

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 9 June 2009**

Case Number: T 0407/07 - 3.4.02

Application Number: 98907775.5

Publication Number: 0968415

IPC: G01N 27/28

Language of the proceedings: EN

Title of invention:
Sensor connection means

Applicant:
USF Filtration and Separations Group Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Novelty/Inventive step: amended claims: yes"

Decisions cited:
-

Catchword:
-



Case Number: T 0407/07 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 9 June 2009

Appellant: USF Filtration and Separations Group Inc.
2118 Greenspring Drive
Timonium
Maryland 21093 (US)

Representative: Smaggasgale, Gillian Helen
W.P. Thompson & Co
55 Drury Lane
London WC2B 5SQ (GB)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 18 October 2006
refusing European application No. 98907775.5
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. G. Klein
Members: F. Maaswinkel
C. Rennie-Smith

Summary of Facts and Submissions

- I. This is an appeal against the decision, dispatched on 18 October 2006, of the examining division refusing European patent application No. 98907775.5 (published under the patent Cooperation Treaty as WO98/43073) on the ground that the amended patent application documents were objectionable under Article 123(2) EPC. In addition, according to the division, the claims then on file did not meet the requirements of Article 52(1) EPC because their subject-matter was not new (Article 54(1) and (2) EPC), and did not involve an inventive step having regard at the disclosures in documents US-A-5,437,999 (document D1) and US-A-5,395,504 (D3).
- II. Against this decision the applicant (appellant) lodged an appeal which was received on 27 December 2006 and paid the fee for the appeal on the same day. With the statement setting out the grounds of appeal filed on 20 February 2007 the appellant filed new claims. The appellant requested that the decision under appeal be set aside and the newly filed claims be allowed or, alternatively, oral proceedings.
- III. In a communication pursuant to Article 15(1) RPBA, dated 27 January 2009 and accompanying the summons to oral proceedings on 9 June 2009, the board expressed its doubts that the amended claims complied with the requirements of Article 123(2) EPC and questioned that the newly filed claims represented patentable subject-matter.

IV. At the oral proceedings the appellant filed a new main request and requested that a patent be granted on the basis of this request.

V. The wording of independent claim 1 of this request reads as follows:

"A sensor adapted for electrical connection with a power source having a contact means, the sensor comprising:

a first insulating substrate (1) carrying a first electrode (2) and a second insulating substrate (7) carrying a second electrode (6), said electrodes (2, 6) being disposed to face each other in spaced apart relationship;

a spacer (4) positioned between the first and second insulating substrates (1, 7) and having an aperture defining the wall of a cell, the cell closed at either end by the first and second electrodes;

a first cut-out portion (21) extending through said first insulating substrate and the spacer (4) to expose a first contact area (23) on the second insulating substrate (1, 7) to permit electrical connection with the second electrode (6); and

a second cut-out portion (25) extending through said second insulating substrate (7) and the spacer (4) to expose a second contact area (27) on the first insulating substrate (1); and

wherein the spacer (4) extends around all edges of cut-out portions (21, 25) or wherein the cut-out portions (21, 25) are cut from an edge of the spacer and the first and second insulating substrate (1, 7) such that the cut-out portions are open on one edge of

the sensor and the spacer (4) extends on three sides of said cut-out parts".

The wording of claim 13 of this request reads as follows:

"A sensing system comprising a sensor according to any one of Claims 1 to 12 and a sensing apparatus including a first contact means (31) adapted to effect electrical contact with the first contact area (239 and/or a second contact means (32) adapted to effect electrical contact with the second contact area (27)".

Claims 2 to 12 and 14 and 15 are dependent claims.

VI. In support of its requests the appellant submitted the following arguments:

Claim 1 has been amended to include the additional feature that the spacer extends around all edges of the cut-out portions or that the cut-out portions are open on one edge of the sensor and the spacer extends on three sides of the cut-out parts. This feature is supported by the passages on page 5, lines 15 and 16 and page 6, lines 3 - 5 in the context of the embodiments in Figures 1 - 4; by the passage on page 7, lines 4 - 6 in the context of the embodiments in Figures 5 - 7, and on page 7, lines 13 - 17 for the embodiment in Figure 8. Therefore the amendment should satisfy the provisions of Article 123(2) EPC.

