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Bezeichnung der Erfindung: Anode and base assemblies for electrolytic cells and  
Title of invention: method of manufacture thereof  
Titre de l'invention :

Klassifikation / Classification / Classement : C 25 B 11/00, C 25 B 9/00

### ENTSCHEIDUNG / DECISION

vom / of / du 24 September 1987

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

Diamond Shamrock Corporation

Einsprechender / Opponent / Opposant :

Conradty GmbH & Co. Metallelektroden KG

Stichwort / Headword / Référence :

EPO / EPC / CBE Articles 56 and 113(1)

Kennwort / Keyword / Mot clé :

"Inventive step (no)" - "Determination of the  
nearest prior art" - "Party not represented at  
the oral proceedings"

Leitsatz / Headnote / Sommaire

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Case Number : T 135 /85

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.1  
of 24 September 1987

**Appellant :** Conradty GmbH & Co. Metallelektroden KG  
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**Decision under appeal :** Decision of the Opposition Division of the European  
Patent Office dated 16 January 1985 rejecting  
the opposition filed against European patent  
No. 0 014 595 pursuant to Article 102(2) EPC.

**Composition of the Board :**

**Chairman :** K. Lederer  
**Members :** J. Roscoe  
O. Bossung

## Summary of Facts and Submissions

- I. European patent 0 014 595 was granted on the basis of European patent application 80 300 390.4.

The independent Claims 1 and 8 read as follows:

1. A cell base assembly for incorporation with a cathode cell can in an electrolytic cell for the electrolysis of alkali metal halide solutions, which comprises:
  - (a) an electrically-conductive cell base (1) having perforations (32) disposed therein for the receipt of anode riser connecting posts (33);
  - (b) a substantially electrically-nonconductive metal cell base cover (3) substantially covering the entire cell base and having perforations (30) disposed therein which correspond to the perforations in the cell base; and
  - (c) a plurality of dimensionally-stable anodes, each comprising a material supporting an electrically-conductive surface and an anode riser (13) having (i) a connecting post extending coaxially from its lower portion and (ii) a downwardly-facing annular surface (34), each connecting post extending downwardly through respective corresponding perforations (30, 32) in the cell base cover and the cell base, so that the annular surface faces the top surface of the cell base cover and contacts the top and/or inside portion of the corresponding perforation (30) in the cell base cover; characterised in that

- (d) a circumferential weld bead (36) extends between the annular surface and the cell base cover within each perforation in the cell base cover, whereby a hydraulically-impermeable seal is created between the annular surface of each anode riser and the cell base cover.
8. A method of manufacture of a cell base assembly according to any one of Claims 1 to 7, in which the connecting post (33) of each anode riser is inserted through a perforation (30) in the cell base cover and each anode riser (13) is positioned so that its annular surface (34) faces the top surface of the metal cell base cover (3) and contacts the top and/or inside portion of the corresponding perforation in the cell base cover, characterised in that the annular surface (34) of each anode riser is circumferentially welded to the interior of the corresponding perforation (30) from the underside of the metal cell base cover, to form the hydraulically-impermeable seal and all the connecting posts are then attached to the electrically-conductive cell base (1).

Claims 2 to 7 depend on Claim 1.

- II. The granted European patent was opposed by the Appellant on the ground of lack of inventive step having regard to the disclosure of the following documents:
- US-A-4 121 994 (D1); and  
"Maschinenelemente", Dr.-Ing. G. Niemann, Volume 1,  
page 139 (D2).
- III. The Opposition Division rejected the opposition on the ground that, starting from the teaching of document D1, it

would require an inventive step by a skilled person seeking a solution to the technical problem resulting from the limitations on space imposed by the anode risers and screens, which preclude the use of automatic welding, to transfer the weld bead site from the top to the underside of the cell cover. The more so since in the arrangement shown in document D1 the underside of the cell base cover is not accessible when the welding operation is performed, and document D2, which relates to tube welding, is neither directed to the technical problem underlying the invention, nor does it give any hint towards the claimed solution.

- IV. The Opponent lodged an appeal against this decision. A Statement of Grounds was filed in response to which no submissions were made by the Respondent (proprietor of the patent), whose observations were limited to agreeing fully with the contents of the communication of the Board sent out with the summons to oral proceedings.
- V. Oral proceedings were held. The Respondent, who had been duly summoned, was not represented.

At the oral proceedings, the Appellant submitted that the Opposition Division's reasoning was erroneous insofar as it started from document D1, which in fact disclosed an unusual construction for mechanically fixing the anode risers on the cell base. When starting instead from a more typical construction as disclosed for instance in the document US-A-3 707 454, hereafter document D3, which had been discussed in the statement of grounds and was acknowledged in the patent itself, it would be obvious to a skilled person to replace the known sealing rubber gaskets by welded seals as taught by document D1 and to locate such seals at the underside of the cell cover in order to avoid interference between the anode screen and the welding equipment.

