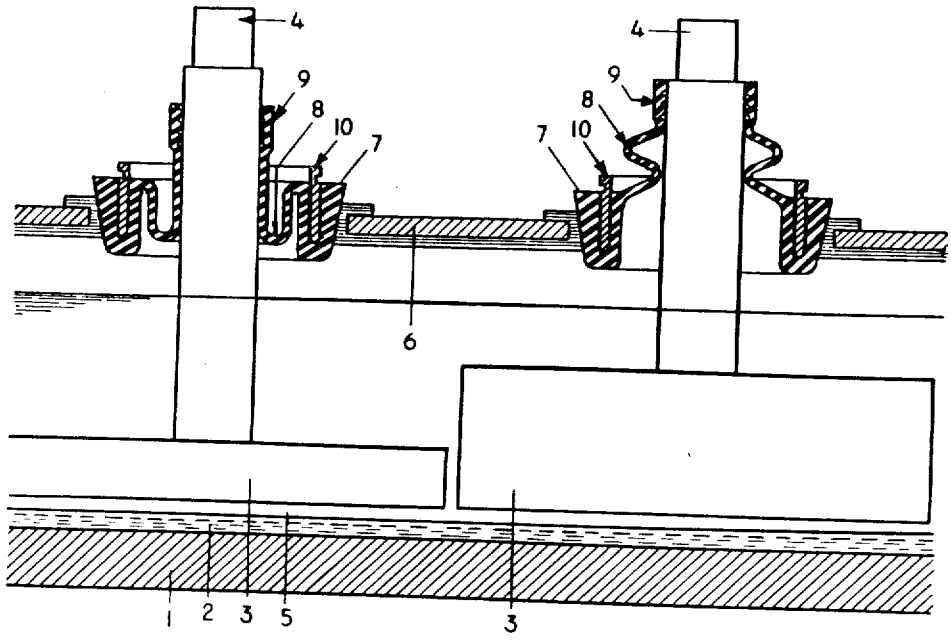
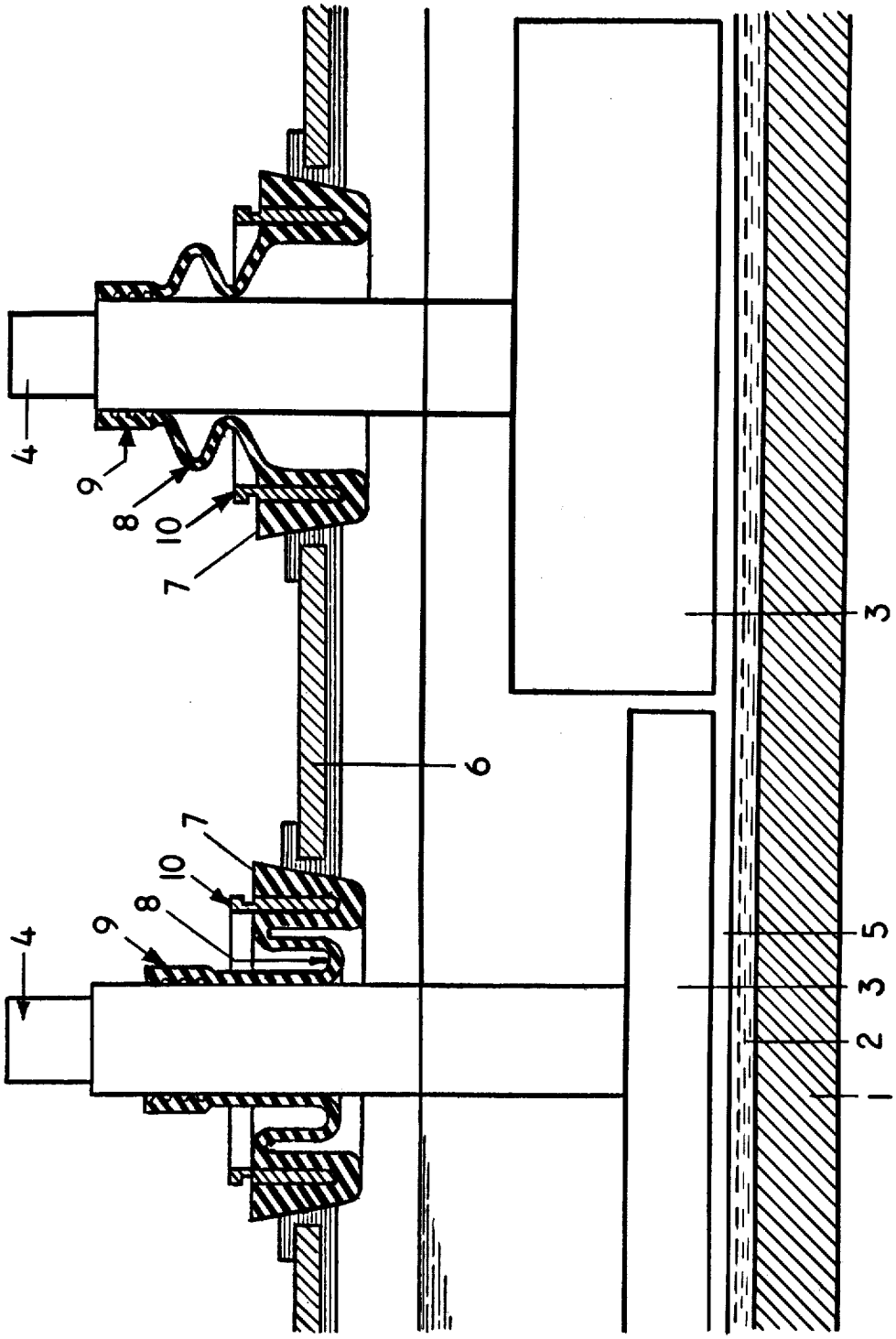
Attorney, Agent, or Firm—Malcolm W. Fraser

[57] **ABSTRACT**

A unitary flexible gas-tight seal is provided between the stationary cover of an electrolysis cell and each anode stem which is of current carrying material. The seal comprises a ring plug of flexible material which snugly fits the cover hole through which the respective anode stem projects. Integral with the ring plug is a neck terminating in a sleeve which gas-tightly embraces the anode stem. The neck may be bellows-like or smooth, such that axial movement of the sleeve relative to the ring plug can be achieved. If desired, the ring plug may be equipped with an expansion ring for reducing the flexibility of the plug.

