United States Patent

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[54] **CATHODE CELL**
6 Claims, 3 Drawing Figs.

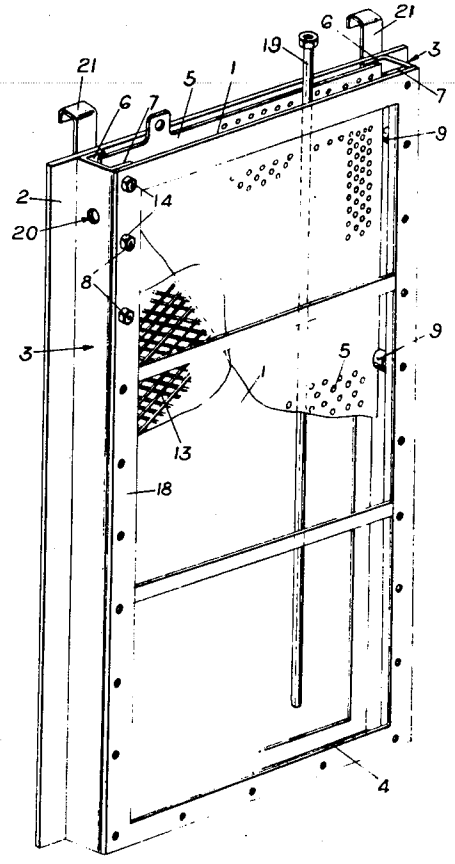
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[51] **Int. Cl.** **C23g 5/74,** B01k 3/04, B01k 3/10
[50] **Field of Search** 204/282, 283, 295, 299, 300, 181

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ABSTRACT: A cathodic cell for use in a paint electrode position process has a front wall constituted in part by a removable semipermeable membrane, backwall and sidewalls and a bottom, a cathode element, and locating means by which the cathode element can be selectively located in the cell in any one of a plurality of positions relative to the front wall.

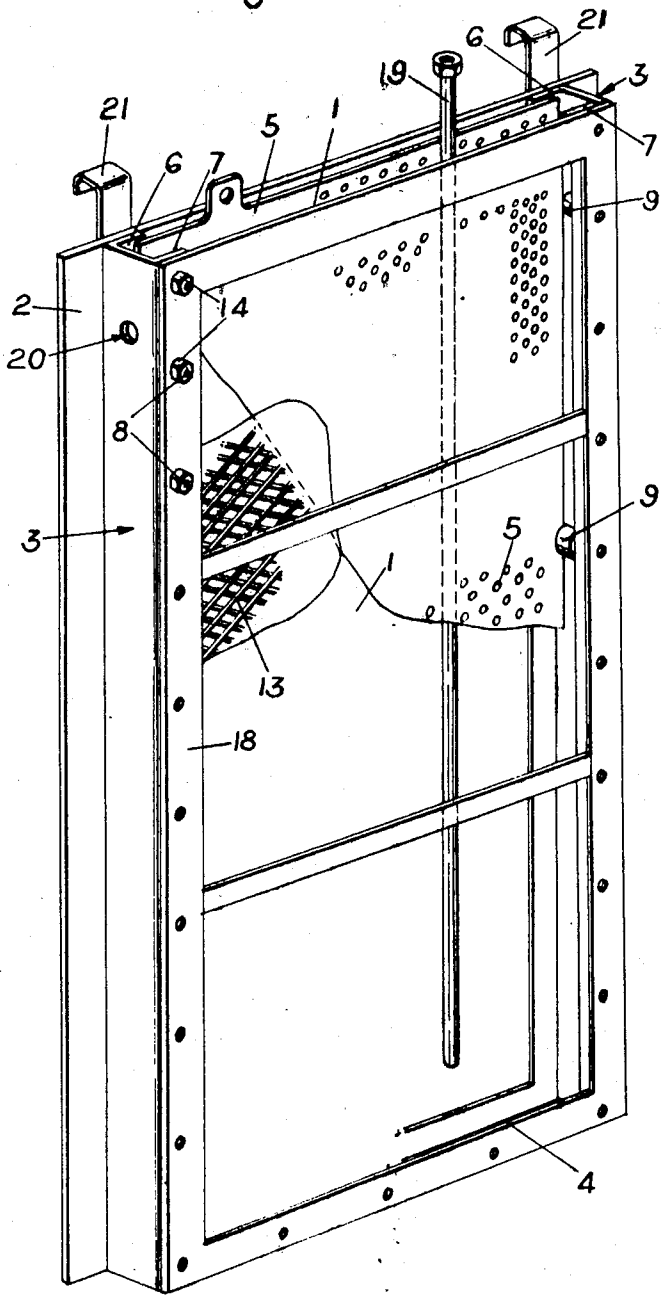


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SHEET 1 OF 2

Fig. 1.



