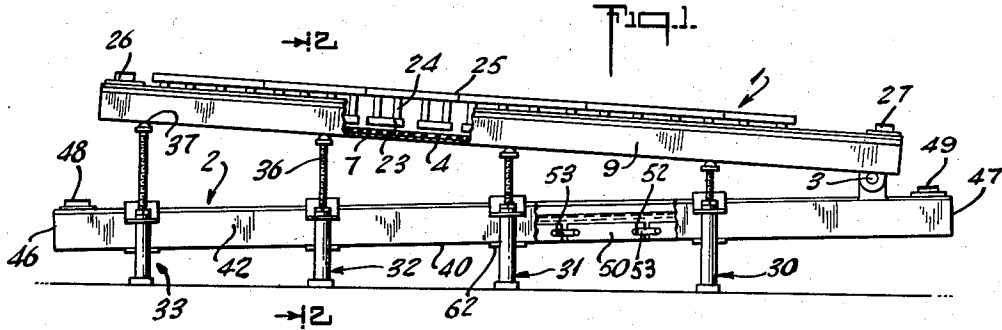
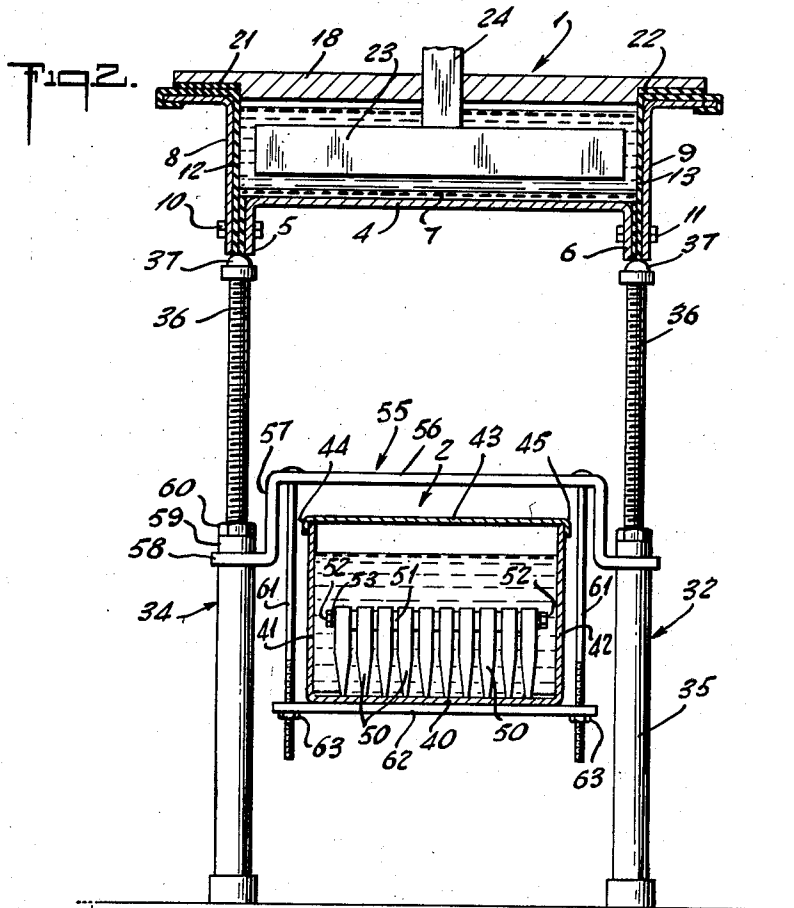


Aug. 19, 1958

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MOUNTING OF PRIMARY AND SECONDARY SECTIONS
OF ELECTROLYTIC CELLS
Filed Nov. 19, 1953

2,848,406



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MOUNTING OF PRIMARY AND SECONDARY SECTIONS OF ELECTROLYTIC CELLS

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Application November 19, 1953, Serial No. 393,155

3 Claims. (Cl. 204—219)

This invention relates to electrolytic cells with a mobile mercury cathode for the electrolysis of alkali metal compounds and is particularly concerned with the mounting and arrangement of the primary and secondary sections of such cells.

