

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID A. GOUGH
and
JOSEPH Y. LUCISANO

Appeal No. 96-0251
Application 07/874,697¹

ON BRIEF

Before PAK, ELLIS and OWENS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of claims 1-14, which are all of the claims in the application.

¹ Application for patent filed April 28, 1992. According to the appellants, the application is a continuation-in-part of Application 07/450,852, filed December 14, 1989, abandoned.

THE INVENTION

Appellants' claimed invention is directed toward methods for extending the service life of an implantable sensor having a corrodible reference electrode, at least one noble metal cathodic working electrode, and at least one noble metal anodic counter electrode maintained at low impedance, by 1) reversing the polarization of electrodes in a recited manner; 2) using multiple electrodes with only one of the electrodes being operative at any time; 3) applying a continuous cathodic current to the reference electrode; or 4) increasing the input impedance at the reference electrode and shielding the reference electrode. Claims 3, 7, 9 and 10 are illustrative and are appended to this decision.

THE REFERENCES

Krebs 1950	2,508,523	May 23,
Perley 1951	2,563,062	Aug. 7,
Hersch 1957	2,805,191	Sep. 3,
Sabins 1961	2,998,371	Aug. 29,
Dahms 1969	3,458,421	Jul. 29,

Joseph Y. Lucisano et al., "In Vitro Stability of an Oxygen

Appeal No. 96-0251
Application 07/874,697

Sensor", 59 *Analytical Chemistry* 736-39, March 1, 1987
(Lucisano).

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows: claims 10, 11/10, 12, 13, 14/10, 14/12 and 14/13 over Lucisano alone or in view of Perley; claims 1, 2, 7, 8, 11/1, 11/2, 11/7, 11/8, 14/1, 14/2, 14/7 and 14/8 over Lucisano in view of Hersch, Dahms or Sabins; claims 3-6 over Lucisano in view of Sabins; claims 9, 11/9 and 14/9 over Lucisano in view of Krebs.²

OPINION

We have carefully considered all of the arguments advanced by appellants and the examiner and agree with the examiner that the methods recited in appellants' claims 1, 2-8, 10, 11/1, 11/2, 11/7, 11/8, 11/10, 12, 13, 14/1, 14/2, 14/7, 14/8, 14/10, 14/12 and 14/13 would have been obvious to one of ordinary skill in the art at the time of appellants' invention over the applied prior art. Accordingly, we affirm the aforementioned rejections of these claims. However, the

²The rejections under 35 U.S.C. §§ 102(b) and 112 have been withdrawn (answer, page 12).

Appeal No. 96-0251
Application 07/874,697

rejection of claims 9, 11/9 and 14/9 is not sustained.

Appellants state that the claims stand or fall together as to each rejection (brief, page 4). We therefore limit our discussion to one claim to which each of the above four rejections applies, i.e., respectively, claims 10, 7, 3 and 9. See *In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(5)(1993).

Rejection of claims 10, 11/10, 12, 13, 14/10, 14/12 and 14/13 over Lucisano alone or in view of Perley

Lucisano discloses an implantable sensor which has a corrodible, silver/silver chloride reference electrode, a platinum cathodic working electrode and a noble metal anodic counter electrode (page 737, last full paragraph). The counter electrode is maintained at low impedance and the reference electrode is maintained at very high impedance (paragraph bridging pages 737-738). Lucisano teaches (page 739, last full paragraph in left column) that "[t]ransient local capacitive currents as a result of inadequate shielding of the leads [of the working and reference electrodes] may also have played a role" in the transfer of silver from the reference electrode to the working electrode. This teaching

Appeal No. 96-0251
Application 07/874,697

indicates that there was some shielding on the reference electrode. For this reason and because the reference electrode is at very high impedance, the method disclosed by Lucisano necessarily has the characteristics of appellants' claimed method which, according to appellants, causes the service life of the sensor to be extended. Thus, we find that Lucisano anticipates appellants' claim 10. Since anticipation is the epitome of obviousness, we affirm the rejection of claim 10. See *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974).

Even if, by "inadequate shielding", Lucisano means that the electrodes were not shielded, appellants' claimed invention would have been *prima facie* obvious to one of ordinary skill in the art because Lucisano would have indicated to such a person that shielding of the electrodes is desirable to reduce transient local capacitive currents which, Lucisano indicates, tends to cause transfer of silver from the reference electrode to the working electrode (page 739, last full paragraph in left column). One of ordinary skill in the

Appeal No. 96-0251
Application 07/874,697

art, given this disclosure, would have been motivated to shield the electrodes to the extent needed to reduce the transfer of silver to the working electrode. Although Lucisano states that "increasing the impedance and improving the shielding may not alone lead to a lower rate of [silver] deposition" (page 739, right column, lines 6-7), the reference, when read as a whole including the teaching discussed above, would have provided one of ordinary skill in the art with a reasonable expectation that shielding the electrodes would reduce the transfer of silver from the reference electrode to the working electrode and thereby extend the service life of the sensor. Because one of ordinary skill in the art would have had both a motivation to shield the electrodes and a reasonable expectation of success in doing so, the method recited in appellants' claim 10 would have been *prima facie* obvious to such a person. See *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894, 902, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988); *In re Longi*, 759 F.2d 887, 892-93, 225 USPQ 645, 648 (Fed. Cir. 1985).

