

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

3SHAPE MEDICAL A/S,

Petitioner,

v.

SIRONA DENTAL SYSTEMS GMBH,

Patent Owner.

Case IPR2016-00481

Patent 6,319,006 B1

Before MEREDITH C. PETRAVICK, BRIAN P. MURPHY, and
KIMBERLY J. McGRAW, *Administrative Patent Judges*.

MURPHY, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a); 37 C.F.R. § 42.73

I. INTRODUCTION

3Shape Medical A/S (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–10 (all claims) of U.S. Patent No. 6,319,006 B1 (Ex. 1001, “the ’006 patent”). Paper 1 (“Petition” or “Pet.”). Petitioner supported its challenge with the Declaration of Dr. Scott D. Ganz, D.M.D. (Ex. 1004). Sirona Dental Systems GmbH (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 8 (“Prelim. Resp.”). On June 30, 2016, we instituted an *inter partes* review of claims 1–10 of the ’006 patent. Paper 12.

After institution, Patent Owner filed a Response (Paper 15, “PO Resp.”) and a Contingent Motion to Amend claims 1–8 of the ’006 patent (Paper 16, “MTA”). Patent Owner supported its Response and MTA with the Declaration of Dr. Douglas Erickson, D.D.S., M.S. (Ex. 2013).

Petitioner filed a Reply (Paper 19, “Reply”) and Opposition to Patent Owner’s MTA (Paper 20). Petitioner supported its Reply and Opposition to Patent Owner’s MTA with the Second Declaration of Dr. Ganz (Ex. 1019).

Patent Owner filed a Reply to Petitioner’s Opposition to Patent Owner’s MTA. Paper 24 (“MTA Reply”). Patent Owner supported its MTA Reply with the Supplemental Declaration of Dr. Erickson (Ex. 2029).

Patent Owner filed Observations Regarding the Cross-Examination Testimony of Dr. Ganz (Paper 28), with respect to the Second Declaration of Dr. Ganz, and Petitioner filed a Response (Paper 34). Petitioner filed Observations on the Cross-Examination testimony of Dr. Erickson (Paper 29), with respect to the Supplemental Declaration of Dr. Erickson, and

Patent Owner filed a Response (Paper 35).

An oral hearing was held on March 28, 2017, and a transcript of the oral hearing is of record. Paper 39 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This is a Final Written Decision under 35 U.S.C. § 318(a) regarding the patentability of the challenged claims. For the reasons that follow, based on our review of the complete trial record, we determine Petitioner has not shown by a preponderance of the evidence that claims 1–10 of the ’006 patent are unpatentable.

A. Real Parties in Interest and Related Proceedings

Petitioner identifies 3Shape Medical A/S, 3Shape, Inc., Biolase, Inc., and 3Shape A/S as real parties in interest. Pet. 1.

Patent Owner identifies Sirona Dental Systems GmbH, Sirona Dental, Inc., and SICAT GmbH & Co. KG as real parties in interest. Paper 7, 2.

The parties identify the following as related district court proceedings regarding the ’006 patent: *Sirona Dental Systems GmbH v. Anatomage, Inc.*, No. 1:14-cv-00540-LPS (D. Del.), filed April 24, 2014; *Sirona Dental Systems GmbH v. Dental Wings Inc.*, No. 1:14-cv-00460-LPS (D. Del.), filed April 11, 2014; *Sirona Dental Systems GmbH v. Dentsply IH Inc.*, No. 1:14-cv-00538-LPS (D. Del.), filed April 24, 2014; *Sirona Dental Systems GmbH v. OnDemand3D Technology Inc.*, No. 1:14-cv-00539-LPS (D. Del.), filed April 24, 2014; *Sirona Dental Systems GmbH v. 3Shape*, No. 1:15-cv-00278-LPS (D. Del.), filed March 30, 2015. Pet. 2; Paper 7, 2–3.

The parties identify the following as related *inter partes* review proceedings: *Anatomage, Inc. v. Sirona Dental Systems GmbH*, IPR2015-01057, filed April 15, 2015; *Institut Straumann AG v. Sirona Dental Systems*

GmbH, IPR2015-01190, filed May 11, 2015. Pet. 1–2; Paper 7, 3. A Final Written Decision in IPR2015-01057 was entered October 19, 2016 and determined the petitioner in that case did not prove by a preponderance of the evidence that claims 1–7, 9, and 10 of the '006 patent were unpatentable (IPR2015-01057 Paper 42). A Final Written Decision in IPR2015-01190 was entered November 15, 2016 (IPR2015-01190 Paper 34). The Final Written Decision in IPR2015-01190 determined the petitioner in that case (i) had proved by a preponderance of the evidence that claims 1–8 of the '006 patent are unpatentable and (ii) had not proved by a preponderance of the evidence that claims 9 and 10 of the '006 patent are unpatentable. The Final Written Decision in IPR2015-01190 also denied Patent Owner's contingent motion to amend claims 1–8 of the '006 patent.

B. Asserted Grounds of Unpatentability

We instituted an inter partes review of claims 1–10 on the following grounds of unpatentability under 35 U.S.C. §§ 102 and 103:

Reference[s]	Statutory Basis	Challenged Claims
Mushabac ¹	§ 102(b)	1–5, 9–10
Bannuscher ² and Massen ³	§ 103	1–5
Mushabac and either Verstreken ⁴ or Truppe ⁵	§ 103	6–8
Bannuscher and Massen and either Verstreken or Truppe	§ 103	6–8

C. The '006 Patent

The '006 patent, titled “Method for Producing a Drill Assistance Device for a Tooth Implant,” issued November 20, 2001, from an application filed October 31, 2000.⁶ Ex. 1001, (45), (22). The '006 patent is directed to a method for producing a drill assistance device (also referred to as a drill template) for use in tooth implant surgery. *Id.* at Abstract. The object of the claimed method is “to precisely place a pilot hole” in the drill template, where the pilot hole is “aligned relative to the teeth that still remain in the jaw.” *Id.* at 1:6–9; *see id.* at 2:6–10 (“a drill assistance device

¹ Mushabac, U.S. Patent No. 5,562,448, filed August 9, 1991, issued October 8, 1996. Ex. 1006 (“Mushabac”).

² Bannuscher, DE 19510294 A1, filed March 22, 1995, published October 2, 1996 (certified English translation). Ex. 1008 (“Bannuscher”).

³ Massen et al., U.S. Patent No. 5,372,502, filed November 7, 1991, issued December 13, 1994. Ex. 1009 (“Massen”).

⁴ Verstreken et al., *An Image-Guided Planning System for Endosseous Oral Implants*, IEEE TRANS. MED. IMAG., Vol. 17, No. 5, (1998). Ex. 1010 (“Verstreken”).

⁵ Truppe, U.S. Patent No. 5,842,858, filed May 13, 1996, issued December 1, 1998. Ex. 1011 (“Truppe”).

⁶ The '006 Patent claims foreign application priority to a German patent application, DE 19952962, filed November 3, 1999. Ex. 1001, (30).

that will allow the exact drilling of a pilot hole for a tooth implant in relation to the teeth that still remain in the jaw”).

