

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OSTEOMED LLC,
Petitioner,

v.

STRYKER EUROPEAN OPERATIONS HOLDINGS LLC,
Patent Owner.

IPR2022-00487
Patent 9,078,713 B2

Before HYUN J. JUNG, SUSAN L. C. MITCHELL, and
MICHAEL A. VALEK, *Administrative Patent Judges*.

VALEK, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

OsteoMed LLC (“Petitioner”) filed a Petition (Paper 1, “Pet.”), seeking *inter partes* review of claims 32–39 of U.S. Patent No. 9,078,713 B2 (Ex. 1001, “the ’713 patent”). We instituted trial on all grounds in the Petition. Paper 8, 34.

Following institution, Stryker European Operations Holdings LLC (“Patent Owner”) filed a Response (Paper 16, “Resp.”), Petitioner filed a Reply (Paper 25, “Reply”), and Patent Owner filed a Sur-reply (Paper 31, “Sur-reply”). We held a hearing on May 11, 2023, and a transcript is of record. Paper 36 (“Tr.”).

After considering the parties’ arguments and evidence, we find that Petitioner has shown by a preponderance of the evidence that the challenged claims of the ’713 patent are unpatentable. *See* 35 U.S.C. § 316(e). Our reasoning is explained below.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies OsteoMed LLC, Acumed LLC, and Colson Medical, LLC as real parties in interest. *See* Pet. ix. Petitioner additionally identifies Marmon Holdings, Inc. and Berkshire Hathaway Inc. as “parties that may be relevant to the determinations.” *Id.* Patent Owner identifies Stryker European Operations Holding LLC, Stryker Corporation, and Howmedica Osteonics Corp. *See* Paper 14, 2.

B. *Related Matters*

Petitioner and Patent Owner identify *OsteoMed LLC v. Stryker Corporation*, 1:20-cv-06821 (N.D. Ill.) as a related matter. Pet. x; Paper 5,

2–3. Patent Owner additionally identifies *OsteoMed LLC v. Wright Medical Technology, Inc.*, 1:20-cv-01621 (D. Del.). Paper 14, 3.

Petitioner also identifies IPR2022-00486 and IPR2022-00488, which were filed concurrently with the Petition and involve the same parties. Pet. x. We denied institution in IPR2022-00486. *See* IPR2022-00486, Papers 8, 12. IPR2022-00488 is currently pending.

C. The '713 Patent

The '713 patent issued on July 14, 2015, and is a continuation of an application filed on October 2, 2009. Ex. 1001, code (63).

The '713 patent relates to “a plate fixed between two bone parts by way of screws engaged in holes formed in the thickness of said plate” that is configured to bring “the two bone parts into a compressive position.” Ex. 1001, code (57). Figure 3 of the '713 patent provides a perspective view of this plate and is reproduced below.