Electrolytic cells of the type here being considered are generally constructed with two principal chambers, known as, and hereinafter referred to, as the primary section and the secondary section. In the primary section mercury flows along the bottom and acts as the cathode for the electrolysis of an aqueous solution of alkali metal chloride which flows along on top of it. The anodes are seated in the aqueous solution, or brine. When current is passed through the brine the alkali metal chloride is broken down, giving off chlorine gas and sodium, or other alkali metal which later forms an amalgam with the mercury. The mercury flows from the primary into the secondary section where the amalgam is decomposed by suitable action, restoring the mercury to its elemental state ready for recirculation back to the primary section.

Cells of this type are normally long and narrow and occupy considerable floor space, particularly where, as has commonly been the case, the secondary section in the form of a trough, sloping slightly with respect to the horizontal, has been mounted alongside of the primary section. In some instances the secondary sections have been extended vertically. In this form they still occupy a fair amount of floor space as well as considerable space above the floor.

This invention is concerned with the provision of electrolytic cell structures, and the mounting of the same, which enable material reduction in the floor space required for a complete cell. This is achieved by so mounting the primary section that the secondary section may be mounted directly beneath it, thus reducing the amount of floor space needed to that occupied by the primary section. The supporting of the primary section not only provides for the reception of the secondary section beneath it, but enables the secondary section to be carried by the same supports. The supporting arrangement for the sections also provides for adjustment of the slope of both or either of the sections independently of the adjustment of the other.

To maintain the operability of the cell with the secondary section mounted beneath the primary one, the necessity of opening the top or cover of the secondary section beneath the primary section has been eliminated. Instead the grid blocks in the secondary section have been so constructed and related that the insertion and removal of them, when needed, can be effected from the ends of the secondary section rather than out of the top thereof as previously required.

It is, accordingly, the principal object of this invention to reduce the floor space required for the mounting of electrolytic cells of the mobile mercury cathode type.

Another object is to provide for improvements in the mounting of the primary and secondary sections of such cells.

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Still another object is to provide for the mounting of the secondary section of such cells beneath the primary section thereof.

A further object is to provide, in such mounting, for the adjustment of the slopes of such cell sections independently.

A further object is to provide mountings which in part support both of such cell sections at the same time.

A still further object is to provide access to the grid blocks in the secondary section despite the position of the same beneath the primary section.

Further and more detailed objects of the invention will in part be obvious and in part be pointed out as the description of the invention, taken in conjunction with the accompanying drawing, proceeds.

In that drawing:

Figure 1 is a side elevation of a cell in accordance with the invention with portions of the primary and secondary sections broken away to show the interiors thereof; and

Figure 2 is a vertical section taken on lines 2—2 of Figure 1 and looking in the direction of the arrows.

The cell of the instant invention consists of a primary section, generally indicated at 1, and a secondary section generally indicated at 2. These are hinged together at 3 adjacent an end of each, enabling the incline of each section with respect to the horizontal to be adjusted to the extent desired without affecting the incline of the other section.

The primary section 1, as here illustrated, is formed as a long, narrow trough having a base 4, preferably of steel, which is formed at its longitudinal edges with down-turned flanges 5 and 6. A thin layer of mercury is illustrated at 7 as flowing along the base 4.

The trough-like formation of the cell is completed by means of sidewalls 8 and 9 whose bottom portions lie in opposed relation to the flanges 5 and 6, and are suitably secured thereto by a plurality of bolts 10 and 11 at closely spaced positions therealong. The sidewalls 8 and 9 are clad on their inner surfaces with hard rubber, or other suitable material, at 12 and 13.

Along the tops of the sidewalls ledges are provided for supporting the cover member 18 and these ledges are likewise covered by a continuation of the lining material 12 or 13, as the case may be.

The top of the primary cell section is closed by means of a suitable member 18, preferably made up of a series of sections. Additional gaskets 21 and 22 may be employed between the edges of the cover 18 and the rubber material overlying the flanges.