The method includes steps for determining i) the optimal bore hole to be drilled into a person's jaw based on an X-ray of the jaw, and ii) a pilot hole in the drill template. "[M]easured data records," derived from the X-ray and from a three-dimensional ("3-D") optical measuring of the visible surfaces of the person's jaw and teeth, are "correlated" to define the optimal location, angle, and depth of the pilot hole. *Id.* at 2:16–28. The '006 patent generally describes use of a Computer-Aided Design/Computer-Aided Manufacturing ("CAD/CAM") machine to generate the measured data records and define a pilot hole in the drill template. *Id.* at 4:37–41. The location, angle, and orientation of the pilot hole in the drill template may be determined so as to correspond to the optimal bore hole to be drilled into the person's jaw. *Id.* at 3:19–22, 4:55–62.

Figure 5 of the '006 patent, is reproduced below.

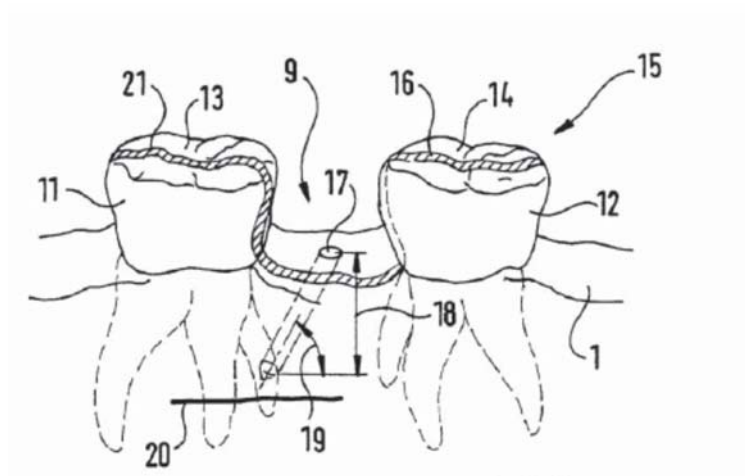


Figure 5, above, shows teeth 11 and 12 adjacent implant position 9. *Id.* at 4:23–31. In preparation for implant surgery, drill template 16 is attached to the surfaces of teeth 11 and 12 and includes pilot hole 17, which is positioned over the implant position and set at angle 19. *Id.* at 4:51–58. Depth 18 corresponds to the desired depth of the bore hole, defined to avoid nerve 20. *Id.* at 2:39–45, 4:58–62. “The dentist determines the depth of the bore hole 18 based on the correlation of the measured data records from x-ray picture 5 . . . and transfers the depth to the drill template as a stop.” *Id.* at 4:58–62.

Claim 1 of the '006 patent is illustrative and reproduced below.

1. Method for producing a drill assistance device for a tooth implant in a person's jaw, comprising the following process steps:

taking an x-ray picture of the jaw and compiling a corresponding measured data record,

carrying out a three-dimensional optical measuring of the visible surfaces of the jaw and of the teeth and compiling a corresponding measured data record,

correlating the measured data records from the x-ray picture and from the measured data records of the three-dimensional optical measuring,

determinating the optimal bore hole for the implant, based on the x-ray picture, and

determinating a pilot hole in a drill template relative to surfaces of the neighboring teeth based on the x-ray picture and optical measurement.

II. ANALYSIS

A. Claim Construction

We construe claim terms of an unexpired patent according to their broadest reasonable interpretation in light of the patent specification.

37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable interpretation standard, we assign claim terms their ordinary and customary meaning, as understood by one of ordinary skill in the art, in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

We determine that only the following claim phrase requires explicit construction for purposes of this Decision. *See, e.g., Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’” (internal citation omitted)).

“carrying out a three-dimensional optical measuring of the visible surfaces of the jaw and of the teeth”

Patent Owner argues that we should adopt our claim construction of the above-quoted phrase from our Decision to Institute. PO Resp. 17 (citing Paper 12, 7–8). In the Decision to Institute, we construed the phrase “carrying out a three-dimensional optical measuring of the visible surfaces of the jaw and teeth” as “using light to measure the visible surfaces of the jaw and teeth in three dimensions.” Paper 12, 7–8. Our Final Written Decisions in IPR2015-01057 and IPR2015-01190 construe the quoted claim phrase identically to our construction in the Decision to Institute in the present case and fully set forth our reasoning. *See Anatomage, Inc. v. Sirona Dental Sys. GmbH*, Case IPR2015-01057, slip op. at 7–9 (PTAB Oct. 19, 2016) (Paper 42); *Institut Straumann AG v. Sirona Dental Sys. GmbH*,

IPR2015-01190, slip op. at 7–9 (PTAB Nov. 15, 2016) (Paper 34). The Petition and Reply do not address the construction of the quoted claim phrase. *See* Pet. 6–7; Reply 2–6.

Claim 1 requires both “taking an x-ray picture of the jaw” and “carrying out a three-dimensional optical measuring” of the jaw and teeth. Ex. 1001, 5:5–8. The x-ray can be “a panoramic tomography picture, a tomosynthetic image or . . . [a] computer tomography [CT]” image. *Id.* at 2:46–48. Such x-ray techniques image the internal, non-visible structures of the jaw. Ex. 1004 ¶ 49. The ’006 patent distinguishes the step of taking an X-ray from the step of carrying out a 3-D optical measuring, and it describes 3-D optical measuring as generating an “optical image” of the “visible surfaces . . . visible proportions . . . and visible structures” of the teeth and jaw. Ex. 1001, 2:49–62. Figure 2 of the ’006 patent depicts 3-D optical image 10 of the visible surfaces of a molar “measured using a three-dimensional system of coordinates.” *Id.* at 3:50–56. The ’006 patent does not further describe the details of carrying out the 3-D optical measuring step.

Therefore, we adopt our reasoning in the Final Written Decisions for IPR2015-01057 and IPR2015-01190 and construe the quoted claim phrase as “using light to measure the visible surfaces of the jaw and teeth in three dimensions.”

B. Person of Ordinary Skill in the Art

Petitioner provides evidence that a person of ordinary skill in the art (“POSA”) is someone with a D.M.D. (Doctor of Medicine in Dentistry or Doctor of Dental Medicine) or D.D.S. (Doctor of Dental Surgery) and at least several years of experience with 3-D technology used in dental implant

treatment, planning, and surgery. Pet. 9–10 (citing Ex. 1004 ¶¶ 63–66). Alternatively, such a person may have a computer engineering degree or be a trained dental laboratory technician having substantial experience with 3-D technology and software applications used in dental implant treatment, planning, and surgery. *Id.* Patent Owner has accepted Petitioner’s definition of a POSA for purposes of this IPR. We adopt and apply Petitioner’s definition of a POSA in this Decision.

C. Asserted Anticipation of Claims 1–5 and 9–10 by Mushabac

Petitioner argues that Mushabac (Ex. 1006) discloses every limitation of claims 1–5 and 9–10 of the ’006 patent and, therefore, anticipates the claims pursuant to 35 U.S.C. § 102(b). Pet. 19–26, 36–44. Petitioner supports its argument with detailed citations to Mushabac, asserted to correspond to each limitation of the claims, and with Dr. Ganz’s Declaration. *Id.* (citing Ex. 1004; Ex. 1006). Patent Owner opposes. PO Resp. 21–44. For the reasons set forth below, we determine that Mushabac does not anticipate claims 1–5 and 9–10 of the ’006 patent.

