

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte KEVIN H. CORNELL,  
JOSEPH C. TOPPING,  
and  
THADDEUS J. SZYNAL

---

Appeal No. 1999-2241  
Application No. 08/714,914

---

ON BRIEF

---

Before PAK, DELMENDO, and PAWLIKOWSKI, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 21 and 33 through 40 in

---

are the only other pending claims, have been indicated as allowable. (Examiner's answer, page 1.)

The subject matter on appeal relates to a free-fluoride-ion-sensitive electrode. Further details of this appealed subject matter are recited in illustrative claims 21, 33 (dependent on allowed claims 22 through 24, 29, and 30), and 40 reproduced below from the application as amended:

21. A free-fluoride-ion-sensitive electrode, comprising:
- (A) a substantially liquid-impermeable solid fluoride-sensing crystal that is constituted of one or more fluoride-ion-sensitive solid, crystalline, substantially water-insoluble fluorides;
  - (B) first and second solid elastomeric gaskets that form a sealing array with the fluoride-sensing crystal;
  - (C) a primary container body constituted of electrically insulating material and having walls surrounding a central cavity that extends completely through the primary container body, thereby forming a first and a second end of said central cavity, said central cavity having a size and a shape such that a sealing array among the primary container body, the fluoride-sensing crystal, and said first and second elastomeric gaskets is formed;
  - (D) means for maintaining the sealing array among
-

container body when they are jointly rotated, said means not including use of any cement or adhesive or any incorporation of the fluoride-sensing crystal into a cohesive unitary solid from which it can not be removed intact without dividing all parts of the unitary solid that do not consist of the fluoride-sensing crystal into at least two separate pieces;

- (E) means for dividing the central cavity of the primary container body so as to constitute, jointly with the primary container body, the fluoride-sensing crystal, and at least one of the first and second elastomeric gaskets, boundaries of a liquid- and vapor-tight portion of the central cavity of the primary container body;
- (F) a volume of a first liquid ionic solution of known composition and concentration confined within said substantially liquid- and vapor-tight portion of the central cavity of the primary container body and in physical contact with the fluoride-sensing crystal;
- (G) a first reference electrode enclosed within said substantially liquid- and vapor-tight portion of the central cavity of the primary container body, said first reference electrode including a metallic electrical conductor that is in physical contact with the first liquid ionic solution but is not in physical contact with the fluoride-sensing crystal; and
- (H) an electrically conducting lead component that is in physical contact with both the metallic electrical conductor part of the first reference electrode and a point outside

22. (allowable) A free-fluoride-ion-sensitive electrode comprising:
- (A) a substantially liquid-impermeable solid fluoride-sensing crystal that is constituted of one or more fluoride-ion-sensitive solid, crystalline, substantially water-insoluble fluorides;
  - (B) first and second solid elastomeric gaskets that form a sealing array with the fluoride-sensing crystal;
  - (C) a primary container body constituted of electrically insulating material and having walls surrounding a central cavity that extends completely through the primary container body, thereby forming a first and a second end of said central cavity, said central cavity having a size and a shape such that a sealing array among the primary container body, the - fluoride-sensing crystal, and said first and second elastomeric gaskets is formed;
  - (D) means for maintaining the sealing array among the fluoride-sensing crystal, the first and second elastomeric gaskets, and the primary container body when they are jointly rotated, said means not including use of any cement or adhesive or any incorporation of the fluoride-sensing crystal into a cohesive unitary solid from which it can not be removed intact without dividing all parts of the unitary solid that do not consist of the fluoride-sensing crystal into at least two separate pieces;
  - (E) means for dividing the central cavity of the primary container body so as to constitute jointly with the primary container body, the

- composition and concentration confined within said substantially liquid- and vapor-tight portion of the central cavity of the primary container body and in physical contact with the fluoride-sensing crystal;
- (G) a first reference electrode enclosed within said substantially liquid- and vapor-tight portion of the central cavity of the primary container body, said first reference electrode including a metallic electrical conductor that is in physical contact with the first liquid ionic solution but is not in physical contact with the fluoride-sensing crystal; and
- (H) an electrically conducting lead component that is in physical contact with both the metallic electrical conductor part of the first reference electrode and a point outside said substantially liquid- and vapor-tight portion of the central cavity of the primary container body but is not in physical contact with the fluoride-sensing crystal or with the first ionic solution, wherein: the central cavity of the primary container body has a central portion that is cylindrical; a first end portion of the central cavity of the primary container body has a shape of a cylinder that is concentric with but has a larger diameter than the cylindrical central portion of the central cavity, so that the primary container body in said first end portion has a bounding wall surface that consists of two concentric cylinders joined by an annular disk with a circular center hole, the disk and center hole both being concentric with said concentric cylinders;

23. (allowable) A free-fluoride-sensitive electrode according to claim 22, wherein the fluoride-sensing crystal is a solid cylinder and each of the first and second elastomeric gaskets is a cylinder with a cylindrical hole therethrough or a torus.