Electrodes 23 are supported within the cell by means of suitable stems 24 which extend up through, and are removably secured on top of member 18 and are connected to electrical contact strips 25 by means of flexible connectors. At its extreme ends the cell section is provided with end boxes having readily removable covers 26 and 27. Suitable piping arrangement is provided for the introduction of mercury and brine into the end box 26 for the removal of mercury and amalgam and depleted brine from the end box 27, for subsequent recirculation after the amalgam has been removed in the cell section 2. Features such as these form no particular part of the instant invention, so are omitted in the interests of clarity. Furthermore, the specific construction of the primary section as here shown has merely been selected for illustrative purposes. Its construction is such that it would be workable in this assembly and it is of a form commonly employed. However, other primary section structures can be used with equal facility in the arrangement of the invention, so it is to be understood that the invention is in no way limited by the specific cell section construction just described.

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As already indicated, the section 1 is hinged with respect to the secondary section 2 on a horizontally extending pivot at the position 3. The other and principal mounting of the cell 1 and the adjustment of the inclination of it is effected by means of a series of jacks at spaced positions along the length of the cell and at either side thereof. As here shown, there are four jacks at either side of the cell section. Such showing is purely for illustrative purposes, it being understood that a greater or lesser number may be employed if desired.

The four jacks on the near side are illustrated in Figure 1 at 30, 31, 32, and 33, it being understood that a similar set, one of which is illustrated at 34 in Figure 2, would extend along beneath the other side of cell section 1. Each of these jacks has a base or mounting portion 35 in which the screw 36 is mounted. The upper end of the screw 36 has a mounting face 37 for engagement with the under edge of the section side. The mounting is here shown as a hemisphere which would facilitate adjustment of the jack while the load was on it, but the invention is by no means limited thereby. In the cell structure here shown, the mounting face 37 engages the bottom edge faces of the down-turned flange 6 and the sidewall 9, and of course the rubber material clamped therebetween. Obviously the actual mounting between the cell section and the jacks will differ with differences in cell structures. However, that will not affect the adjustability achieved by the provision of jacks at a plurality of positions along the length of the cell as provided for here.

It is important to note, however, that the set of jacks, such as 32, along one side of the cell is widely spaced from the set of jacks, such as 34, along the other side of the cell. Thus there is ample room between the sets of jacks and beneath the primary cell of section 1 for suspension of the secondary section 2.

The secondary section 2, as here shown, is a steel trough having a bottom 40 with upstanding sidewalls 41 and 42, formed integrally with the bottom, and having for the top a cover 43. The cover 43 may be permanently secured in place across the sides 41 and 42 in any desired manner, since the necessity of gaining access to the cell section through its top, as in prior art constructions, is absent here. The cover 43, as here shown, is provided with short down-turned flanges 44 and 45 which are suitably secured, as by the welding here indicated, to the sides 41 and 42.

The cover 43 terminates a short distance from each of the ends 46 and 47 of the cell section, the remaining portions being closed by removable covers 48 and 49. Access through these removable covers is all that is required in the course of operation and maintenance of the secondary section as here constructed, since the grids in the secondary compartment may be readily removed lengthwise thereof whenever removal of them for periodic reactivation or other purpose is desired.

The grid construction which enables them to be handled so expeditiously is as follows: First, the grids illustrated at 50 are located in rows, forming sets, as seen from Figure 2, and they extend longitudinally of the secondary section, as seen from the broken away portion in Figure 1. At each end of each set of grids the individual grid elements are spaced apart by spacer members 51, and are secured in such spaced relation by suitable bolts or tie rods 52 extending therethrough. Each set of such grids is joined to the set ahead of it and the set following it by means of links 53 which join the outside ends of the tie rod at one end of one set with the outside ends of the tie rod extending through the adjacent end of the next set. Thus the whole assembly of grids can be moved along as a continuous chain to expose the sets of grids as desired at the ends of the cell section. Each set may be readily removed by disengaging the connecting links. Obviously this arrangement renders access to the grids at positions along the length of the section unnecessary.