Appellants argue (brief, pages 8-9) that Lucisano merely states the problem and makes appellants' claimed method "obvious to try" as that term is discussed in *O'Farrell*, 853 F.2d at 903, 7 USPQ2d at 1681. In that case, as pointed out by appellants (brief, page 9), the court stated that in previous cases, the court's admonition that "obvious to try" is not the standard for obviousness was directed toward two kinds of error. *See id.* "In some cases, what would have been 'obvious to try' would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful." *See id.* In the present case, as discussed above, Lucisano would have indicated to one of ordinary skill in the art that electrode shielding is desirable and that using electrode shielding is likely to be successful. In the other cases referred to by the court in *O'Farrell*, "what was 'obvious to try' was to explore a new technology or general approach that seemed to be a promising field of

Appeal No. 96-0251
Application 07/874,697

experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it". See *id.* As discussed above, Lucisano provides more than general guidance as to the particular form of the claimed invention but, rather, discloses maintaining the reference electrode at high impedance and indicates that adequate shielding of the electrodes is desirable. The present case therefore does not fit into either of the groups of cases discussed by the court in *O'Farrell*. Consequently, we are not persuaded by appellants' argument. Appellants also rely upon *In re Dow Chemical Co.*, 837 F.2d 469, 472, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) and *In re Tomlinson*, 363 F.2d 928, 933, 150 USPQ 623, 627 (CCPA 1966), but in those cases the references did not provide the guidance toward the claimed invention provided by Lucisano as discussed above.

For the above reasons, we conclude, based on the preponderance of the evidence, that the invention recited in appellants' claims 10, 11/10, 12, 13, 14/10, 14/12 and 14/13 would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103 over Lucisano.

Appeal No. 96-0251
Application 07/874,697

Accordingly, we affirm the rejections of these claims over Lucisano alone or in view of Perley.³

Rejection of claims 1, 2, 7, 8, 11/1, 11/2, 11/7, 11/8, 14/1, 14/2, 14/7 and 14/8 over Lucisano in view of Hersch, Dahms or Sabins

Appellants' claim 7 recites that the polarization of the working electrode and reference electrodes is periodically changed to drive electrodeposited material from the working electrode back to the reference electrode.

Lucisano teaches that the silver/silver chloride reference electrode had partly dissolved, that the working electrode had acquired a layer of silver, and that "[i]n cases of gradual sensor failure the original signal could be restored by appropriate polarization treatment or by replatinization of the working electrode" (page 739, left column, second full paragraph). This teaching of use of a polarization treatment to restore the signal after the transfer of silver from the reference electrode to the working electrode would have fairly suggested, to one of ordinary skill in the art, periodically changing the polarization of

³A discussion of Perley is not necessary to our decision.

the reference electrode and working electrode to drive the silver from the working electrode back to the reference electrode. Thus, we sustain the rejection of claims 1, 2, 7, 8, 11/1, 11/2, 11/7, 11/8, 14/1, 14/2, 14/7 and 14/8 over the applied references.⁴

*Rejection of claims 3-6 over
Lucisano in view of Sabins*

Appellants' claim 3 recites that the sensor includes a plurality of working electrodes or reference electrodes such that only one of the electrodes is operative at any one time and all of the electrodes are adapted to be connected sequentially into the sensor circuit.

Sabins discloses a method for providing cathodic protection for various types of structures by impressing current upon the structures to maintain them at a predetermined polarization (col. 1, lines 10-15 and 36-38; col. 2, lines 31-37 and 64-69). A circuit for monitoring the impressed current includes one or more reference cells which can be silver/silver chloride half cells and which are

⁴A discussion of Hersch, Dahms and Sabins is not necessary to our decision.

Appeal No. 96-0251
Application 07/874,697

submerged in an electrolyte (col. 2, lines 46-47 and 53-60). When more than one reference cell is used, while a cell is being rejuvenated by reversing the polarity between the reference cell and the structure, one reference cell is always connected to the millivoltmeter to provide continuous monitoring (col. 7, lines 36-75; col. 8, lines 11-14).