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Fig. 2.

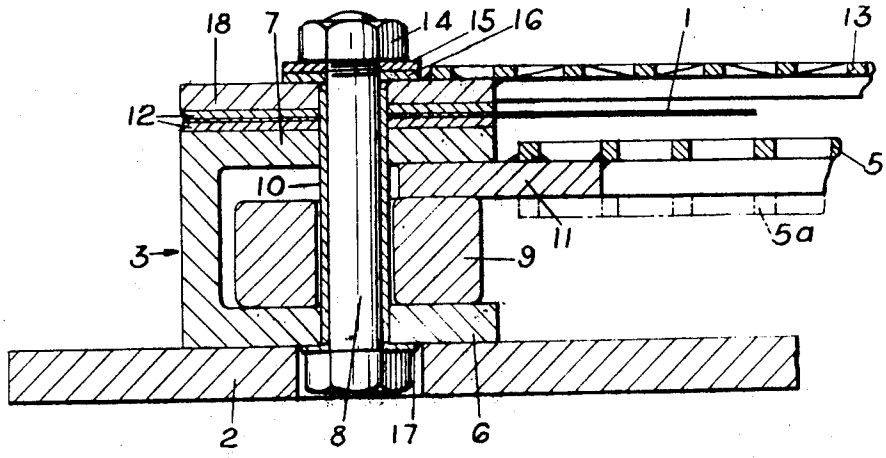
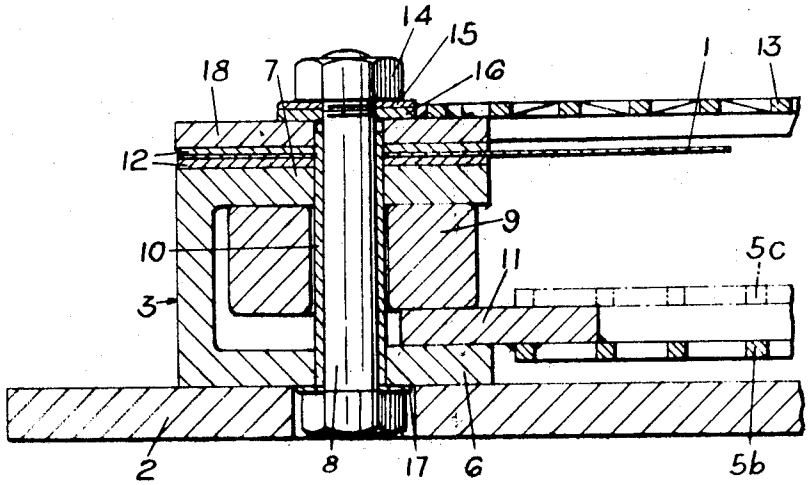


Fig. 3.



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CATHODE CELL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a cathodic cell for use in a tank in which articles are coated with paint by an electrodeposition process.

2. Description of the Prior Art

In some electrodeposition processes for coating articles with paint it is necessary to control the alkalinity of the contents of the tank, while coating is being effected, by means of an electrodialysis and osmosis through a semipermeable membrane, while in other processes the paint employed is of a kind which does not require such control. In addition, it has, heretofore been necessary, due to the varying nature of paints supplied by different paint manufacturers, to provide dialysis cells with specific membranes and cathodes in positions relative to the membrane, as specified by the paint manufacturer.

It is a main object of the present invention to provide a cell which is so constructed that by adjustment thereof it can be adapted for use with paint supplied by any manufacturer.

SUMMARY

According to the invention there is provided a cathodic cell comprising a front wall constituted in part by a removable semipermeable membrane, backwalls and side walls and a bottom, a cathode element, and locating means by which the cathode element can be selectively located in the cell in any one of a plurality of positions relative to the front wall.

In one embodiment of the invention the sidewalls are each a U-channel section with the open sides thereof facing each other, the backwall is secured to one pair of aligned limbs of the channel sections, the front wall is secured to the other pair of aligned limbs of the channel sections, and the locating means are positioned in the channel sections. The front wall may be retained in position by bolts extending through the channel sections and the locating means consist of spacer elements surrounding some at least of said bolts and between which and one of said pairs of aligned limbs the cathode element is located.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a cathodic cell according to the invention with some parts broken away,

FIG. 2 is a section of a part of the cell, and

FIG. 3 is a section similar to that of FIG. 2 but showing the cathode in an alternative position thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the cathodic cell comprises a front wall constituted in part by a removable semipermeable membrane 1, a backwall 2, sidewalls 3, and a bottom 4, FIG. 1, a cathode element 5, and locating means, described below, by which the cathode element 5 can be selectively located in the cell in any one of a plurality of positions relative to the front wall.