24. (allowable) A free-fluoride-ion-sensitive electrode according to claim 23, wherein: the means for maintaining the sealing array of the fluoride-sensing crystal, the first and second elastomeric gaskets, and the primary container body comprises the following components:

- (A') male screw threads on an exterior first end portion of the walls of the primary container body; and
- (B') a first end cap component comprising:
  - (1) a primary cylinder portion having a concentric cylindrical hole therethrough, so that the primary cylinder portion has exterior and interior walls and distinct first and second ends of each of the exterior and interior walls;
  - (2) a retainer portion joined to the primary cylinder portion at its second end; and
  - (3) a continuous zone of female screw threads on at least a part of the interior wall of the primary cylinder portion, said female screw threads being matable with the male screw threads on the exterior first end portion of the walls of the primary container body when these male screw threads are inserted

first and second elastomeric gaskets,  
(i) said male screw threads on the primary container body, (ii) said first end cap component, (iii) said primary cylinder portion of the first end cap component, (iv) said concentric cylindrical hole therethrough, (v) said exterior and interior walls of the first end cap component, (vi) said female screw threads on at least a zone of said interior walls, (vii) said retainer portion of the first end cap component, and (viii) a hole therethrough all forming a torque-limited-screwed, temperature-stable sealing container around the sealing array of the fluoride-sensing crystal and the first and elastomeric gaskets.

29. (allowable) A free-fluoride-ion-sensitive electrode according to claim 24, wherein the means for dividing the central cavity of the primary container body is a plug of solidified potting resin through which electrically conducting lead component (H) passes.

30. (allowable) A free-fluoride-ion-sensitive electrode according to claim 29, wherein: the central cavity through the primary container body has an enlarged zone which has two ends, both ends of said enlarged zone of the central cavity being within, rather than at either end of, the central cavity and both of the ends of the enlarged zone being between an end of the primary container body and the liquid- and vapor-tight portion of the central cavity that contains the first ionic solution of known composition, said enlarged zone being larger in cross-section than is another portion of said central cavity that is situated between the enlarged zone and said one of said ends of said central cavity; and at least a portion of said plug of potting resin fits within said enlarged zone of

according to claim 30, wherein the primary container body and any end cap or caps present in the free-fluoride-ion-sensitive electrode are constituted of polytetrafluoroethylene and the first and second elastomeric gaskets are constructed of a copolymer of tetrafluoroethylene and perfluoro(methylvinylether).

40. A free-fluoride-ion-sensitive electrode according to claim 21, wherein the primary container body and any end cap or caps present in the free-fluoride-ion-sensitive electrode have a modulus of elasticity in flexure from  $1.0 \times 10^7$  to  $5.0 \times 10^7$  kg/m<sup>2</sup> and the first and second elastomeric gaskets are constructed of a fluorocarbon elastomer.

The examiner relies on the following prior art references as evidence of unpatentability:

Frant	3,431,182	Mar. 4, 1969
Bukamier	4,128,468	Dec. 5, 1978

Claims 33 through 40 on appeal stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. (Examiner's answer, page 4.) Further, claims 21 and 40 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Frant and Bukamier. (Id. at page 3.)

We reverse the examiner's rejection under the second paragraph of 35 U.S.C. § 112 but affirm the rejection under 35

or caps" appearing in, for example, appealed claim 33 renders indefiniteness. Specifically, the examiner held (examiner's answer, page 4):

The expression "any end cap or caps" (e.g. claim 33, line 2) is indefinite in that it is unclear whether an end cap is claimed or not. Note that claim 33 depends upon claim 24, which recites an end cap at line 6. Thus, claim 33 would appear to "unclaim" subject matter already recited in a parent claim. The expression is also vague for a dependent claim whose parent claim does not recite any end cap, because it makes no sense to further define an element when that element is not claimed in the first place.

We hold that the examiner's position is not tenable for the reasons stated in the appeal brief at pages 3-4. We only add that claim 33, which depends from claim 24, cannot "unclaim" any element that is recited in any base claim, because "[c]laims in dependent form shall be construed to include all the limitations of claim incorporated by reference into the dependent claims." See 37 CFR § 1.75(c) (1996).

Accordingly, we cannot uphold the examiner's rejection on this ground.

Rejection under 35 U.S.C. § 103(a)

fluoride substantially insoluble in water" (24); an O-ring preferably made of plastic material (26); an elongated, tubular container or stem open at both ends (22); a collar (28) having an annular flange (27) which press-fits the membrane (24) to the O-ring (26) when the collar is threaded onto the container or stem (22); a reference electrolyte (30); a reference electrode (32); and a coaxial cable (36). (Figure 1; column 2, line 32 to column 3, line 10; column 3, lines 19-28 and 43-56.) According to Frant, an O-ring (i.e., a gasket) and a sealing compound are alternatives for the purpose of mounting the membrane (24) onto the container or stem (22). (Column 2, lines 53-60.) In this regard, the appellants further acknowledge that Frant discloses or suggests an electrode having an adhesive seal on one side of the membrane and a gasket on the other side. (Appeal brief, page 8.)