1. Mushabac

Mushabac Figure 25, reproduced below, depicts a computer monitor used to aid a dental surgeon. Ex. 1006, Fig. 25.

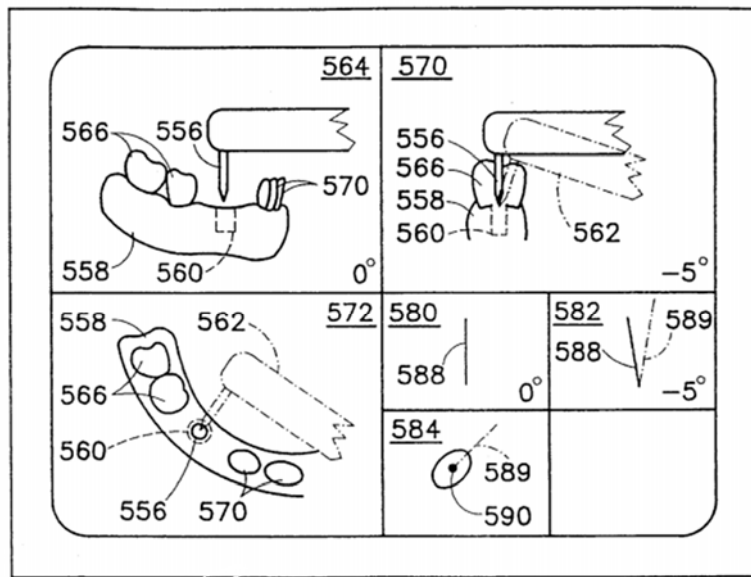


FIG.25

The two left-hand quadrants of Mushabac Figure 25, above, depict an implant position between molars 566 and front teeth 568 (incorrectly labelled 570⁷). *Id.* at 24:43–49. Area 560 is the bore hole to be drilled into jaw bone 558 for receiving an anchor of an implant. *Id.* at 24:35–39.

2. Analysis of “optical measuring of the visible surfaces of the jaw”

Anticipation under 35 U.S.C. § 102 requires “the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008).

⁷ Mushabac repeatedly describes “molars 566” and “front teeth 568.” Ex. 1007, 24:44–46, 24:49, 25:2. Numerical indicator 570 is the upper right-hand screen in Figure 25. *Id.* at 24:47

Claim 1 of the '006 patent recites “carrying out a three-dimensional optical measuring of the *visible surfaces of the jaw* and of the teeth.” (Emphasis added). The Petition cites to sections in Mushabac that expressly disclose “generating electrically encoded data compris[ing] a first step of generating digitized surface data” for “pre-existing dental structure” (Ex. 1006, 3:44–46, 4:3–5), and “[t]he digitized surface data may include, for example, video surface data and/or contour data generated with the aid of a probe” (*id.* at 4:8–10). Pet. 20. The Petition then cites to sections of Mushabac that expressly disclose the use of an opto-electrical transducer and grid projection assembly to measure visible surfaces of a patient’s “tooth” or “teeth” in three-dimensions, but not the jaw. *Id.* at 20–21 (citing Ex. 1006, 10:42–46, 12:46–60, 16:5–10, Figs. 1, 2); PO Resp. 31–32. Petitioner’s claim chart for the quoted limitation in claim 1 also cites Mushabac’s disclosure regarding the use of “probe member 52 (Fig. 1) . . . to digitize the surface of the jaw bone 558.” Pet. 21 (citing Ex. 1006, 24:53–56, Fig. 1).

Petitioner implicitly recognizes that Mushabac expressly discloses 3-D optical measuring of the visible surfaces of the teeth, not the visible surfaces of the jaw (i.e., the gums), but argues that Mushabac “also *stipulates* that surface information concerning a patient’s teeth *and jaw* is also digitized.” *Id.* at 38–39 (citing Ex. 1004 ¶ 100) (emphasis added). Petitioner’s framing of the argument, however, does not recognize the recitation in claim 1 requiring an “optical” measuring of the “visible surfaces” of the jaw. To say Mushabac stipulates that surface information of a patient’s jaw is digitized, is to disregard the quoted claim limitations.

a. Mushabac's bone sounding technique

Petitioner's argument regarding 3-D optical measuring of visible surfaces of the jaw relies on Dr. Ganz's Declaration testimony in paragraph 100, which cites Mushabac's disclosure of using probe member 52 to digitize the underlying surface of the "jaw bone" rather than optically measuring the visible surfaces of the jaw (i.e., the gums). Ex. 1004 ¶ 100 (citing Ex. 1006, 24:53–56). The cited section of Mushabac discloses a technique known as "bone sounding," where a sharp stylus (attached to probe member 52) pierces the patient's gum and contacts the underlying jaw bone in several places such that the resulting data can be used to approximate the shape of the jaw bone, as shown in the computer display of Figure 25 (jaw bone 558). PO Resp. 32–33 (citing Ex. 1006, 24:53–56, Fig. 25; Ex. 2013 ¶¶ 97–98); *see also* Ex. 1006, 24:35–39 ("FIG. 25 shows . . . a patient's mandible 558 (or any bone structure)"); 24:43–46 ("first screen portion 564 illustrates . . . part of jaw bone 558"); 24:55–56 ("surface of jaw bone 558"); 24:60–65 ("surface of bone 558"); 25:5 ("jaw bone 558"). The display of jaw bone 558 in Mushabac Figure 25 is consistent with Mushabac's description of using contact digitization (bone sounding) to measure the shape of the underlying (i.e., non-visible) jaw bone.

Under cross-examination, Dr. Ganz agreed that "nothing in Mushabac describes 558 as being anything other than jawbone." Ex. 2026, 366:12–17. Dr. Ganz also agreed that the passage he relies on in his declaration—at column 24, lines 53–56 of Mushabac—describes contact digitizing the underlying (*i.e.*, non-visible) surface of the jaw bone. *Id.* at 250:21–252:20. Dr. Ganz further agreed that Mushabac's bone sounding technique "is not an

optical measurement.” *Id.* at 251:4–17. Dr. Ganz’s testimony is consistent with Dr. Erickson’s on this point. *See* Ex. 2013 ¶¶ 97–98.