By virtue of this feature the claimed device offers major improvements over prior art electrochemical sensors. For instance, the arrangement disclosed in

document D1, which is considered as the closest prior art, suffers from the disadvantage that the substrate is required to be of considerable rigidity in order to ensure satisfactory and reliable electrical contact. In particular, as shown in Figures 5 and 6 of D1, the electrode contact pads 9 and 45 are formed by cut-outs of the respective electrode elements 11 and 48. Because these protrusions stick out from the device they are mechanically not very stable, therefore this construction is not suitable for use as a thin sensor. Furthermore that structure does not guarantee a reliable and effective electrical connection. In the sensor according to the invention the arrangement with the spacer extending at least around three sides of the electrodes provides a more robust mechanical structure less likely to be damaged by mating with a contact means and, in addition, enables a click engagement with the measuring device, thereby providing a reliable electrical connection. These problems are not addressed in the prior art device in D1. With respect to the prior art in document D3, cited by the examining division, this document does not remedy the deficiencies of D1. Rather, D3 only discloses a cover film (29, 30) having windows (34) for admitting a sample to the sensor, see Figure 8. D3 does not suggest forming a cut-out portion through the cover film (29) and support strip (1) to expose a contact area on cover film (30), so as to permit electrical connection with electrode (20) as required by the claimed cut-out portion. Therefore even a combination of the teachings of documents D1 and D3 would not result in the claimed device. It is therefore submitted that the claims define patentable subject-matter.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The present claims do not include the features of the former claims objected to under Article 123(2) EPC in the decision, therefore this objection no longer arises.

2.2 With respect to the new features in claim 1, last paragraph, the board is satisfied that these are fairly supported by the passages in the description and the drawings referred to by the appellant.

3. *Patentability*

3.1 *Document D1*

3.1.1 This document, in particular the embodiments in Figures 5 and 6, discloses a sensor adapted for electrical connection with a power source having a contact means. The sensor comprises a first insulating substrate (42; see col. 3, lines 26 - 28) carrying a first electrode (metalized support 41) and a second insulating substrate (11) carrying a second electrode (metalized support 3), which electrodes are disposed to face each other in spaced apart relationship. Furthermore the cell comprises a spacer (43) positioned between the first and second insulating substrates (11, 48) and having an aperture defining the wall of a cell, the cell closed at either end by the first and second electrodes; it is noted that the appellant in its

letter of 8 May 2009 had argued that document D1 disclosed vent ports 10, 47 which provided openings into the capillary space 49, referring to col. 8, lines 37 - 45. The board, however, observes that these vent ports are optional (see col. 5, lines 20 - 22; and col. 8, lines 6 - 9), therefore the disclosure of D1 includes embodiments without these vent ports being present. In the sensor disclosed in D1 cut-out portions (9 and 45) extend through the insulating substrates and the spacer (43) to expose first and second contact areas to permit electrical connection with the electrodes, see col. 8, lines 33 - 36.

Therefore, these features are known from document D1.

3.1.2 This document does not disclose the features of the last part of claim 1 "wherein the spacer extends around all edges of cut-out portions or wherein the cut-out portions are cut from an edge of the spacer and the first and second insulating substrate such that the cut-out portions are open on one edge of the sensor and the spacer extends on three sides of said cut-out parts". Rather, as shown in Figures 5 and 6 of D1, the cut-out electrode portions protrude from the body of the sensor device without any lateral enclosure by the spacer. The subject-matter of claim 1 is therefore new over the disclosure in D1.

3.1.3 These features in claim 1 address the problem of improving the rigidity of the sensor and ensuring satisfactory and reliable electrical contact, see also page 1, lines 20 - 22 and page 2, lines 5 - 11 of the published patent application. With respect to the issue of rigidity document D1 only teaches that the

respective substrates may be chosen to provide the desired rigidity, see col. 4, lines 30 - 32, therefore it offers an alternative solution, which, however, may require a thicker sensor device, as is pointed out in the above mentioned passages in the patent application. Furthermore, the possible problem of the reliability of the electrical connection to the power source is not discussed in document D1.

3.2 *Document D3*

This document discloses an electrochemical sensor in which the electrodes are arranged at one side of an insulating substrate (Figures 1 - 5 and 12 - 14) or at opposite sides of an insulating support strip (Figures 6 - 9). The problem of a reliable connection is only addressed in the embodiment of Figures 12 - 14 which relies on the electrode arrangement on one side of the substrate (Figures 1 - 5). In this embodiment the connection is by means of resilient foils (Figure 14 and col. 7, lines 41 - 44). Hence, the respective embodiments in the device of D3 being basically different from the sensor arrangement in D1, it would not be obvious to combine their teachings, and in any case, neither of these devices includes a spacer with the properties as defined in claim 1.

3.3 The other documents on the file are not more relevant.

4. Therefore, in the opinion of the board, the subject-matter of claim 1 involves an inventive step (Art. 52(1) and 56 EPC).

5. Claim 13 defines a sensing system including a sensor as defined in claim 1 or its appended claims and therefore equally defines patentable subject-matter. This similarly applies to the further dependent claims.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of claims 1 to 15 of the main request filed during the oral proceedings and a description and drawings to be adapted thereto.

The Registrar:

The Chairman:

M. Kiehl

A. G. Klein