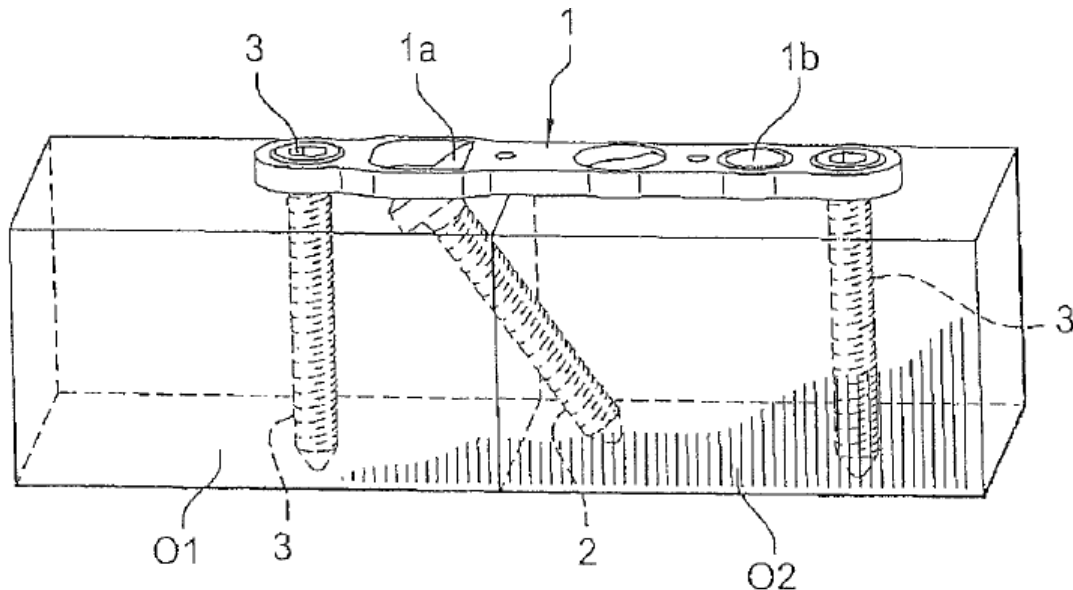


Fig. 3

Figure 3 depicts a plate 1 positioned between two bone parts O1 and O2. Ex. 1001, 2:16–17. Screws 3 are set through holes in the plate to attach it to bone parts O1 and O2. *Id.* at 2:33–35. A third screw 2 is positioned at an angle through a hole in tab 1a such that it extends through both parts O1 and O2. *Id.* at 1:64–66, 2:28–29. According to the Specification, engaging screw 2 in this manner “place[s] the fracture in compression.” *Id.* at 2:28–29.

D. Challenged Claims

The Petition challenges claims 32–39. Claim 32 is the only independent claim and illustrative. Claim 32 is reproduced below with the same bracketed annotations used in the Petition to identify particular limitations.

32. [32Pre] A method of fusing a joint, the method comprising:

[32a] spanning first and second bones separated by a joint with a bone plate, such that a first hole of the bone plate is aligned with a first bone of the joint and a second hole of the bone plate is aligned with a second bone of the joint;

[32b] inserting a first fixation member through the first hole of the plate and into the first bone of the joint;

[32c] inserting a second fixation member through the second hole of the plate and into the second bone of the joint; and

[32d] inserting a third fixation member through a third hole in the plate, into the first bone, across the joint, and into the second bone so that a free end of the third fixation member, not attached to any portion of the plate, resides in the second bone and [32e] a head of the third fixation member is seated in the third hole, [32f] the third hole being angled relative to a longitudinal axis of the plate through a thickness of the plate, [32g] wherein the third fixation member is the only fixation member extending across the joint.

Ex. 1001, 5:1–19.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
32, 33, 36, 37	103(a)	Slater ²
34, 35, 39	103(a)	Slater, Myerson ³
32, 33, 38	103(a)	Slater, Zahiri ⁴
32, 33, 36–39	103(a)	Arnould, ⁵ Zahiri
34, 35	103(a)	Arnould, Zahiri, Myerson

In support of these grounds, Petitioner relies on the declaration of Michael Sherman (Ex. 1002) submitted with the Petition. Patent Owner relies on declarations from Karl R. Leinsing (Ex. 2005) and George B. Holmes (Ex. 2007) submitted with the Patent Owner Response.

Our analysis below focuses on Grounds 4 and 5, i.e., the two grounds relying on Arnould instead of Slater. Grounds 4 and 5 collectively reach all of the challenged claims.

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. § 103 that became effective after the filing of the applications to which the ’713 patent claims priority. Therefore, we apply the pre-AIA version of § 103.

² WO 2007/131287 A1, published November 22, 2007 (Ex. 1004) (“Slater”).

³ US2006/0241608 A1, published October 26, 2006 (Ex. 1008) (“Myerson”).

⁴ US 8,187,276 B1, filed September 26, 2006 and issued May 29, 2012 (Ex. 1007) (“Zahiri”).