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As already indicated, the secondary section 2 is mounted within the rows of supporting jacks and beneath the primary section 1. This mounting is effected by a plurality of hanger members 55, one of which is preferably employed extending across between each of the pairs of jacks on opposite sides of the cell. These hanger members have top portions 56 which extend substantially all of the way across, are turned downwardly at their ends into vertical portions 57, and are then flanged outwardly into securing portions 58. The securing portions 58, seated on the tops of the base portions 35 of the jacks, are perforated for the jack screws 36 to pass downward therethrough, and are held in place on the tops of the jack bases by means of the collars 59 and the jack adjusting nuts 60.

The hangers 55 support the secondary section at the positions along its length where the pairs of jacks are located. This support is effected by tie bolts 61 which extend down from the top 56 of the hanger member at either side of the cell section and pass through straps 62 which lie across beneath the bottom of the cell section. The tie bolts are suitably threaded above and below the straps 62 so that vertical adjustment of the straps 62, and consequently of the secondary cell section, at each position may be readily effected. This is done by turning the nuts 63 on which the straps 62 rest.

Since these adjustable hangers are located at a number of positions along the length of the secondary section, it will be obvious that adjustment of the inclination of the cell section can be effected by individual adjustments at each of these positions. Also, since these hanger constructions are mounted on the bases 35 of the jacks, it will be readily apparent that the secondary cell section can be adjusted independently of any adjustment of the primary cell section, which latter is effected by means of the jack screws themselves. Thus the incline of either one of the cell sections can be varied independently of that of the other, as the pivotal connection at 3 will have no significant effect on the position of one cell section with respect to the other.

While in the foregoing embodiment of the invention particular cell and electrode structures have been illustrated and described, it is of course to be understood that these are purely for illustrative purposes and that the scope of the invention is in no way limited thereby. On the contrary, the invention contemplates the applicability of the arrangement, and adjustment of cell sections, within the scope of the invention, to any cell and electrode constructions capable of being so mounted and adjusted.

It is, moreover, to be contemplated that different and various adjustable supporting and hanging constructions from those here disclosed will suggest themselves to those skilled in the art. Here again, the structures of the instant embodiment are presented for illustrative and not limiting purposes.

Speaking more generally, since certain changes may be made in the above construction, and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description, or shown in the accompanying drawing, shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In electrolytic cell construction employing a mobile mercury cathode, an elongated trough like secondary section, an elongated trough like primary section, hinge means, having a horizontal axis, extending between said primary and secondary sections and adjacent an end of each thereof for hinging said primary and secondary sections together with said primary section in aligned relation above said secondary section, means for turning said primary section about said hinge to vary the incline of the same with respect to the horizontal, and mounting means for said secondary section, said mounting means

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including adjustable members for varying the incline of said secondary member with respect to the horizontal.

2. In electrolytic cell construction employing a mobile mercury cathode, an elongated trough like primary section and an elongated trough like secondary section, said secondary section being mounted beneath said primary section in alignment therewith and in spaced relation with respect thereto, said secondary section being formed as an upwardly opening trough having a portion underlying said primary section and having portions extending beyond the ends of said primary section, said underlying portion having a cover permanently secured thereto and said extending portions being provided with removable covers grids in said trough and means for moving said grids longitudinally in said trough to bring them into said extending portions.

3. In electrolytic cell construction employing a mobile mercury cathode, an elongated trough like primary section and an elongated trough like secondary section, said secondary section being mounted beneath said primary

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section in alignment therewith and in spaced relation with respect thereto, said secondary section being formed as an upwardly opening trough having a portion underlying said primary section and having portions extending beyond the ends of said primary section, grids within said trough and extending longitudinally thereof, means for connecting said grids together throughout the length of said trough in the form of a chain, a cover permanently secured across the underlying portion of said trough and means on the extending portions of said trough for opening the same to obtain access to said grids.

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