Therefore, we find that Mushabac’s point-by-point contact digitizing of the underlying jaw bone is neither an “optical” measurement nor a technique for measuring the “visible surfaces of the jaw,” as recited in claim 1.

b. Mushabac’s 3-D optical surface measurements

With regard to carrying out 3-D optical surface measurements, Petitioner acknowledges that Mushabac discloses “video surface data” provided by data generating device 22 (Figs. 1, 2), which transmits digitized signals “pertaining to the 3-D surface of the *tooth* to the computer (24).” Pet. 38–39 (emphasis added) (citing Ex. 1004 ¶¶ 98–99); *see also id.* at 20–21 (citing Ex. 1004, 30–31; Ex. 1006, 3:44–46, 4:3–6, 4:8–10, 10:42–46, 12:46–60, 16:5–10, Figs. 1, 2). Mushabac expressly discloses a 3-D optical measurement of the visible surfaces of a tooth or teeth, without mentioning, suggesting, or implying optical measurement of the visible surfaces of the jaw (i.e., the gums). Ex. 1006, 10:42–46, 12:46–60, 16:5–10, 24:53–54, Figs. 1, 2, 25; *see also* Ex. 2013 ¶¶ 93–95 (“Mushabac does not disclose or suggest ‘using light to measure the visible surfaces of ***the jaw*** . . . in three dimensions.’”). Patent Owner’s expert, Dr. Erickson, testified at his deposition that Mushabac’s video surface data of the teeth would not include collecting information concerning the gums. Ex. 1018, 243:14–244:25. Petitioner’s expert, Dr. Ganz, agreed “it would be possible to use

Mushabac’s or Massen’s optical probes to capture only a portion of a tooth.”
Ex. 2030, 154:4–9.⁸

Mushabac discloses the use of a grid-based projection method in data generating device 22, which “focus[es] the grid light on the surface of a subject tooth.” Ex. 1006, 12:50–51. “CCD 48 generates and transmits to computer 24 a digitized video signal containing information used by computer 24 to calculate the dimensions of the subject tooth and to display the tooth’s structure in a three-dimensional graphic representation on monitor 34 [Fig. 25].” Ex. 1006, 12:55–60, Figs. 1, 2; *see also id.* at 16:5–12 (“computer displays partial or complete graphic representations on monitor 34 of the subject tooth or teeth”), 24:53–55 (“[t]he external surfaces of teeth 566 and 568 are measured,” Fig. 25); Ex. 2026, 244:14–245:10 (“That’s referring to external surfaces of teeth”). We also credit Dr. Erickson’s Declaration testimony that “[e]ven if gum surface data was desired using Mushabac’s system, there is no suggestion in Mushabac for using the disclosed optical measuring tool instead of, for example, the contact digitizing tool also disclosed by Mushabac.” Ex. 2013 ¶ 102.

⁸ Massen is an example of a 3-D optical measuring system that uses laser light to measure a single tooth in a patient’s mouth. Massen discloses an optical 3-D measuring probe “utilized to generate a three-dimensional image of a single tooth or a group of teeth The measuring probe projects a particular pattern onto the single tooth or group of teeth . . . to be surveyed. The projected pattern of stripes is distorted by the tooth or teeth which is/are to be measured due to variations in height.” Ex. 1009, 4:14–22. Massen, therefore, provides an explicit example of a precise optical measuring technique known to be capable of optically measuring an individual tooth without necessarily measuring the gums or visible surfaces of a patient’s jaw. We address Massen in more detail in Section II.C., below.

Dr. Ganz agreed under cross-examination that “Mushabac optically measures the teeth [a]nd then it uses ... bone sounding to measure the surfaces of the jawbone.” Ex. 2026, 252:11–20. When directly asked where a three-dimensional optical measuring of visible surfaces of the jaw was “stipulated” in Mushabac, Dr. Ganz could not identify any passage to support that assertion made in paragraph 100 of his Declaration. *Id.* at 248:16–252:20. We find Dr. Ganz’s cross-examination testimony to be highly persuasive and consistent with the disclosures in Mushabac and the testimony of Dr. Erickson.

For the reasons given above, we determine that Mushabac does not expressly disclose an “optical” (light-based) measurement of the “visible surfaces of the jaw” in three dimensions, as recited in claim 1 of the ’006 patent.

c. Petitioner’s reply argument

Petitioner raises a new argument in reply, namely that “[b]ecause the Mushabac Fig. 1/Fig. 2 video capture mechanism *necessarily captures and determines* the 3D coordinates of all structures in the oral cavity, Mushabac provides ‘an optical measurement of the jaw.’” Reply 10 (emphasis added). Petitioner’s Reply differs from the argument in the Petition, which relies on Mushabac’s disclosure of 3-D optical measurement of visible surfaces of the teeth, contact digitization of the jaw bone, and Dr. Ganz’s Declaration statement (Ex. 1004 ¶ 100) that Mushabac “stipulates” that surface information of a patient’s jaw is digitized. We view Petitioner’s Reply argument as a new assertion that Mushabac inherently discloses 3-D optical measuring of the visible surfaces of the jaw.

Petitioner initially maintains that the Petition itself demonstrates that “Mushabac captures 3D optical measurements of the visible surfaces of the jaw and teeth,” citing to Petition pages 20, 21, 24 (dependent claim 3), and 38–39. Reply 10–11. We have addressed, above, why the argument and evidence cited at Petition pages 20, 21, 38, and 39 are insufficient to support the asserted express anticipation of claim 1 by Mushabac with respect to a 3-D “optical measuring of the visible surfaces of the jaw.” Petition page 24 addresses dependent claim 3, which recites “wherein the three-dimensional, measured, visible surfaces are the occlusal surfaces of neighboring teeth located on the jaw.” Petitioner’s argument regarding claim 3 fares no better. The quotations from Mushabac in Petitioner’s claim chart for claim 3 are addressed to graphical representations of the teeth and jaw bone 558 (Figure 25), not to 3-D optical measurements of the visible surfaces of the jaw. Pet. 24 (citing Ex. 1006, 16:5–10, 24:35–50, Figs. 1–2, addressed above).

Petitioner’s argument that Mushabac “captures” 3-D video surface data and “[n]othing in Mushabac restricts the captured data to *only* the teeth” is insufficient on its face. Reply 11–12 (citing Ex. 1019 ¶¶ 43–44).

First, claim 1 requires a 3-D optical “measuring” of the visible surfaces of the jaw and teeth, not merely “capturing” 3-D optical surface data. Dr. Ganz understood that “there is a difference between capturing information and measuring it” (Ex. 2030, 257:20–258:3), and he agreed that “[c]apturing an image by itself is not a three-dimensional optical measuring.” *Id.* at 292:2–6. Dr. Ganz, in his Second Declaration, states only that Mushabac “*captures* optical data without regard to structure” and that Mushabac does not restrict such optical data capture to only the teeth. Ex. 1019 ¶ 43 (emphasis added). Dr. Ganz further states a “video data

capture” of the oral cavity “will *capture*” the visible surfaces of the jaw and teeth, and he cites to his *Triangle of Bone* article as an example. *Id.* ¶ 44 (emphasis added) (citing Ex. 1013, 5, Figs. 14–16). Dr. Ganz, however, does not state that Mushabac discloses optically “measuring” the visible surfaces of the jaw (i.e., the gums), as recited in claim 1, only that “*capturing* of the visible surfaces of the jaw along with those of the teeth is necessary or inherent in Mushabac.” *Id.* (emphasis added). Because “capturing” 3-D optical data is not the same as the recited 3-D optical “measuring,” Dr. Ganz’s Second Declaration testimony is not sufficient to support a finding that Mushabac inherently or necessarily discloses 3-D optical “measuring” of the visible surfaces of the jaw. Therefore, Petitioner’s argument, that Mushabac’s video scan of the oral cavity (i.e., “video surface data” (Ex. 1006, 4:8–10)) necessarily captures the visible surfaces of the jaw (i.e., the gums), fails to satisfy the recitation in claim 1 of a 3-D optical “measuring” of the visible surfaces of the jaw for use in correlating the optically “measured” data record with the “measured” X-ray data record.

