

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PHILIP S. LYREN

Appeal 2006-2283
Application 10/375,343
Technology Center 3700

Decided: March 19, 2007

Before JENNIFER D. BAHR, LINDA E. HORNER, and
ANTON W. FETTING, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Philip S. Lyren (Appellant) appeals under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-20, all the claims pending in the Application. We have jurisdiction over this appeal under 35 U.S.C. § 6.

Appellant's invention is a dental implant having a bone fixation body formed of a completely porous structure. The invention is an improvement over prior art dental implants having a bone fixation body formed of a thin porous coating applied to a non-porous metallic substrate of the implant (Specification 1-2). Independent claim 1 is illustrative of the invention and reads as follows:

1. A dental implant, comprising:
 - a coronal body extending from a proximal end to a distal end and formed of a biocompatible metal having a transgingival section and an interface at the proximal end that is adapted to connect to a dental component; and
 - a bone fixation body extending from a proximal end to a distal end and formed of a completely uniform porous structure from the proximal to distal ends, the proximal end of the bone fixation body connected to the distal end of the coronal body.

The Examiner relies upon the following as evidence of unpatentability:

Small	US 4,439,152	Mar. 27, 1984
Sutter	US 4,447,209	May 08, 1984
Kawahara	US 4,957,819	Sep. 18, 1990
Otani	US 5,049,074	Sep. 17, 1991
Wagner	US 5,989,027	Nov. 23, 1999

Appellant seeks review of the Examiner's rejections under 35 U.S.C. § 102(b) of claims 1-3, 5, 7, 8, 11, 12, and 15-18 as anticipated by Sutter and claims 1, 2, 4, 5, 7-11, and 15-19 as anticipated by Otani and rejections under 35 U.S.C. § 103(a) of claims 1-3, 5-8, and 11-18 as unpatentable over

Kawahara in view of Sutter, claims 1-3, 5, 7-12, and 15-19 as unpatentable over Small in view of Sutter, and claim 20 as unpatentable over Otani in view of Wagner.

The Examiner provides reasoning in support of the rejections in the Answer (mailed March 27, 2006). Appellant presents opposing arguments in the Brief (filed February 21, 2006) and Reply Brief (filed April 21, 2006).

THE ISSUES

The primary issue in this appeal is whether the structures of Sutter, Otani, Kawahara, and Small that form the bone fixation body of the implant are bone fixation bodies formed of “a completely uniform porous structure,” as recited in claim 1, and formed of “a completely uniform porous structure throughout the entire bone fixation body,” as recited in claims 7 and 16.

Secondary but closely related issues in this appeal are whether the structures of the applied references forming the bone fixation body satisfy the similar limitations in claim 2 that the “entire bone fixation body is porous,” in claim 15 that the bone fixation body is “entirely porous from the proximal to distal ends,” and in claim 17 that the bone fixation body “has a cross section formed entirely of the porous structure.”

Another issue in this appeal is whether the Examiner has shown that Sutter, Kawahara and Small teach or would have suggested an implant comprising a coronal body having a triangular shape, as recited in claim 3.

PRINCIPLES OF LAW

When determining the scope of claims in a patent application, we give the claims their broadest reasonable construction “in light of the specification as it would be interpreted by one of ordinary skill in the art.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005) (en banc) (quoting *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004)).

Anticipation does not require that the reference teach what the subject application teaches, but only that the claim read on something disclosed in the reference, i.e., that all of the limitations in the claim be found in or fully met by the reference. *Kalman v. Kimberly Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983).

FINDINGS OF FACT

1. Appellant’s implant includes two primary components or bodies, a coronal body 14 and a bone fixation body 16 (Specification 4: 10-13). The coronal body 14 includes a transgingival section 24, which extends along the gum or gingival tissue 38 of the patient, as illustrated in Fig. 2, and a dental interface 26 extending upwardly from the transgingival section and provided with a threaded bore 28 adapted to receive a fixation screw for connecting the implant to a dental component (Specification 4: 14-22). The bone fixation body 16 extends along the region where the implant contacts the surrounding bone 36 once the implant is implanted into the jawbone (Specification 5: 3-5). Preferably, the coronal body 14 and the bone fixation body 16 are connected with a sintering process (Specification 2: 27-29).