Lucisano teaches that when the silver/silver chloride reference electrode has partially dissolved and a layer of silver has been formed on the working electrode, a polarization treatment can be carried out to restore the signal (page 739, left column, second full paragraph). The teaching by Sabins of use of multiple reference electrodes adapted to be connected sequentially to the circuit such that a reference electrode always is in service while a reference electrode is being rejuvenated by a polarization treatment (col. 7, lines 36-75; col. 8, lines 11-14) would have fairly suggested, to one of ordinary skill in the art, connecting multiple reference electrodes in the Lucisano sensor such that one is always in service during the disclosed polarization treatment.

Appellants argue that there is no reason to believe that

Appeal No. 96-0251
Application 07/874,697

Sabins' multiple electrodes would solve Lucisano's service life problems (brief, page 12). For the above reason, we are not persuaded by this argument as it relates to the problem disclosed by Lucisano of silver forming on the working electrode (page 739, left column, second full paragraph). Even regarding Lucisano's teaching of abrupt sensor failure caused by silver dendrite formation between the working and reference electrodes (*see id.*), the above teaching by Sabins would have fairly suggested, to one of ordinary skill in the art, using multiple electrodes in the circuit and switching to another electrode when dendrites have formed, in order to extend the life of the sensor.

For the above reasons, we affirm the rejection of claims 3-6 over Lucisano in view of Sabins.

*Rejection of claims 9, 11/9 and 14/9
over Lucisano in view of Krebs*

Appellants' claim 9 recites that a continuous cathodic current is applied to the reference electrode.

Krebs discloses a device for protecting the cathodes in electrolytic cells used for decomposing alkaline chlorides (col. 1, lines 1-3). Krebs applies a protection current to a

Appeal No. 96-0251
Application 07/874,697

cell preferably before the electrolysis current to the cell has been stopped (col. 3, lines 3-31). The cell, under the action of the protective current, may be submitted to any desired operation such as cleaning (col. 3, lines 48-51).

The examiner argues that it would have been obvious to one of ordinary skill in the art to use Krebs' protection current in Lucisano's sensor in order to minimize the dissolution of the silver/silver chloride reference electrode (answer, pages 6-7). The examiner, however, provides no evidence that Krebs' protection current would have this effect. Thus, we find that the examiner has not established a factual basis which is sufficient to support a conclusion of obviousness of the invention recited in appellants' claims 9, 11/9 and 14/9. We therefore do not sustain the rejection of these claims.

DECISION

The rejections under 35 U.S.C. § 103 of claims 10, 11/10, 12, 13, 14/10, 14/12 and 14/13 over Lucisano alone or in view of Perley, claims 1, 2, 7, 8, 11/1, 11/2, 11/7, 11/8, 14/1, 14/2, 14/7 and 14/8 over Lucisano in view of Hersch, Dahms or

Appeal No. 96-0251
Application 07/874,697

Sabins, and claims 3-6 over Lucisano in view of Sabins, are affirmed. The rejection of claims 9, 11/9 and 14/9 over Lucisano in view of Krebs is reversed.

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)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
JOAN ELLIS)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
TERRY J. OWENS)	
Administrative Patent Judge)	

Appeal No. 96-0251
Application 07/874,697

TJO/caw

Brown, Martin, Haller & McClain
1660 Union St.
San Diego, CA 92101

APPENDIX

3. A method for extending the service life of implantable sensors containing corrodible electrodes within a potentiostat sensor circuit having a sensor having a corrodible reference electrode, at least one noble metal cathodic working electrode, and at least one noble metal anodic counter electrode maintained at a low impedance, which comprises including in said sensor a plurality of working or reference electrodes, with only one of said plurality of electrodes operative at any one time, with all of said electrodes adapted to be connected sequentially into the sensor circuit.

7. A method for extending the service life of implantable sensors containing corrodible electrodes within a potentiostat sensor circuit having a sensor having a corrodible reference electrode, at least one noble metal cathodic working electrode, and at least one noble metal anodic counter electrode maintained at a low impedance, which comprises periodically changing the polarization of said working and reference electrodes so as to drive electrodeposited material from the working electrode back to the reference electrode.

9. A method for extending the service life of implantable sensors containing corrodible electrodes within a potentiostat sensor circuit having a sensor having a corrodible reference electrode, at least one noble metal cathodic working electrode, and at least one noble metal anodic counter electrode maintained at a low impedance, which comprises applying to said reference electrode a cathodic current.

10. A method for extending the service life of implantable sensors containing corrodible electrodes within a potentiostat sensor circuit having a sensor having a corrodible reference electrode, at least one noble metal cathodic working electrode, and at least one noble metal anodic counter electrode maintained at a low impedance, which comprises increasing the input impedance at the reference

Appeal No. 96-0251
Application 07/874,697

electrode and shielding said reference electrode.