6 Claims, 1 Drawing Figure

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SEAL FOR ANODE STEMS IN AN ELECTROLYSIS CELL

BACKGROUND OF THE INVENTION

The invention relates to flexible seals for the anode stems of an electrolysis cell with stationary cover and graphite or dimensionally stable anodes, the anode stem being the electric current conductor through the cover to the anode.

The anode stem seal must provide a hermetic closure between the inside of the cell and the atmosphere while permitting axial displacement of the stem relative to the cover.

A known method of meeting these requirements is to provide a round opening in the cell cover at each point where the stem passes through the cover, the diameter of the opening being a multiple of the anode stem diameter. The annular opening around the stem is covered, e.g. according to German OS 1,671,440, with a flexible diaphragm which is heat and corrosion resistant. The seal between cell cover and diaphragm is effected by means of a flanged ring and several screws. Sealing the cell at the anode stem is effected by pressing the diaphragm against a corrosion and compression resistant sleeve around the stem by means of a nut on the stem.

Further methods are known for sealing the cell at the anode cell by means of diaphragms, the central part of which is secured to the smooth stem by means of a clamp. The seal comprises several parts in this case also. A major disadvantage of these known sealing methods is the fact that the diaphragms, which are held in place by screws and clamps, are cumbersome to disengage for the purpose of adjusting the anode height. If the screws are tightened excessively, the diaphragm may easily be contused or injured, and, thus, lose its sealing properties. In the event of minor explosions in a cell using such known methods of anode stem sealing, the seals will be destroyed, since they constitute the weakest part of a cell.

SUMMARY OF THE INVENTION

The object of the invention is to provide a flexible seal at the anode stems of an electrolysis cell so as to avoid the known disadvantages.

According to the invention, this object is met by providing a seal made of one piece, with an outer ring plug having a neck which terminates at the anode stem in a cylindrical sealing sleeve.

If it is desired to increase the force with which the ring plug is pressed against the cover, a further embodiment of the invention provides for an expansion ring to be used in conjunction with the ring plug. An expansion ring may be omitted if the outer ring plug is less flexible and elastic than the diaphragm.

The particular advantages of the seal according to this invention are quick and simple installation and dismantling, the good sealing effect and the ability to adjust or displace the anode stem in the vertical or horizontal direction. In the event of any explosions within the cell, caused by the formation of explosive gas mixtures, the ring plugs are forced out in an upward direction without damaging any parts of the cell or the sealing arrangement itself.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE is a fragmentary sectional view of flexible seals for anode stems of an electrolysis cell.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Bottom 1 of the electrolysis cell serves as the base for the cathode in the form of mercury layer 2. Anodes 3 of graphite are adjusted in height by means of an adjusting device (not illustrated here) so that a proper gap is obtained between the lower surface of the anode and the mercury layer. Between the mercury cathode 2 and each anode 3, and around the anodes is brine to be electrolytically decomposed. The upper end of the cell is closed by a stationary cover 6. Electric power is fed to the anodes 3 through current carrying anode stems 4.

The gas-tight closure between the cell cover 6 and each anode stem 4 is achieved by a unitary seal of elastomeric material according to the invention. As shown, an outer ring plug 7 has an integral flexible neck 8 which extends inwards and upwards to an integral sleeve-like sealing part 9 which embraces the respective anode stem. The ring plug 7 is slightly conical on the outside in order to facilitate its being forced sealingly into a tapered opening in the cell cover 6.

If it is desired to reduce the radial flexibility or resilience in the direction of the anode stem, the ring plug 7 may be provided with an expansion ring 10 of rigid material. The neck 8 itself may be smooth as shown on the left side of the drawing provided with a loop connection with the ring plug 7, or of bellows or accordian form as shown on the right side of the drawing. Both forms enable axial movement of the sleeve 9 relative to the ring plug 7.

The sealing neck 8 should expediently have sufficient flexible lips, as shown, with the required pre-stress to ensure adequate gas-tightness. The anode stems 4, against which the sealing sleeves 9 are pressed, should be as smooth as possible, in order to facilitate axial displacement of the sleeves, if required.

What I claim is:

1. A seal of elasomeric material between an anode stem and the edge of the hole in the stationary cover of an electrolysis cell through which the stem freely projects, said seal comprising a unitary structure having a tapered ring plug for fitting the cover hole, a sleeve for engagement with the anode stem, and a neck part connecting said ring plug and said sleeve.

2. A seal as claimed in claim 1, comprising an expansion ring in said ring plug for reducing the flexibility thereof.

3. A seal as claimed in claim 1, in which said neck part is of bellows form.

4. A seal as claimed in claim 1, in which said neck part is in the form of a tube to fit the anode stem and has a loop connection with said ring plug to afford axial movement of said sleeve relative to said ring plug.

5. A seal as claimed in claim 1, comprising flexible prestressed lips on the interior of said sleeve for effecting a gas-tight seal with the anode stem.

6. A seal as claimed in claim 1, in which said ring plug is less flexible and resilient than said neck part.

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