2. Preferably, Appellant's fixation body 16 is formed with a sintering process, is completely porous, and does not include a metal substrate. Therefore, in cross section, the bone fixation body 16 has a porous structure with no solid metal substrate (Specification 2: 22-25).
3. Appellant defines "porous" as meaning that "the material at and under the surface is permeated with interconnected interstitial pores that communicate with the surface" (Specification 5: 8-10). With respect to porosity and pore diameter requirements, Appellant states that "the geometric configuration of the porous structure should encourage natural bone to migrate and grow into and throughout the entire body 16" (Specification 5: 17-19).
4. Appellant discloses an embodiment (Figs. 5 and 6) wherein the distal end surface of the coronal body has an outwardly extending elongated protrusion 86. The protrusion extends into the bone fixation body and is adapted to increase the interface between the coronal body and the bone fixation body (Specification 7: 7-10).
5. The Examiner relies on the embodiment of Sutter illustrated in Fig. 14 and discussed in column 7. In that embodiment, Sutter discloses a dental implant 71 comprising a pin including a thicker portion formed by a substantially hollow sleeve 73, which serves as a base to be anchored in a jaw, and a column 75 for supporting a denture. The cylindrical wall of sleeve 73 is provided with through holes 73e (col. 7, ll. 15-35). Akin to through holes 3e and 5e in the embodiment of Fig. 1 (col. 5, l. 12), bone grows through the holes 73e upon inserting the implant.

6. Otani discloses a dental implant comprising a core material with a porous layer formed on the core material. The Examiner relies on the porous layer 8 in Fig. 13 as the “completely uniform porous structure” recited in independent claims 1, 7 and 16 (Answer 5). In Otani’s Examples 1 and 2, the thickness of the porous layer is about half the diameter of the core rod (col. 5, ll. 39-55; col. 6, ll. 26-50). While Otani discloses that the core material may be sintered carbon (col. 2, l. 56), Otani gives no indication that such sintered carbon is porous within the context of the invention and does not describe the core material as porous and the Examiner does not contend that the core material is porous. Otani’s implant includes a rod made of the core material and having a neck portion 14 and a base portion 13, the porous layer 8 being formed on the base portion. A hexagonal hole 4 is formed in the neck for receiving a crown base 5 (col. 6, ll. 24-32).

7. Kawahara discloses a coreless porous endosseous implant comprising a porous sintered metal layer 2 having relatively large pores (50 to 200 μm) and porous sintered layers 1 each having relatively fine pores (30 to 50 μm) laminated into one body by sintering the layers 1 onto either side of layer 2 (col. 4, ll. 45-53). The body is then connected by sintering, welding or pressure welding integrally to the lower part of a metal post 4 to be crowned with an artificial tooth (col. 2, ll. 44-61; col. 4, ll. 41-43; col. 5, ll. 22-34). The metal post 4 protects a bone mucous membrane and cartilage tissue against possible inflammation and secondary infection caused by bacteria invading through pores in the porous body (col. 5, ll. 35-41).

8. Small discloses a hollow porous cylinder 19 of titanium mesh into which a Nylon or Teflon plug 25 is threaded. The cylinder and plug are

inserted within the jawbone through a surgical incision in the gum tissue. The cylinder and plug are retained for a healing period of several months while adjacent bone tissue grows into and through the mesh. The surgeon then cuts the gum tissue again, removes the plug from the cylinder, and threads a titanium replacement abutment retaining device 33 into the cylinder. The abutment retaining device projects from the jawbone and gum tissue for attachment of a dental prosthesis (col. 2, ll. 33-53; col. 4, l. 54 to col. 5, l. 29).