Thus, the appellants do not dispute the examiner's finding (examiner's answer, page 3) that Frant describes each and every element of appealed claim 21 except for the use of a second

matter of appealed claim 21 would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103. (Id. at pages 3 and 4-5.)

Moreover, as we discussed above, the appellants acknowledge that Frant discloses or suggests an electrode in which the membrane is press-fitted against a gasket on one side and a sealing compound on the other. To use another gasket in lieu of the sealing compound would have been prima facie obvious to one of ordinary skill in the art, because Frant teaches that a gasket and a sealing compound are alternatives for purposes of securing the membrane in the electrode. On this point, we determine, that the motivation to replace the sealing compound with another gasket also arises from the reasonable expectation that the use of a gasket would eliminate the need for applying and/or curing the sealing compound to join the membrane (24) onto annular flange (27) as well as facilitate ease of separating the components of the electrode during maintenance.

Regarding appealed claim 40, the appellants' specification

container or stem (22) can be made from various liquid-impervious, substantially rigid, electrically-insulating materials such as PTFE. (Column 2, lines 43-48.) Further, the examiner found that the appellants admitted that O-rings made from fluorocarbon elastomer have been used extensively in the art. (Examiner's answer, pages 6-7; specification, page 4, lines 27-30.) Under these circumstances, we agree with the examiner that it would have been prima facie obvious for one of ordinary skill in the art to construct the container or stem (22) and the O-rings of Frant's electrode with PTFE or a fluorocarbon elastomer in order to provide a structure that is liquid-impervious, substantially rigid, and electrically-insulating. When a PTFE or fluorocarbon elastomer is selected as the material of choice as suggested in the prior art, the recited modulus of elasticity in flexure would necessarily flow from such selection of material.

The appellants argue that the use of a second gasket in the invention recited in the appealed claims serves purposes that are

[T]he appellants' invention as a whole includes the use of two gaskets as a means of providing an increased service life for the electrode, lengthening the time interval between recalibrating or replacing the electrode, decreasing the probability that the fluoride-sensing crystal will fracture due to pressure placed on it to hold it securely in place and to form a seal, and permitting the fluoride-sensing crystal to be replaced without replacing any other part of the electrode.

We, like the examiner (examiner's answer, pages 5-6), do not find this argument to be persuasive for the reasons stated in the answer. In addition, we note that the appellants have not directed us to any objective evidence (e.g., declaration evidence) demonstrating that the alleged additional benefits of using two gaskets, as opposed to a gasket and a sealing compound, would have been considered unexpected by one of ordinary skill in the art. On this point, naked attorney arguments or conclusory statements are not enough to rebut a prima facie case of obviousness. In re Geisler, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997). In any event, we point out that the motivation provided in the prior art does not have to be the same as that of the appellants for the purpose of establishing a prima

two gaskets would provide better sealing than the use of only one gasket and that no reason has been provided as to why a gasket would perform better than an adhesive seal. (Appeal brief, page 8; reply brief, page 2.) As to the first point, it is clear to us that one of ordinary skill in the art would have reasonably expected that a double seal (single O-ring and sealing compound or two O-rings) would be superior to a single O-ring seal. With respect to the second point, the rejection is not based on the notion that an O-ring would provide a better seal than an adhesive. Rather, it is based on the notion that an adhesive seal can be replaced with an O-ring seal as expressly taught in Frant. Here, the appellants have admitted that Frant would have suggested the use of both an O-ring seal and an adhesive seal. One of ordinary skill in the art would have expected that by replacing the adhesive seal with an O-ring seal, the need for applying and/or curing an adhesive would be eliminated and ease in separating the components of the electrode during maintenance would be facilitated.

Appeal No. 1999-2241  
Application No. 08/714,914

Summary

In summary, we reverse the rejection under 35 U.S.C. § 112, second paragraph, of appealed claims 33 through 40. We affirm, however, the examiner's rejection under 35 U.S.C. § 103 of appealed claims 21 and 40 as unpatentable over the applied prior art.

The decision of the examiner is affirmed in part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

CHUNG K. PAK )

Appeal No. 1999-2241  
Application No. 08/714,914

ROMULO H. DELMENDO	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
	)	
BEVERLY A. PAWLIKOWSKI	)	
Administrative Patent Judge	)	

RHD/gjh

STEPHEN D HARPER  
HENKEL CORPORATION  
PATENT DEPT  
2500 RENNAISSANCE BLVD STE 200  
GULPH MILLS PA 19406