⁵ EP 1,897,509 B1, published December 3, 2008 (Ex. 1005). Exhibit 1006 is a certified translation of EP 1,897,509 B1, which we cite and refer to herein as “Arnould.”

III. ANALYSIS OF THE ASSERTED GROUNDS

A. Legal Standards

A claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, “differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Subsumed within the *Graham* factors is the requirement that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). “Obviousness does not require absolute predictability of success . . . [A]ll that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903–904 (Fed. Cir. 1988). Moreover, “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416.

On the other hand, a patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. An obviousness determination requires finding “both ‘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.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted).

B. Level of Ordinary Skill in the Art

Relying on the testimony of its declarant, Mr. Sherman, Petitioner contends that a person of ordinary skill in the art (POSITA) of the ’713 patent

as of October of 2009, had, among other attributes, a Bachelor’s Degree in mechanical engineering, biomedical engineering, biomechanics or similar discipline and had approximately three years of experience with orthopedic implant design. Such a POSITA would have had knowledge of design considerations known in the industry and would have been familiar with then-existing products and solutions. A POSITA would have been familiar with orthopedic implants, bone plates, and intramedullary implants.

Pet. 6 (citing Ex. 1002 ¶¶ 55–57).

In its Response, Patent Owner argues that

[i]n pending IPRs involving Petitioner’s own patents relating to the same bone plate technology, the parties and the Board agreed that “a POSITA at the time of the invention would be an individual having at least a bachelor’s degree in engineering with at least two years of experience in the field, such as experience with the design of surgical implants, or a clinical practitioner with a medical degree and at least two years of experience as an orthopedic surgeon.”

Resp. 10. Patent Owner urges that same level of ordinary skill in the art should apply here. *Id.* at 11.

Patent Owner disagrees with Petitioner’s proposal to the extent it “excludes clinical practitioners with a medical degree and at least two years of experience as an orthopedic surgeon.” Resp. 11 (internal quotations omitted). Patent Owner argues that “Petitioner’s omission of clinical practitioners from its definition appears to be an oversight because Petitioner’s expert . . . agreed at his deposition that orthopedic surgeons should be included within the definition of a POSITA.” *Id.* (citing Ex. 2009, 38:21–39:17).

Petitioner did not respond to Patent Owner’s argument regarding the level of ordinary skill in the art in its Reply and confirmed at the hearing that it does not dispute Patent Owner’s proposed description. *See* Tr. 62:3–16.

While both parties’ descriptions are similar, we find that Patent Owner’s description is better supported by the record. As Patent Owner points out, the main distinction between the parties’ proposals is that Patent Owner’s description is broader because it includes orthopedic surgeons. The record supports the inclusion of such individuals in the description of a POSITA. *See* Ex. 2005 ¶¶ 37, 41; Ex. 2009, 38:21–39:7 (Petitioner’s declarant testifying that he would “include an orthopedic surgeon that has some experience developing implants as a person of ordinary skill in the art”). Thus, we apply Patent Owner’s description of a POSITA for our analysis.

C. Claim Construction

Patent Owner argues that we should construe the term “bone plate.” Resp. 12–13. More specifically, Patent Owner argues that “[b]ecause Petitioner fails to define the term ‘bone plate,’ Petitioner’s obviousness

analysis relies on nonanalogous art, such as Zahiri.” *Id.* at 12. Patent Owner alleges that the ’713 patent “defines ‘bone plate’ as ‘a plate for arthrodesis or osteosynthesis adapted to be fixed between two bone parts.’” *Id.* at 12–13 (quoting Ex. 1001, 1:20–22). Patent Owner contrasts this with the device disclosed in Zahiri, which “is designed to be positioned on only one side of a fracture – [such that] it does not span any fracture, let alone a joint.” *See id.* at 36 (urging that Zahiri “does **not** disclose a ‘bone plate,’ as properly defined”). According to Patent Owner, we can “resolve the controversy regarding the meaning of ‘bone plate’ by “determin[ing] that the claim term ‘bone plate’ refers to a ‘a plate adapted to be fixed **between two bone parts** to immobilize a fracture or joint.’” *Id.* at 13.