Second, Dr. Ganz testifies that a POSA would have understood from reading Mushabac that “where contact digitization is used, video *could* also be used” “to meet the optical limitation” in claim 1. *Id.* ¶ 41 (emphasis added). Dr. Ganz cites to exemplary video systems disclosed in references other than Mushabac, such as the *Triangle of Bone*⁹ and CEREC¹⁰

⁹ S.D. Ganz, *The Triangle of Bone – A Formula for Successful Implant Placement and Restoration*, 5(5) THE IMPLANT SOCIETY, INC. (1995). Ex. 1013 (“*Triangle of Bone*”)

¹⁰ Werner H. Mörmann, *The Evolution of the CEREC System*, 137 JADA 7S-13S (2006). Ex. 1021 (“CEREC”)

references, in support. *Id.* ¶¶ 38–39, 44. Dr. Ganz’s Second Declaration testimony establishes only a possibility, not the necessity, of using Mushabac’s optical probe to measure the visible surfaces of the jaw (i.e., the gums) in three dimensions.

Dr. Ganz further clarified under cross-examination that “while Mushabac describes optically measuring teeth, it’s *possible* to measure structures beyond teeth using Mushabac.” Ex. 2030, 199:4–8 (emphasis added). The possible use of Mushabac’s 3-D optical scanning system to measure visible surfaces of a patient’s jaw while optically measuring the patient’s teeth, however, does not satisfy the “necessarily present” standard for inherent anticipation. *See Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991) (“To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference.’”); *id.* at 1269 (“‘Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.’” (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981))). Further weighing against Petitioner’s argument and Dr. Ganz’s testimony, is the fact that there is no disclosure or suggestion in Mushabac of using a 3-D optical measuring technique to measure the visible surfaces of the jaw (i.e., the gums), as opposed to using another disclosed technique such as contact digitization or radiopaque markers for measuring the gum surface. Ex. 1006, 27:58–28:34, Figs. 17, 30, 31; Ex. 1018, 245:23–252:10; Ex. 2030, 190:25–192:20.

In addition, for the reasons explained in subsections II.B.2.a. and II.B.2.b., above, we also do not credit Dr. Ganz’s Second Declaration

statement that he did not rely on Mushabac's disclosure of contact digitization of the jaw bone ("bone sounding," see Ex. 1006, 24:53–56) to satisfy the so-called "optical limitation" recited in claim 1. Ex. 1019 ¶ 41. The evidence indicates that he did. Furthermore, under cross-examination Dr. Ganz agreed that "where contact digitization is used to measure the underlying jawbone" in Mushabac, "video could not be used." Ex. 2030, 197:2–198:17. Dr. Ganz's cross-examination testimony further undercuts his statements in paragraph 41 of his Second Declaration.

For the reasons given above, we are not persuaded that Mushabac expressly or inherently discloses a 3-D "optical measuring of the visible surfaces of the jaw" as recited in claim 1 of the '006 patent. Therefore, we determine Petitioner has not proved by a preponderance of the evidence that Mushabac anticipates claim 1 of the '006 patent. Because claims 2–5 and 9–10 all depend directly, or indirectly, from claim 1, Petitioner also has not proved by a preponderance of the evidence that claims 2–5 and 9–10 are anticipated by Mushabac. See, e.g., *Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1296 (Fed. Cir. 2002) (if independent claim not anticipated, then dependent claims not anticipated).

D. Obviousness of Claim 1 over Bannuscher and Massen

Petitioner argues that the subject matter of claim 1 would have been obvious over Bannuscher and Massen. Pet. 32–36, 50–54 (citing Ex. 1004 ¶¶ 72, 82–86, 135–145; Ex. 1008; Ex. 1009). Petitioner supports its argument with citations to Bannuscher and Massen, asserted to correspond to each limitation of the claim, and with Dr. Ganz's Declaration. *Id.* at 32–36 (citing Ex. 1004, 44–49; Ex. 1008; Ex. 1009). Patent Owner opposes. PO Resp. 45–58. For the reasons given below, we determine Petitioner has

not proved by a preponderance of the evidence that the subject matter of claim 1 would have been obvious to a POSA over the combination of Bannuscher and Massen.

Obviousness under 35 U.S.C. § 103 requires an assessment of (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of nonobviousness such as “commercial success, long-felt but unsolved needs, failure of others, etc.”¹¹ *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)). A party who petitions the Board for a determination of obviousness must show that “‘a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (quoting *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)). We address the parties’ arguments and evidence according to the articulated standard.

1. *Bannuscher*

Bannuscher discloses a method of preparing a surgical template for dental implant surgery. Ex. 1008, 2 (57), 5:1–3.¹² A plaster model is cast from an impression taken of a patient’s mouth or jaw area. *Id.* at 4:7–8, 8:21–23. A panoramic X-ray image is taken to determine the “available

¹¹ Patent Owner has not offered secondary consideration evidence in this proceeding. PO Resp. 42–58.

¹² Bannuscher published on October 2, 1996, more than one year before the October 31, 2000 U.S. application filing date of the ’006 patent, and, therefore, qualifies as prior art under 35 U.S.C. § 102(b).

vertical bone” for drilling a bore hole into the patient’s jaw. *Id.* at 4:14–16, 9:2–3. The 3-D geometry of the plaster model and the X-ray image are “entered, relative to the patient’s skull, into a computer by digital transmission.” *Id.* at 9:4–5; *see also id.* at 2 (57), 5:12–15. Reference points are used to correlate the data for determining the optimum positioning of the implant, including comparison with the existing vertical bone. *Id.* at 9:7–11. A transverse tomographic X-ray “is also digitized and now complements the overall planning in three-dimensional planes” so that “the angle and anatomical conditions [can] be objectively dimensioned and evaluated.” *Id.* at 9:15–17. “[A]ll the important information and parameters for implant surgery” are combined so that “by the spatial allocation in the computer” “angles that are of primary importance to the implantation [are] represented by real values.” *Id.* at 9:17–20; *see also id.* at 5:16–22. Bannuscher discloses that the data for the optimized implant position is “transferred to a transponder or a surgical template.” *Id.* at 9:21.

To produce a dental implant drill template, Bannuscher mounts the plaster model of the patient’s mouth or jaw area on a base frame having two “swivel platforms.” *Id.* at 9:23–10:9, Figs. 1–3. The plaster model can be pivoted around two pivot shafts to assume any angular position. *Id.* at 10:12–14. A surgical template is “arranged on the three-dimensional geometric model.” *Id.* at 10:14–17. Bannuscher discloses that “any angle, determined by the combination of the three-dimensional geometric model and the X-ray image of the mouth and jaw area of the patient, can be made on a surgical template,” for use “during the operation in the mouth of the patient.” *Id.* at 10:10–20.