As shown in FIG. 1, the sidewalls 3 are each of U-channel section with the open sides thereof facing each other, the backwall 2 is secured, in any suitable manner, to one pair of aligned limbs 6 of the channel sections, the front wall is secured to the other pair of aligned limbs 7 of the channel sections, and the locating means are positioned in the channel sections. The front wall is retained in position by bolts 8, FIGS. 2 and 3, extending through the channel sections and the locating means consist of spacer elements 9, for example rollers, made of nylon or polyvinyl chloride, freely surrounding some at least of the bolts 8. The bolts may be made of plastics material, such as nylon, or of metal, for example stainless steel, in which case the shanks of the bolts may be surrounded by sleeves 10, FIGS. 2 and 3, of electrically insulating material such as polyvinyl chloride. The channel sections are preferably extruded from plastics material such as polyvinyl chloride, and the back wall 2 is a plate of plastics material such as polyvinyl chloride welded to the channel sections.

As can be seen from FIGS. 2 and 3 the cathode element 5 is selectively located between the spacer elements 9 and the limbs 7 or 6 of the channel sections and the cathode element preferably consists of a stainless steel grid secured to flat platelike members 11, also made of stainless steel, which are engageable by the spacer elements 9.

The membrane 1, which may be made of any suitably semipermeable material known in the art, is located between two gaskets 12, FIGS. 2 and 3, one of which rests against the outer surfaces of the limbs 7 of the channel sections.

The front wall also includes an open mesh cover 13, provided to protect the membrane 1, spaced from the membrane on the side of the membrane opposite the side thereof which faces the cathode element 5. The cover 13 consists of a mild steel grille coated with a plastics material such as nylon.

The front wall is retained in position by the bolts 8, which are provided with stainless steel nuts 14, a stainless steel washer 15 and a neoprene washer 16 being provided beneath each nut 14. A neoprene gasket 17 is fitted beneath the head of each bolt 8. The cover 13 is secured with a plastics material such as nylon, and the bolts 8 extend through the frame 18.

The cell is provided with a feedpipe 19, FIG. 1, by which liquid can be admitted to the cell, and overflow means, shown as a hole 20 to which an overflow pipe, not shown, can be fitted, adjacent to the top of the cell.

Suspension means, shown as hooks or brackets 21, FIG. 1, are secured to the back wall 2 to permit the cell to be suspended in an open-topped tank, not shown, from a side of the tank.

When the cell is to be used as a cathodic dialysis cell the membrane 1 remains in position as shown in the drawings and the position of the cathode element 5 is adjusted, as desired, to one of the positions 5, 5*a* FIG. 2, or 5*b*, 5*c*, FIG. 3.

If the paint to be used is of a kind which does not require the cell to be used as a dialysis cell the membrane 1 is removed before the cell is inserted into the tank. The cell then acts solely as a cathode negative below earth potential, the goods to be paint coated are positive at earth potential, and the tank is neutral and internally insulated and at earth potential thus giving a greater degree of electrical safety than is obtainable by some known methods.

In the foregoing description the locating means have been described as spacer elements freely surrounding the bolts; if desired, however, the channel sections may be provided with longitudinally extending ribs forming in the channels between the links 6, 7 a plurality of locating grooves into and out of which the platelike members 11 can be slid.

I claim:

1. A cathode structure comprising two U-section channel members the open sides of which face each other in spaced relation with their respective limbs in alignment, a backplate secured to one said pair of aligned limbs, a semipermeable membrane spanning the other said pair of aligned limbs, flat platelike members one for each channel member, said platelike members each engaging one limb of its channel member and extending outwards from the open side of the channel member, a cathode element extending between the platelike members and secured to the portions of the platelike members which extend outwards from the open sides of the channel members, spacer elements located in each channel member and each extending between a platelike member and the limb of the channel member opposite that engaged by the platelike member, and electrically insulated bolts extending through the limbs of the channel members, the platelike members, the spacer elements, and the membrane thereby to secure the channel members, the platelike members, the spacer elements, and the membrane in position relative one to the other and by repositioning of the spacer elements and the platelike members relative to the channel members to permit location of the cathode element in any one of four different spaced positions thereof in relation to the membrane.

2. A cathode structure according to claim 1, wherein the cathode element consists of a stainless steel grid secured to a said platelike members.

3. A cathode structure according to claim 1, wherein the bolts are metal bolts the shank of each of which is surrounded by a sleeve of electrically insulating material.

4. A cathode structure according to claim 1, wherein membrane is located between two gaskets one of which rests against the outer surfaces of said other pair of aligned limbs of the channel members.

5. A cathode structure according to claim 4, including an open-mesh cover spaced from the membrane on the side of the membrane opposite the side thereof which faces the cathode element.

6. A cathode structure according to claim 5, wherein the cover consists of a mild steel grill coated with a plastics material.

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