Petitioner generally disputes Patent Owner’s position, urging that the Specification does not define the term differently than its plain and ordinary meaning. Reply. 3. According to Petitioner, none of the “dictionary definitions [Patent Owner cites] require the plate itself cross a fracture or joint to be fixed.” *Id.* at 4 (citing Ex. 2012, 5; Ex. 2013, 4). Moreover, Petitioner points to Mr. Sherman’s testimony and other evidence that bone plates for fracture fixation are “not always” placed across the fracture. *Id.* (citing Ex. 2009, 52:9–53:1; Ex. 1019). Accordingly, Petitioner contends that “to the extent ‘bone plate’ requires explicit construction . . . it must include plates that are positioned on one side of a joint or fracture consistent with the term’s plain and ordinary meaning.” *Id.*

We begin by observing that Patent Owner does not dispute that both Arnould and Slater disclose a “bone plate” regardless of how the term is construed. *See* Tr. 41:1–6. Rather, Patent Owner seeks to construe “bone plate” to further its attempt to show that Zahiri is not analogous art, and

therefore, cannot be combined with the other references. As explained below, we find that Zahiri is analogous art even if we were to adopt Patent Owner's proposal limiting "bone plate" to a plate "adapted to be fixed between two parts to immobilize a fracture or joint" because it is in the same field of endeavor, i.e., orthopedic implants, as the '713 patent. *Infra* § III.E.i.

That said, we do not agree with Patent Owner that the Specification defines "bone plate" as it contends. In the background of the invention, the Specification states that "[t]he invention relates to the technical field of orthopedic implants. More particularly, the invention relates to a plate for arthrodesis or osteosynthesis adapted to be fixed between two bone parts." Ex. 1001, 1:18–22. Contrary to Patent Owner's argument, this passage does not "define" the term "bone plate" nor otherwise suggest that the patentee acted as its own lexicographer. *See* Resp. 12–13.

Moreover, nothing in the record suggests that the ordinary meaning of "bone plate" requires the plate to be fixed between two bone parts. The medical dictionaries Patent Owner cites do not include such a requirement in their definitions. *See* Ex. 2012, 1478 (defining "bone plate" as "a metal bar with perforations for the insertion of screws, used to immobilize fractured segments"); Ex. 2013, 241 (defining "bone plate" as "a metal plate used to reconstruct a bone that has been fractured" and "designed to hold the bone fragments in apposition"). Both of these definitions are consistent with Mr. Sherman's testimony that a bone plate is "not always" placed across the fracture. *See* Ex. 2009, 52:9–53:1 (identifying particular instances in which a plate is not placed across the fracture). We credit that testimony over the competing testimony of Patent Owner's declarant, Mr. Leinsing. Ex. 2005

¶ 33 (referring to the statement from the Specification and dictionary definitions discussed above).

For these reasons, we agree with Petitioner that the term “bone plate” as recited in the challenged claims has its ordinary meaning and that meaning does not exclude plates located on only one side of a joint or fracture. To the extent any further claim construction is necessary to resolve the issues presented in this proceeding, we consider such in our analysis below.

D. Overview of Arnould, Zah

i. Arnould

Arnould is a European patent filed September 10, 2007 and published on March 12, 2008. Ex. 1006, codes (22), (43). Petitioner asserts, and Patent Owner does not dispute, that Arnould qualifies as prior art under 35 U.S.C. § 102(b). Pet. 9.

Arnould describes “an arthrodesis plate for a metatarsal-phalangeal joint, particularly for the joint between the first metatarsal and the first phalanx of the big toe” and “a surgical method for placing such an arthrodesis plate.” Ex. 1006 ¶ 1.