9. Wagner discloses a dental implant having multiple textured surfaces. With reference to Fig. 1, a first surface region 24 is sufficiently porous to permit growth of bone therein (col. 3, ll. 64-65). A second surface region 26 comprises a non-porous biocompatible metal that is sufficiently rough to permit bone to attach thereto (col. 4, ll. 15-17). A third surface region 28 comprises a non-porous biocompatible metal that is substantially smooth (col. 4, ll. 37-38). As illustrated in Fig. 5, Wagner discloses a further embodiment wherein the porous coating 38''' of first surface region 24''' is formed with a macrotecture, including concave and convex features such as dimples, grooves, or ridges (col. 5, ll. 28-32). The Examiner relies on Wagner for the teaching of the macrotecture in Fig. 5.

ANALYSIS

Appellant argues that Sutter does not anticipate independent claims 1, 7, and 16 because Sutter does not disclose a bone fixation body formed of a "porous" structure, as "porous" is defined in Appellant's Specification (Br. 7). Specifically, Appellant contends that Sutter's through holes 73e are

large, and thus not “pores,” are not interconnected, and are not “interstitial.” Appellant further argues that Sutter has no material under the surface that is permeated with the interstitial pores (Br. 7-8). Additionally, Appellant argues that, even if Sutter’s holes are porous, the bone fixation body of Sutter is not formed of “completely” porous structure (Br. 8).

Appellant’s independent claims do not recite a pore size. Nevertheless, one of ordinary skill in the art would understand from Appellant’s Specification that the geometric configuration of the porous structure should encourage natural bone to migrate and grow into and throughout the entire body (Finding of Fact 3). Bone grows into the holes 73e of Sutter’s implant (Finding of Fact 5). Sutter’s holes are therefore pores of appropriate geometric configuration within the context of Appellant’s invention. Additionally, Sutter’s holes 73e extend into the material of the implant from the surface through material under the surface and are interconnected by the central passage through the implant material. We thus conclude that Sutter comprises a bone fixation body (the base to be anchored in a jaw) formed of a porous structure, in that the material at and under the surface of the base is permeated with interconnected interstitial pores (the through holes 73e and the central passage) that communicate with the surface so as to encourage natural bone to migrate and grow into and throughout the entire base. Further, Sutter’s through holes 73e are dispersed uniformly over the entirety of the surface of the base. The base is thus formed of a completely uniform porous structure, as called for in independent claims 1, 7, and 16.

In light of the above, Appellant has not demonstrated that the Examiner erred in rejecting independent claims 1, 7, and 16, or dependent claims 5, 8, 11, and 12, which Appellant has not argued separately apart from the independent claims, as anticipated by Sutter. The rejection is therefore sustained as to these claims.

Appellant argues that Sutter's base is solid metal with some large holes and that, accordingly, part of the base is solid metal and part of the base is holes. Consequently, according to Appellant, Sutter does not meet the limitation "wherein the entire bone fixation body is porous" of claim 2 (Br. 9). Likewise, Appellant argues, Sutter's base is not "entirely porous from the proximal to distal ends," as called for in claim 15, and lacks "a cross section formed entirely of the porous structure," as called for in claim 17 (Br. 9-10). Appellant's porous structure could be described in the same way. Specifically, part of Appellant's bone fixation body (the material between the pores) is solid metal and part of the bone fixation body is pores. As discussed above, the through holes 73e are uniformly dispersed over the entirety of Sutter's base. Sutter therefore meets the limitations of claims 2, 15, and 17. The rejection is sustained as to claims 2, 15, and 17, as well as to claim 18 which depends from claim 17 and has not been separately argued by Appellant.

Claim 3 recites that the coronal body has a triangular shape. Appellant argues that Sutter does not teach a triangular shape (Br. 9). While we see a frustoconical portion on the denture supporting portion of Sutter's implant, we do not find a coronal body having a triangular shape. The Examiner's response that "the coronal body has a triangular shape when

viewed from the side as seen in the other embodiments” (Answer 4) is unavailing. We therefore conclude that Appellant has demonstrated that the Examiner erred in rejecting claim 3 as anticipated by Sutter. The rejection of claim 3 is not sustained.