- VI. The appellant requests that the decision under appeal be set aside and the patent revoked.
- VII. The respondent did not make any formal request in the appeal procedure, but it is assumed that he maintains his request made in the opposition proceedings that the patent be maintained unamended and, consequently, that the appeal be dismissed.

#### Reasons for the Decision

1. The appeal is admissible.
2. Novelty.
  - 2.1 Document D3 discloses a cell base assembly as defined in the generic portion of independent Claim 1, for incorporation with a cathode cell can in an electrolytic cell for the electrolysis of alkali metal halide solutions, which comprises:
    - (a) an electrically-conductive cell base (1) having perforations disposed therein for the receipt of anode riser connecting posts (25);
    - (b) a substantially electrically-nonconductive metal cell base cover (3) substantially covering the entire cell base and having perforations disposed therein which correspond to the perforations in the cell base; and
    - (c) a plurality of dimensionally-stable anodes (19) each comprising a material (titanium) supporting an electrically-conductive surface (of platinum) and an anode riser (13) having (i) a connecting post

extending coaxially from its lower portion and (ii) a downwardly-facing annular surface (underside of flange (15)), each connecting post extending downwardly through respective corresponding perforations in the cell base cover and the cell base, so that the annular surface faces the top surface of the cell base cover and contacts the top and/or inside portion of the corresponding perforation in the cell base cover (see figures 1 to 3 and corresponding portion of the description).

When the cell base cover (3) is made of titanium, the holes in the cell base and base cover are of the same size and compressible O-rings and gaskets are provided for obtaining a hydraulically-impermeable seal between the downwardly facing annular surface of the flange (15) of the anode riser (13) and the cell base cover (3) (see column 3, lines 13 to 16 and 22 to 25 in conjunction with column 5, lines 3 to 7).

The subject-matter of independent Claim 1 distinguishes over this prior art structure in that, instead of said O-rings or gaskets,

- (d) a circumferential weld bead extends between the annular surface and the cell base cover within each perforation in the cell base cover, whereby a hydraulically-impermeable seal is created between the annular surface of each anode riser and the cell base cover, as set out in the characterising portion of independent Claim 1.

2.2 Document D1 also relates to a cell base assembly exhibiting most of the features defined in the generic portion of independent Claim 1 and, in addition thereto, a circumferential weld bead (22) creating a hydraulically-impermeable seal between each anode riser (10) and the cell base cover (16) (see Figure 1).

In this assembly, the connecting post of each anode riser is engaged in a threaded hole which terminates in the cell base (14) itself or in a bus bar welded to its lower surface, and the weld bead (22) is provided between the outer peripheral edge of a washer (17) comprising a downwardly facing annular surface and the top surface of the cell base cover (16).

The subject-matter of independent Claim 1 distinguishes over this prior art device in that the threaded blind holes in the known cell base or cell base-bus bar assembly are replaced by perforations, as claimed in the generic portion of the claim, and in that the sealing weld bead extends between the annular surface and the cell base cover within each perforation in the cell base cover as set out in the characterising portion of the claim.

2.3 D2 and the other prior art documents cited in the European search report or mentioned in the patent are less relevant to the present invention and will not therefore be discussed.

2.4 For the reasons given above, the subject-matter of independent Claim 1 is deemed to be novel within the meaning of Article 54 EPC.



- 2.5 None of the above-mentioned prior art documents discloses a method of manufacture of a cell base assembly wherein the annular surface of an anode riser is circumferentially welded from the underside to the interior of a corresponding perforation of a cell base cover.

Therefore, the subject-matter of independent Claim 8 is also deemed to be novel within the meaning of Article 54 EPC.

3. Inventive step.

- 3.1 In the Board's opinion, the closest prior art is that disclosed in document D3, on which the two-part form of independent Claims 1 and 8 is based (see point 2.1 above).

- 3.2 From a comparison of what is achieved by the cell base assembly disclosed in document D3 and that forming the subject-matter of present Claims 1 and 8, it emerges that the technical problem to which said subject-matter provides a solution is, as acknowledged in the patent specification (see column 5, lines 19 to 25),

(a) to eliminate the use of degradable rubber components;

while (b) avoiding the drawbacks of the structure known from document D1, wherein the anode risers and anode screens limit the accessibility of the welding sites and thus preclude the use of automatic welding equipment.

- 3.3 No contribution to inventive step is to be found in recognition of the technical problem, since:

- (a) document D1 already provides a cell base assembly dispensing with rubber components; and
- (b) the limitation on space imposed by the anode risers and anode screens above the cell base cover is readily apparent to the skilled person, and, furthermore, it is common practice in the art of manufacturing to try to devise structures or improve existing ones so as to permit easy and labour-saving assembly.