Figure 1 of Arnould, reproduced below, “depicts an arthrodesis plate 1 for a joint between the first metatarsal M and the first phalanx P of the big toe of a left foot.” Ex. 1006 ¶ 11.

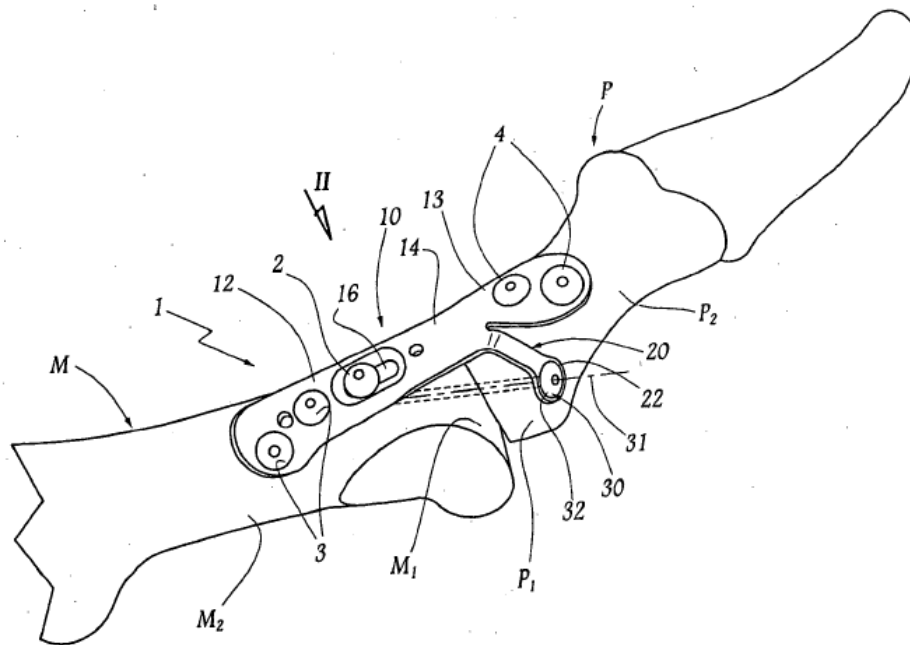


Fig. 1

Figure 1 above shows screws 2 and 3 extending through holes 15₁ and 15₂ in plate 1 to “secure the plate body 10 to the metatarsal M.”⁶ *Id.* ¶ 33. “Before or after securing the plate body 10 in relation to the metatarsal M, additional screws 4 are inserted into the holes 15₃ and 15₄ in order to secure the phalangeal portion 13 to the phalanx P.” *Id.* ¶ 34. Screw 30 is inserted through hole 25 “following a direction of insertion inclined in relation to the plate body 10 at an angle . . . chosen by the surgeon so that this screw, during its screwing, successively passes through the phalangeal epiphysis P₁ and the metatarsal epiphysis M₁” to join those bones. *Id.* ¶ 32; *see also id.* ¶ 6 (explaining that this screw “will extend both through the bone material of the phalanx and into the bone material of the metatarsal”).

⁶ The labels for holes 15₁, 15₂, 15₃, 15₄, and 25 do not appear in Figure 1 of Arnould, but are shown in other figures depicting Arnould’s plate. *See, e.g.*, Ex. 1006, Figs. 2, 4.

Arnould also teaches that “in order to allow the screw 30 to be screwed in and locked with its axis 31 inclined in relation to the central axis” of hole 25, that hole has “a concave surface which is substantially complementary to an associated surface delimited by this screw head.” Ex. 1006 ¶ 27. Figure 4 of Arnould is reproduced below and provides an elevation view of plate 1 from another angle.