Appellant argues that Otani does not anticipate independent claims 1, 7, and 16 because Otani’s implant body has both a solid core and a porous layer and, therefore, is not formed of a completely uniform porous structure (Br. 11). The Examiner reads the bone fixation body formed of a “completely uniform porous structure” claim recitation on Otani’s porous layer 8 and likens the base portion 13 of Otani to Appellant’s elongated protrusion 86 in Fig. 6 (Finding of Fact 4) extending into the bone fixation body and to the “male protrusion” recited in dependent claim 9 (Answer 5). The issue with respect to the rejection based on Otani is, therefore, whether the porous layer 8 alone may be considered the bone fixation body “formed of a completely uniform porous structure” as recited in Appellant’s independent claims 1, 7, and 16.

Appellant’s arguments with respect to the Otani reference are premised on a reading of the bone fixation body on Otani’s porous layer 8 in combination with the core material base portion 13, which is not disclosed as being porous, and not on the Examiner’s reading of the bone fixation body on the porous layer 8 alone. There is no question that the porous layer 8 is entirely porous throughout from its proximal end to its distal end; there is no portion of the porous layer 8 that is not porous. Accordingly, the dispositive issue with regard to the Otani rejection is whether the Examiner’s reading of the bone fixation body on porous layer 8 alone is reasonable.

Otani's porous layer 8 is a "body" as it has "real or material substance or form" (David B. Guralnik, *Webster's New World Dictionary* 158 (2nd Coll. Ed., Simon & Schuster, Inc. 1984)). That it is formed on the base portion 13 does not preclude it being considered a "body" by itself within the context of Appellant's Specification, as Appellant describes the coronal body and the bone fixation body as being connected to each other by a sintering process (Finding of Fact 1). Otani's porous layer 8 also extends along the region where the implant engages the bone and is the portion of the implant into which the bone will grow, thereby functioning as the "bone fixation" body. We find nothing in Appellant's Specification or claims which specifies the shape of the bone fixation body or excludes extension of a portion, even a non-porous portion, of the coronal body into a recess within the bone fixation body. On the contrary, as pointed out by the Examiner (Answer 5), Appellant discloses and claims an embodiment wherein the coronal body includes a male protrusion 86 extending into the bone fixation body. Further, Otani's porous layer 8 has a proximal end connected to the distal end (the bottoms of neck 14 and base portion 13) of the coronal body, as recited in claim 1, and has one end (the proximal or top end) connected to the coronal body (neck 14 and base portion 13), as recited in claims 7 and 16.

In light of the above, we conclude that the Examiner's reading of the bone fixation body of Appellant's claims on the porous layer 8 of Otani is reasonable. Appellant's arguments, which do not address this reading of the claims on Otani, thus fail to demonstrate the Examiner erred in rejecting

claims 1, 2, 4, 5, 7-11, and 15-19 as anticipated by Otani. The rejection is sustained.

With respect to the rejection of claim 20 as unpatentable over Otani in view of Wagner, Appellant merely relies on the argument discussed above premised on a reading of the bone fixation body on Otani's porous layer 8 in combination with the core material base portion 13, which is not disclosed as being porous, and not on the Examiner's reading of the bone fixation body on the porous layer 8 alone (Br. 18-19). For the reasons discussed above with respect to the rejection of claims 1, 2, 4, 5, 7-11, and 15-19 as anticipated by Otani, Appellant's arguments fail to demonstrate the Examiner erred in rejecting claim 20 as unpatentable over Otani in view of Wagner. The rejection of claim 20 is sustained.