2. *Massen*

Massen is directed to an “optical oral or mouth probe which is utilized for the three-dimensional measurement or surveying of teeth.” Ex. 1009, Abstract.¹³ Massen explains that “direct optical three-dimensional surveying or measuring of teeth in the oral cavity of a patient facilitates the obtainment of the digital construction data necessary for the computer-controlled manufacture of tooth replacements without having to make any impressions of the teeth.” *Id.* at 1:19–24. Massen discloses an optical 3-D measuring probe “utilized to generate a three-dimensional image of a single tooth or a group of teeth The measuring probe projects a particular pattern onto the single tooth or group of teeth . . . to be surveyed. The projected pattern of stripes is distorted by the tooth or teeth which is/are to be measured due to variations in height.” *Id.* at 4:14–19. Massen’s optical probe includes a charge-coupled image sensor that “is a device in which electrical charges are introduced when light from a scene is focused on the surface of the device.” *Id.* at 5:46–49.

3. *Analysis – Motivation to Combine Bannuscher and Massen with a Reasonable Expectation of Success*

Petitioner and Dr. Ganz acknowledge that Bannuscher does not disclose “three-dimensional optical measuring of the visible surfaces of the jaw and of the teeth,” as recited in claim 1 of the ’006 patent. Pet. 52 (citing Ex. 1008, 9; Ex. 1004 ¶ 139). Therefore, Petitioner relies on Massen as disclosing the quoted limitation. Pet. 32 (citing Ex. 1009, 1:19–24, 3:22–41,

¹³ Massen issued on December 13, 1994, more than one year before the October 31, 2000 U.S. application filing date of the ’006 patent, and Massen qualifies as prior art under 35 U.S.C. § 102(b).

4:14–17; Ex. 1004, 45). Petitioner argues that a POSA would have been motivated to “remove[] a manual step from Bannuscher (having to create the 3-D physical model) and replace[] it” with Massen’s “highly-precise automated method” of 3-D optical measuring of a patient’s tooth or teeth. Pet. 52–53 (citing Ex. 1004 ¶¶ 140–141). Petitioner also argues that a POSA would have had a reasonable expectation of success when replacing Bannuscher’s 3-D plaster model with Massen’s 3-D optical measuring technique, because “Bannuscher and Massen are both concerned with providing 3-D models of a patient’s mouth and jaw.” *Id.* at 53; Ex. 1004 ¶ 141. Petitioner further argues that Massen’s teaching to use “3D optical data in place of physical impressions of teeth” would have been a recognizable improvement to Bannuscher’s implant planning method and drill template production process. Reply 18–20 (citing Ex. 1009, 1:19–24; Ex. 1019 ¶¶ 61–66).

Patent Owner opposes, arguing, *inter alia*, that:

Massen describes optically measuring a patient’s existing teeth as part of a process for forming dental restorations (e.g., crowns) that are to be secured on top of the existing teeth. Petitioner has not adequately explained why a person of ordinary skill in the art (“POSA”) would have modified Bannuscher’s conventional process for creating a drill template used at the site of a missing tooth with Massen’s process of fixing an existing tooth with a crown.

PO Resp. 6; *see also id.* at 46. Patent Owner also argues that neither Bannuscher nor Massen discloses or suggests a 3-D optical measurement of the visible surfaces of the jaw (i.e., the gums). *Id.* at 6, 45–46. Patent Owner further argues that the proposed use of Massen’s 3-D optical measurement system in place of Bannuscher’s dental impressions and plaster

model would render Bannuscher inoperable for its intended purpose. *Id.* at 6, 46. We agree that Petitioner’s argument and evidence for why a POSA would have been motivated to replace the 3-D plaster model in Bannuscher with Massen’s 3-D optical measurement system, with a reasonable expectation of success, do not withstand scrutiny.

a. Massen optically measures the topography of teeth for preparing tooth restorations

As acknowledged in the Petition and by Dr. Ganz, Massen is directed to the use of a precise 3-D optical technique for measuring the topography of an individual tooth or teeth for preparing “replacements,” e.g., a restoration or crown. Ex. 1009, 1:19–24; Pet. 52–53 (“Massen’s optical probe is used to generate a 3-D image of a single tooth or a group of teeth”; “a pattern projected against the tooth or teeth is always varied”; “each iteration provides refinement of the topography of the tooth or teeth” (citing Ex. 1004 ¶ 141)); Ex. 2026, 208:12–209:25 (Q. Massen [is] optically measuring the tooth structure to get data to make tooth restorations? . . . A. Yes.”). We also credit Dr. Erickson’s Declaration testimony that Massen is concerned exclusively with optically measuring visible surfaces of teeth to prepare restorations or crowns on top of existing teeth, not with measuring visible surfaces of the jaw where a tooth was missing and an implant was intended. Ex. 2013 ¶¶ 160, 185. Petitioner’s Reply argument, that “Massen captures – and would of necessity capture – the visible surfaces of the jaw while imaging the visible surfaces of the teeth” (Reply 21), is insufficient for the same reasons set forth in Section II.B.2.c., above. A 3-D optical *capturing* of the visible surfaces of the jaw (i.e., the gums) is not the same as “measuring” the visible surfaces of the jaw, as recited in claim 1. Petitioner

neither cites to a description in Massen of a 3-D optical “measuring” of the visible jaw surfaces, nor explains what, if anything, Massen does with the “captured” jaw surface data. Reply 21 (citing Ex. 1019 ¶¶ 69–70).

b. Bannuscher and Massen are directed to solving different problems arising in different types of dental procedures

Even if Massen were construed as measuring the visible surfaces of the jaw, such a construction still would not be determinative in this case. Unlike Bannuscher, Massen is not concerned with (i) planning for dental implant surgery, where an anchor for holding a prosthetic tooth is inserted into a bore hole drilled into the jaw bone, (ii) correlating digitized X-ray data of the patient’s jaw with digitized 3-D data of the patient’s jaw and teeth to determine an optimal bore hole and corresponding pilot hole in a drill template, or (iii) producing a drill template for use in dental implant surgery. In short, Massen is directed to solving a different problem arising in a different type of dental procedure than Bannuscher.

Bannuscher is directed to solving the problem of determining the optimal bore hole to drill into an implant patient’s jaw and the corresponding pilot hole in a drill template. Bannuscher uses panoramic and transverse X-ray images to determine the available vertical bone for drilling a bore hole into the patient’s jaw. Ex. 1008, 4:14–16, 9:2–3. Bannuscher digitizes and correlates the X-ray imagery and the 3-D geometry of the plaster model of the patient’s jaw and teeth in a computer program, to determine the optimum drilling angle and position of the bore hole and corresponding pilot hole. *Id.* at 5:12–22, 9:4–20; *see also id.* at 2 (57). Bannuscher uses the correlated information to drill the pilot hole into a drill template. *Id.* at 9:23–10:20, Figs. 1–3. Bannuscher arranges the drill template on the plaster model,

which is set in place on the swivel platform, to support the drill template when drilling the pilot hole. *Id.*

Massen, on the other hand, is directed to refining the 3-D optical measuring technique for accurately surveying the topography of a patient's tooth or teeth to prepare a tooth restoration that fits properly in the patient's mouth. Ex. 1009, 1:15–24, 2:65–3:3, 4:14–17; Ex. 2030, 253:2–6 (“Q. So Massen is really related to collecting data for making restorations, correct? A. That was the initial intent, yes.”). Massen is not directed to planning for implant surgery, where a bore hole will be drilled into a patient's jaw at the site of a missing tooth, or for producing a surgical drill template. Ex. 2030, 252:11–253:1. Petitioner's reply, that Bannuscher and Massen are both concerned with “deriving accurate data to allow for *well-planned dental procedures*” misses the mark. Reply 19 (emphasis added).

