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OLIFF PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* TERUKO YAMAMOTO and YOSHIHIKO YOKOYAMA

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Appeal 2019-003713
Application 15/118,203
Technology Center 3700

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Before DANIEL S. SONG, BENJAMIN D. M. WOOD, and BRETT C. MARTIN, *Administrative Patent Judges.*

WOOD, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's January 22, 2018 Final Action rejecting claims 1–4 and 6–9. *See* Final Act. Act. 1. An oral hearing in accordance with 37 C.F.R. § 41.47 was held on June 4, 2020. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] "Appellant" refers to the applicant as defined by 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Maruemu Works Co., LTD. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The claims are directed to a dental member made of an amorphous Zirconium alloy. Sole independent claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A dental member, comprising:
>
> an amorphous alloy having a composition represented by formula: $Zr_aNi_bCu_cAl_d$, wherein a, b, c, and d denote at.%, "a" ranges from 67 to 73 at.%, "b" ranges from 11 to 17 at.%, "c" ranges from 5 to 13 at.%, and "d" ranges from 5 to 9 at.%, and
>
> wherein the dental member has a higher removal torque value seven days after implantation than a pure titanium dental member.

REFERENCES

| Name | Reference | Date |
|---|---|---|
| Fredriksson | US 8,632,836 B2 | Jan. 21, 2014 |
| Ogawa | US 2009/0283701 A1 | Nov. 19, 2009 |
| Zadeh | US 2013/0122052 A1 | May 16, 2013 |
| Yokoyama | JP 2009-215610 A | Sept. 24, 2009 |

REJECTIONS

| Claims Rejected | 35 U.S.C. § | Reference(s)/Basis |
|---|---|---|
| 1, 2, 6, and 7 | 103 | Zadeh, Yokoyama, and Fredriksson |
| 3, 4, 8, and 9 | 103 | Zadeh, Yokoyama, Fredriksson, and Ogawa |

OPINION

*A. Claims 1, 2, 6, and 7—Rejected as Unpatentable over Zadeh, Yokoyama, and Fredriksson*

Sole independent claim 1 recites a "dental member" comprising an amorphous alloy comprising 67–73 at.% (atomic percent) Zirconium, along

with specific atomic-percentage ranges of Nickel, Copper, and Aluminum, the dental member having "a higher removal torque value seven days after implantation than a pure titanium dental member." Appeal Br., A-1 (Claims App.). The Examiner finds that Zadeh teaches a dental member comprising an amorphous alloy, but does not disclose the composition of any particular amorphous alloy or the claimed torque values. Final Act. 3 (citing Zadeh ¶ 124). The Examiner further finds that Yokoyama discloses an amorphous alloy having the claimed composition, and that it would have been obvious to one of ordinary skill in the art to make Zadeh's dental member with Yokoyama's amorphous alloy composition "to provide a dental implant with preferred material properties, optimized [for] the specific application." *Id.* (citing Yokoyama ¶ 9, abstract). For the removal torque limitation, the Examiner finds that Fredriksson discloses higher removal torque of Zr alloys compared to conventional Ti implants, indicating that it "provide[s] a dental implant with improved biocompatibility." *Id.* at 3–4.

Appellant responds that "Yokoyama nowhere describes or suggests that the compounds described therein are used in dental implants." Appeal Br. 4. Appellant asserts that although Yokoyama teaches that its alloy "is applicable to a cold pressing metal working process," Yokoyama does not "describe or suggest that a cold pressing process is used to form dental implants." *Id.* at 5. According to Appellant, "the Examiner nowhere explains, and none of the references describe or suggest, what the preferred material properties of a dental implant are, and/or what to optimize to achieve the allegedly preferred material properties." *Id.*

In the Answer the Examiner responds that Zadeh discloses that "zirconium and its alloys" and "amorphous alloys" are used in dental

implants "for improved osseo-integration and bone growth with dental implants." Ans. 7 (citing Zadeh ¶¶ 1–2, 48, 124). The Examiner also asserts that Yokoyama discloses amorphous zirconium alloys "in screws," and that "[i]t is known in the art of dentistry that most implants have a screw shape." *Id.* at 8. The Examiner further alleges that Yokoyama discloses that its alloy has certain characteristics—"workability, processability, and other desirable material properties"—that are "favorable for biocompatibility with bone and/or dental implants (as disclosed by Zadeh)." *Id.* at 8 (citing Yokoyama ¶¶ 6–8).

We do not sustain this rejection. Although Zadeh discloses that dental implants may be made of "zirconium and its alloys" (among a number of other materials) (Zadeh ¶ 48); or that they may be made of "amorphous alloys" (also among a number of other "biocompatible materials") (*id.* ¶ 124), Zadeh does not disclose amorphous zirconium alloys, much less the specific amorphous zirconium alloy recited in claim 1. Yokoyama discloses the specific alloy claimed, but does not teach its use for dental implants. Yokoyama teaches that its alloy is "highly ductile" and "excellent in plastic workability and applicable to a metal working process such as cold pressing," but neither Yokoyama nor Zadeh indicates that these properties would have been desirable for dental implants, or would have made Yokoyama's material superior to any other material for dental implants.

The Examiner's contrary findings are not supported by the evidence. Zadeh does not teach that using amorphous alloys "improve[s] osseo-integration and bone growth with dental implants" as asserted. Ans. 8. Zadeh does not single out amorphous or zirconium alloys from other metallic and non-metallic materials used to make medical implants for any

purpose. *See* Zadeh ¶ 6 (listing "various materials" from which medical implants may be made). Zadeh does teach improving osseo-integration around surgical implants (i.e., the merging of bone tissue with the medical implant (Zadeh ¶ 6)), but not by making the implant from any particular material, but rather from "antibody mediated osseous regeneration (AMOR)." *Id.* ¶ 49.

Nor does Yokoyama teach making "screws" from its alloy. The Examiner is referring to a "test piece" in an "elongated rod shape" used to test the tensile strength of the alloy. Yokoyama ¶ 21, Fig. 4. There is nothing in Yokoyama to indicate that the shape of the test piece has any significance other than as a standard shape to use to test the properties of a particular material. Finally, we are unable to discern anything in Yokoyama suggesting that the beneficial properties of its alloy would make it better than other materials for dental implants. For example, we do not find any teaching in Yokoyama associating its alloy has superior "biocompatibility," as the Examiner suggests. Ans. 8 (citing Yokoyama ¶¶ 6–8).

For the above reasons, we do not sustain this rejection.

*B. Claims 3, 4, 8, and 9—Rejected as Unpatentable over Zadeh, Yokoyama, Fredriksson, and Ogawa*

This rejection relies on the erroneous finding that one of ordinary skill in the art would have combined Zadeh and Yokoyama to achieve the claimed invention. Final Act. 5. Ogawa is not relied on to cure this deficiency. Therefore, for the above reasons, we do not sustain this rejection.

## CONCLUSION

The Examiner's rejections are reversed.

DECISION SUMMARY

| **Claims Rejected** | **35 U.S.C. §** | **Reference(s)/Basis** | **Affirmed** | **Reversed** |
|---|---|---|---|---|
| 1, 2, 6, 7 | 103 | Zadeh, Yokoyama, Fredriksson | | 1, 2, 6, 7 |
| 3, 4, 8, 9 | 103 | Zadeh, Yokoyama, Fredriksson, Ogawa | | 3, 4, 8, 9 |
| **Overall Outcome** | | | | 1–4, 6–9 |

REVERSED