With respect to the rejection of claims 1-3, 5-8, and 11-18 as being unpatentable over Kawahara in view of Sutter, Appellants do not dispute the Examiner's determination that it would have been obvious to provide Kawahara's upper portion 4 with a bore to permit attachment of a prosthetic tooth thereto with a screw as taught by Sutter (Answer 6). Rather, Appellant's arguments focus on the "completely uniform" language in Appellant's independent claims. In particular, Appellant argues that Kawahara's laminated body is not formed of a "completely uniform porous structure" because it is formed of two layers 1 having relatively fine pores and a layer 2 having relatively large pores (Br. 12-14).

Accordingly, the first issue presented to us in the appeal of the rejection based on Kawahara is whether Kawahara's laminated body is a "completely uniform porous structure" as called for in independent claims 1,

7, and 16. Other issues are whether Kawahara's laminated body satisfies the recitation "wherein the entire bone fixation body is porous" in dependent claim 2 (Br. 14), is "entirely porous from the proximal to distal ends," as recited in dependent claim 15 (Br. 14-15), and "has a cross section formed entirely of the porous structure," as recited in dependent claim 17 (Br. 15).

In order to resolve the first issue, we must first determine how the term "uniform" is used in Appellant's claims 1, 7, and 16. Appellant's argument appears to be grounded on the position that the language "completely uniform porous structure" requires that the porosity and pore size of the body fixation body is the same throughout the body. Appellant's Specification, however, does not support such an interpretation. The term "uniform" is not used in Appellant's Specification, outside of claims 1, 7, and 16 as now presented. Moreover, the term "uniform" was not in Appellant's claims as originally filed. With respect to porosity and pore size, Appellant describes the size and shape of the porous structure as emulating the size and shape of the porous structure of natural bone and discusses an "average" pore diameter of about 40 μm to about 800 μm with a porosity from about 45% to 65% (Specification 5). There is nothing in this description that would convey to one of ordinary skill in the art that the porosity and pore size are the same throughout the entire body. In fact, the use of the term "average" implies that the pores in the body vary in size. Consistent with Appellant's disclosure, we interpret "completely uniform porous structure" to require merely that the entire structure be porous, that is, all parts of the body are porous, not that the porosity or pore size of the body be identical throughout the body. In other words, the term "uniform"

modifies “porous structure” by requiring that the structure is or looks the same in all parts (David B. Guralnik, *Webster's New World Dictionary* 1551 (2nd Coll. Ed., Simon & Schuster, Inc. 1984)) in the sense that no part thereof is non-porous.

Kawahara’s laminated body is porous throughout. We therefore conclude that Kawahara’s laminated body is a “completely uniform porous structure,” as recited in claim 1, and a “completely uniform porous structure throughout,” as recited in claims 7 and 16. We likewise conclude that Kawahara’s laminated body is “entirely porous from the proximal to distal ends,” as recited in dependent claim 15 and satisfies the limitation “wherein the entire bone fixation body is porous” in dependent claim 2. As the claims do not require any particular shape or cross section or exclude a hollow structure, we further conclude that Kawahara’s laminated body “has a cross section formed entirely of the porous structure,” as recited in dependent claim 17. Appellant’s arguments thus fail to demonstrate the Examiner erred in rejecting claims 1, 2, 5-8, and 11-18 as unpatentable over Kawahara in view of Sutter. The rejection is sustained as to these claims.

Appellant argues that neither Kawahara nor Sutter teaches a coronal body having a triangular shape, as recited in claim 3 (Br. 14). The Examiner does not address this limitation of claim 3 in the rejection based on Kawahara in view of Sutter. To the extent that the Examiner is relying on Sutter for a suggestion of this feature (Answer 4), the Examiner has not coherently demonstrated that Sutter teaches or suggests such, as discussed above with respect to the rejection of claim 3 as anticipated by Sutter. Accordingly, Appellant has successfully demonstrated that the Examiner

erred in rejecting claim 3 as unpatentable over Kawahara in view of Sutter. The rejection cannot be sustained.