Bannuscher and Massen are directed to different types of dental procedures having different objectives and different concerns, as explained above. The existence and availability of 3-D optical measuring technology does not itself provide a reason for combining the references, as Petitioner appears to suggest. *Id.* at 19–20. Both Dr. Erickson and Dr. Ganz agree, moreover, that Massen does not disclose or suggest using X-ray or radiographic data, and Massen does not disclose correlating optical data with X-ray data. *Compare* Ex. 2013 ¶¶ 192–193 (“Dr. Ganz and I appear to be in agreement that the “correlating” limitation is not disclosed or suggested by Massen.”) *with* Ex. 2026, 212:2–11 (“Q. And Massen also doesn't, does not disclose using x-ray or radiographic data, correct? A. Not that I recall. Q. So Massen doesn't disclose correlating optical data with x-ray data, correct? A. . . . That would be correct.”). Petitioner's Reply argues in

conclusory fashion that the combination of Bannuscher and Massen “would correlate X-ray diagnostics and the oral situation of the patient as captured and measured by Massen.” Reply 22 (citing Ex. 1004 ¶ 72 (p. 46); Ex. 1019 ¶ 71). Petitioner, however, has not persuasively addressed the fundamental distinctions between Bannuscher and Massen to explain why a POSA would have been motivated to use Massen’s 3-D optical measurement of the teeth in a system like Bannuscher’s, which correlates digitized X-ray imagery of the jaw and 3-D plaster model geometry of the jaw and teeth for a different purpose.

c. Inconsistency of the evidence regarding Petitioner’s proposed rationale for combining Bannuscher and Massen

Petitioner’s evidence in support of the proposed rationale for why a POSA would have combined Bannuscher and Massen – to “eliminate” the manual step of preparing plaster models (Reply 20) – also is inconsistent. Dr. Ganz first stated, consistent with Petitioner’s argument, that a POSA would have been motivated to “replace” Bannuscher’s plaster model with Massen’s 3-D optical measuring system. Ex. 2026, 218:4–219:8 (“Q. [Y]ou’re proposing a combination where you replace Bannuscher’s impressions and mold with Massen’s optical measurement probe, correct? A. That is correct.”). Under cross-examination, however, Dr. Ganz equivocated and could not explain how Bannuscher’s device would operate without the plaster model. Dr. Ganz testified as follows:

Q. So if you replace the plaster cast in Bannuscher with the optical measuring probe, in Massen, how would this inventive device work?

A. There is nothing that I have stated or that’s stated in the, in the declaration that says that we’re necessarily

replacing what Bannuscher does completely. It's a concept where we can also gain the optical data and digitize it so that we can reference that and superimpose those images on the computer to help with the diagnostic phase. . . .

Q. So are you saying that the plaster mold would still exist in this combination?

A. Yes, it can still exist in order to create a physical template. So the physical template has to be fabricated in some way. Someone has to do that. Some fabrication process has to occur. . . .

Q. In your proposed combination that you're proposing, does the plaster cast still exist with Massen's optical measuring probe?

[colloquy]

A. In one of the examples or protocols that I described, yes, a plaster model can be used. In another one, it is possible to do it without it.

Q. Which one are you relying on in your declaration?

A. I would say that I would use – [colloquy]

A. Yes, I would use the Bannuscher reference up to the fabrication of the plaster cast and not digitize that information that he describes, but use Massen to do an intraoral scan. Get that digital information. Bring it into the computer. Diagnose and plan the surgical template based on the position of the implant utilizing the data that you have. . . .

Q. So the manual step in Bannuscher of having to create that 3-D model, the physical model, would still be required in your proposed combination?

A. Yes.

Ex. 2026, 234:3–241:13.

Petitioner’s argument in reply also is inconsistent. Petitioner first states that Massen’s 3-D optical measuring technique would “improve Bannuscher by removing a physical step, *i.e.*, the creation of a 3D physical model.” Reply 18 (citing Ex. 1004 ¶¶ 140–141). Petitioner then argues the combination “would enable the Bannuscher pivotable platform to move in response to an optimized implant position coordinate system developed using both X-ray and 3D optical data.” Reply 20 (2.). Bannuscher’s swivel platform, however, is designed to hold the plaster model on which the drill template is arranged when drilling the pilot hole. Petitioner does not explain how the proposed Bannuscher-Massen combination would work in the absence of a plaster model.

We further credit Dr. Erickson’s Declaration testimony that “a POSA would not have understood that the plaster casts disclosed and used in Bannuscher could simply be replaced by an optical measuring probe simply because such probes existed and were used to measure teeth for forming crowns.” Ex. 2013 ¶ 167. Patent Owner’s argument, consistent with Dr. Erickson’s testimony, emphasizes the incompatible principles of operation between Bannuscher and Massen. PO Resp. 50–54. We agree that the incompatibilities in Petitioner’s proposed Bannuscher-Massen combination weigh against finding a sufficient reason or motivation for a POSA to have combined Bannuscher and Massen to arrive at the claimed invention, in the absence of hindsight. *See KSR*, 550 U.S. at 421 (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.”).

In sum, Petitioner has not explained persuasively why a POSA would have looked to replace Bannuscher's plaster model, used in planning for dental implant surgery and for preparing a drill template, with Massen's 3-D optical measurement of the teeth, used for preparing a tooth restoration.

d. Inoperability of the proposed Bannuscher-Massen combination

Although Massen does disclose a 3-D optical measurement technique that is performed without needing dental impressions (or a plaster model cast from those impressions), Petitioner's proposed replacement of Bannuscher's plaster model would eliminate Bannuscher's ability to use the plaster model for (i) measuring jaw articulation movements and (ii) mounting a surgical drill template thereon to drill a pilot hole. The concept of mounting plaster models in an articulator is illustrated below. PO Resp. 51 (citing Ex. 2028, Abstract, 6:59–63, 9:10–12; Fig. 2 (annotated by Patent Owner)).