3.4 Starting from the cell base assembly disclosed in document D3, the skilled person faced with the technical problem defined in point 3.2 above would draw from document D1 the teaching that a circumferential weld bead can be used to provide a leak-proof seal between each anode riser and the cell base cover in lieu of the known compressible rubber sealing gaskets which were disposed between a downwardly-facing annular surface of the anode risers and the cell base cover made of titanium before the anode risers extending through the respective perforations in the cell base cover and cell base were fastened to the underside of the cell base by means of nuts to effect the seal.

The anoderisers and anode screens, however, obviously limit access from above the cell base cover to the outer peripheries of the flanges of the anode risers where the welds are made in the assembly of D1. Thus, if a weld bead is to be used an alternative location has to be found for it.

It is immediately apparent that the only alternative location available is at the internal periphery of the hole in the base cover at the underside of the flange. The only method of mounting the anode posts to the base described in D1 involves a rotational movement of the rods relative to

the base, so that the formation of the weld bead, which, of course, fixes the posts to the cover, has to be made after a mounting step which renders the underside of the base cover completely inaccessible, a fact which was recognised by the Opposition Division and was largely instrumental in leading it to acknowledge the presence of inventive step.

The skilled man starting from the assembly disclosed in D3 on the other hand would realise that this limitation on the sequence of the steps of manufacture did not apply with the method of mounting used there where the only movements required are a linear movement of the risers into the perforations and rotational movement of the nuts, which remain accessible and free to move even in the finished assembly. This method of assembly would, in the Board's view, be seen by the skilled man to open up the possibility of making a weld in the alternative position prior to assembly of the anode posts to the base, using automatic welding equipment, which would then have unobstructed access to the weld sites. The resulting sub-assembly would subsequently be mounted to the base by simply passing the risers through the holes in the base and tightening the nuts as in D3. In this way the skilled man would produce a cell base assembly according to Claim 1 by the method of Claim 8. Of course, to weld the anode risers to the base cover in the above manner would require a jig to maintain the risers in proper alignment with the respective perforations in the cover since they would not be fixed to the base as they are in the method of D1. Since it is, however, common practice in the art of assembling parts by welding, and especially automatic welding, to use jigs to hold parts to be connected, this requirement cannot be seen as something which would dissuade the skilled man from

adopting such a procedure, and its fulfilment would require nothing more than his routine skill as is implicitly recognised by the patentee by his failure to provide any teaching on this in the patent.

3.4 Therefore, the subject-matter of Claims 1 and 8 does not involve an inventive step within the meaning of Article 56 EPC and consequently the maintenance of the European patent with these claims is prejudiced by Article 100(a) EPC.

3.5 The Opposition Division came to a different conclusion because its considerations, in the Board's view wrongly, started from D1 and indeed from the specific embodiment of the invention claimed in that document. It therefore saw the skilled man constrained not to dispense with or look beyond specific features of this embodiment, and thus viewed the welding in a narrow context. The Board, on the other hand, as emerges from the above, sees this document as drawing the attention of the skilled man already aware of the structure of D3 to the advantages of using a weld bead as a method of sealing an anode riser to the metal cell base cover as an alternative to using compressible O-rings and gaskets, without blinding him to the possibility of its use in association with structures differing in detail from that specifically disclosed. The possibility of using different methods of attaching the anode risers to the base of the cell is in fact implicitly recognised in document D1 itself at line 61 of col. 4 to line 4 of col. 5, where, following a statement that the exact configuration of the anode support rod will vary from cell to cell, the threaded extension of the rod as shown in Fig. 1 is stated to be a convenient means of attaching it to the base structure of the cell in order to maintain positioning of the rod within the cell. Also the generality of Claim 1 in this respect and the passage commencing "If

the support rod contains a threaded portion 12,..." at col. 4, line 21 et seq. are a clear indication that the form shown in the figure was not regarded as essential.

4. The present decision is based only on grounds (lack of inventive step) and evidence (documents D1 and D3) which were put forward in the Appellant's Statement of Grounds. Moreover, the Respondent himself acknowledged documents D1 and D3 in the patent specification as forming part of the relevant prior art, and defined the technical problem underlying the alleged invention in the same terms as has the Board. He further based the two-part form of the independent claims on the disclosure of D3 which the Board has considered to form the nearest prior art in its reasoning.

Though not present at the oral proceedings, the Respondent therefore clearly had an opportunity to present his comments on these grounds and evidence as required by Article 113(1) EPC and the present decision accordingly has a proper basis.

#### Order

For this reason, it is decided that:

1. The decision under appeal is set aside.
2. European patent 0 014 595 is revoked.

The Registrar:

F.Klein

The Chairman:

K.Lederer