We turn our attention next to the rejection of claims 1-3, 5, 7-12, and 15-19 as unpatentable over Small in view of Sutter. The first issue presented in the appeal of this rejection is very similar to that presented in the appeal of the anticipation rejection based on Otani. Specifically, the Examiner is reading the “bone fixation body” on the hollow porous cylinder 19 of Small and taking the position that the body 35 of replacement abutment retaining device 33 is a protrusion extending into the bone fixation body (Answer 6). Appellant, on the other hand, appears to be arguing that Small’s porous cylinder 19 and the body 35 of titanium replacement abutment retaining device 33 together form the “bone fixation body” of claims 1, 7, and 16. Consequently, according to Appellant, Small’s bone fixation body includes both a porous cylinder and a solid titanium core and thus lacks a bone fixation body formed of a completely uniform porous structure, as called for in claims 1, 7, and 16 (Br. 17).

Accordingly, a threshold issue in deciding the appeal of the rejection of claims 1-3, 5, 7-12, and 15-19 as unpatentable over Small in view of Sutter is whether Small’s porous cylinder 19 alone reasonably corresponds to the bone fixation body recited in Appellant’s independent claims 1, 7, and 16, with the body 35 constituting merely a protrusion of the coronal body (replacement abutment retaining device 33), akin to Appellant’s protrusion 86 in Fig. 6. For the reasons discussed above with respect to the anticipation rejection based on Otani, we conclude that Small’s porous cylinder 19 does reasonably correspond to the bone fixation body of claims 1, 7, and 16.

Appellant additionally argues that Small's porous cylinder 19 is not a "completely uniform porous structure," as recited in independent claims 1, 7, and 16, does not meet the "entire bone fixation body is porous" limitation of claim 2, is not "entirely porous from proximal to distal ends," as recited in claim 15, and does not have a "cross section formed entirely of the porous structure," as recited in claim 17, because of the plurality of spaced venting holes 30 and the hollow configuration of the porous cylinder 19 (Br. 16-18). As discussed above, Appellant's claims do not specify a shape of the bone fixation body and thus do not exclude a hollow cylindrical shape or a shape formed with venting holes. The limitations at issue are thus met by the hollow porous cylinder 19 of Small.

In light of the above, Appellant's arguments do not demonstrate the Examiner erred in rejecting claims 1, 2, 5, 7-12, and 15-19 as being unpatentable over Small in view of Sutter.

Appellant argues that neither Small nor Sutter teaches a coronal body having a triangular shape, as recited in claim 3 (Br. 17). The Examiner does not address this limitation of claim 3 in the rejection based on Small in view of Sutter. To the extent that the Examiner is relying on Sutter for a suggestion of this feature (Answer 4), the Examiner has not coherently demonstrated that Sutter teaches or suggests such, as discussed above with respect to the rejection of claim 3 as anticipated by Sutter. Accordingly, Appellant has successfully demonstrated that the Examiner erred in rejecting claim 3 as unpatentable over Small in view of Sutter. The rejection cannot be sustained.

SUMMARY AND ORDER

The rejections of claims 1-3, 5, 7, 8, 11, 12, and 15-18 as anticipated by Sutter is sustained as to claims 1, 2, 5, 7, 8, 11, 12, and 15-18 and reversed as to claim 3. The rejections of claims 1, 2, 4, 5, 7-11, and 15-19 as anticipated by Otani and claim 20 as unpatentable over Otani in view of Wagner are sustained. The rejection of claims 1-3, 5-8, and 11-18 as unpatentable over Kawahara in view of Sutter is sustained as to claims 1, 2, 5-8, and 11-18 and reversed as to claim 3. The rejection of claims 1-3, 5, 7-12, and 15-19 as unpatentable over Small in view of Sutter is sustained as to claims 1, 2, 5, 7-12, and 15-19 and reversed as to claim 3. The Examiner's decision is affirmed as to claims 1, 2, and 4-20 and reversed as to claim 3.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

vsh:

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