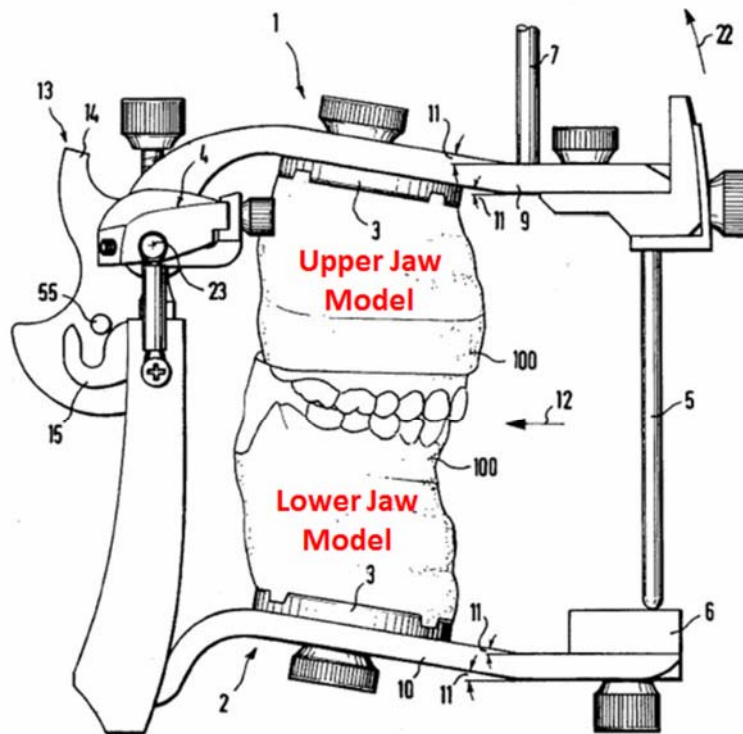
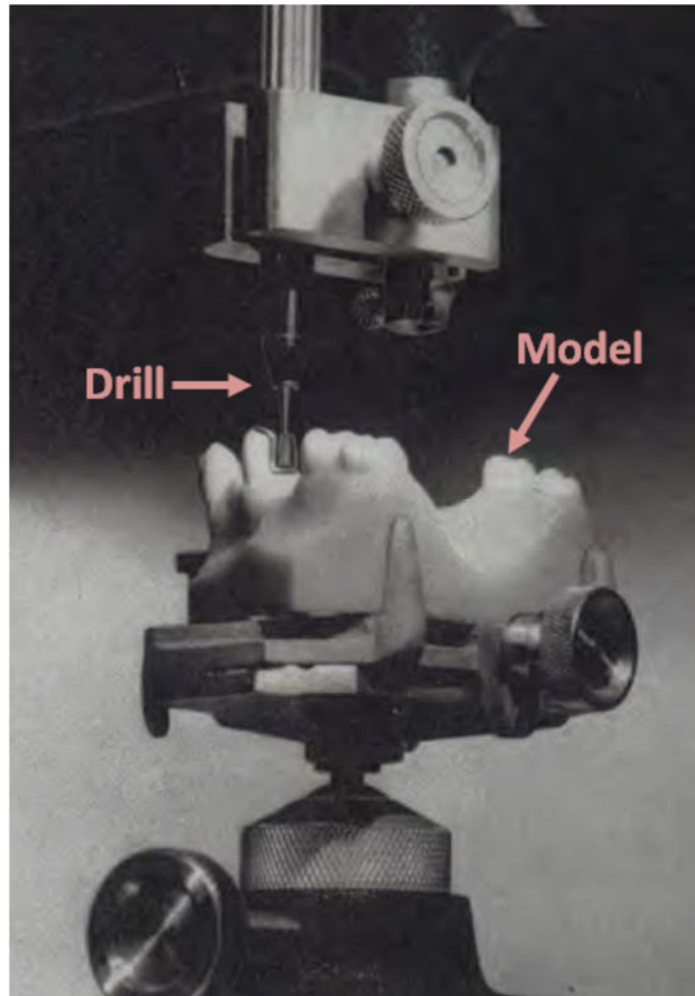


FIG. 2

As can be seen in the annotated figure of a jaw articulator, above, replacement of the plaster models of the upper and lower jaws with Massen's optical measuring probe (Ex. 1009, Fig. 1) would not permit the mechanical articulator to function as intended. Under cross-examination, Dr. Ganz could not explain how Bannuscher's jaw articulation process could be carried out without plaster models, instead referring to a "virtual articulator" that is not described anywhere in his declaration or suggested by Bannuscher or Massen. Ex. 2026, 220:5–221:17, 222:6–13.

A similar conclusion of inoperability would be drawn with respect to Bannuscher's process of drilling a pilot hole into a drill template. Although Bannuscher Figures 1–3 schematically depict only the swivel platform, and not the plaster model having the drill template "arranged on" it, Bannuscher's device is similar to a dental surveyor, an example of which is

illustrated below. PO Resp. 53 (citing Ex. 2003, 135–139 (annotated by Patent Owner); Ex. 2013 ¶ 166; Exhibit 2026, 113:22–115:23; 200:13–201:8).



The drill template in Bannuscher, as in the dental surveyor above, is arranged on the plaster model of the patient’s teeth and jaw, and, once the plaster model has been positioned properly on the platform, a drill is used in a manner similar to a drill press to drill a pilot hole into the drill template. Ex. 1008, 10:10–20; Ex. 2013 ¶¶ 154, 166–167, 171; Ex. 2026, 115:16–23, 201:6–17. We credit Dr. Erickson’s Declaration testimony that Bannuscher’s process “cannot be replaced with optical measuring,” at least

because the surgical template would not have the support of the plaster model necessary to drill the pilot hole into the drill template. Ex. 2013 ¶ 166; see *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (no obviousness where primary reference “would be rendered inoperable for its intended purpose”). Dr. Ganz agreed that Bannuscher’s method for drilling the pilot hole into the drill template “may require some physical model.” Ex. 2030, 227:18–230:1.

e. Conclusion

In sum, Petitioner’s argument and evidence are inconsistent and do not establish persuasively why a POSA would have had a reason to replace Bannuscher’s plaster model with Massen’s 3-D optical measuring system. We also are not persuaded that a POSA would have had a reasonable expectation that Bannuscher’s method would work if the plaster model were replaced with Massen’s 3-D optical measuring system. We recognize that claim 1 does not recite a step for actually producing the drill template, but this does not mean a POSA would have ignored Bannuscher’s disclosure of using a plaster model to measure articulation movements and to support the drill template when drilling a pilot hole. Therefore, we are not persuaded it would have been obvious to a POSA to combine Bannuscher and Massen as proposed by Petitioner, in the absence of hindsight.

For the reasons given above, we determine Petitioner has not demonstrated by a preponderance of the evidence that the combination of Bannuscher and Massen would have rendered the subject matter of claim 1 of the ’006 patent obvious to a POSA.

E. Obviousness of Dependent Claims 2–8

Claims 2–8 of the '006 patent all depend directly or indirectly from claim 1. Therefore, for the same reasons given in Section II.C., above, Petitioner has not proved by a preponderance of the evidence that the subject matter of claims 2–8 would have been obvious to a POSA over the stated combinations of references. *See, e.g., Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc.*, 520 F.3d 1358, 1365 (Fed. Cir. 2008) (“[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious.”).

III. CONTINGENT MOTION TO AMEND

Patent Owner filed its MTA contingent on a determination that Petitioner has proved claims 1–8 to be unpatentable by a preponderance of the evidence. MTA, 1–2. We have determined Petitioner has not met its burden of proving the challenged claims unpatentable in this case. Therefore, Patent Owner’s MTA is dismissed as moot.

IV. CONCLUSION

For the reasons given above, we determine Petitioner has not shown by a preponderance of the evidence that claims 1–10 of the '006 patent are unpatentable.

This is a Final Written Decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

V. ORDER

It is

ORDERED that claims 1–10 of the '006 patent have not been proved to be unpatentable by a preponderance of the evidence.

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Patent 6,319,006 B1

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