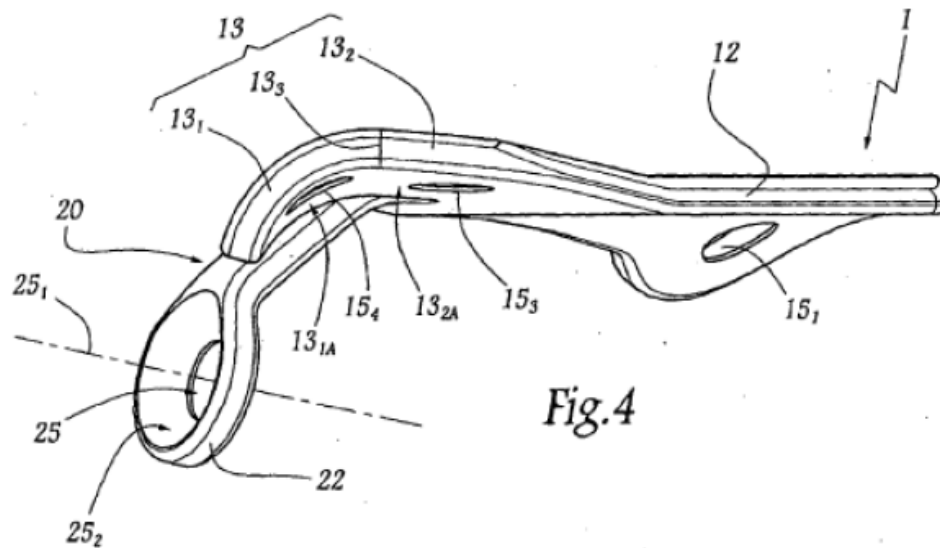


Figure 4 above shows hole 25 with a concave edge 25₂. *Id.* ¶ 27. According to Arnould, “when screw 31 is fully inserted into the hole 25, its head 32 comes to rest and wedge[s] against at least a portion of the edge 25₂.” *Id.*

ii. *Zahiri*

Zahiri is a United States patent filed on September 26, 2006, and issued May 29, 2012. Ex. 1007, codes (22), (45). Petitioner asserts, and Patent Owner does not dispute, that Zahiri qualifies as prior art under 35 U.S.C. § 102(e). Pet. 11.

Zahiri describes “fixation devices for compressing bone fractures of a human being.” Ex. 1007, 1:9–11. Figure 1 of Zahiri, reproduced below from

the version on page 11 of the Petition, depicts an embodiment of Zahiri's fixation device.

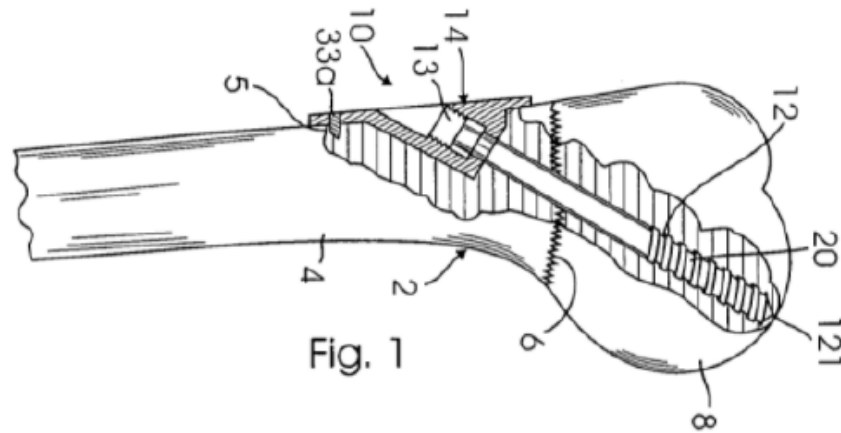


Figure 1 of Zahiri shows the insertion of lag screw 12 through guide plate 14 such that it extends through fracture line 6 in the bone at “an angle of 150 degrees or 170 degrees.” *See id.* at 4:58–67. According to Zahiri, the inclined angle of the “short barrel portion” of the guide plate can vary in “the range of from 90 to 170 degrees.” *Id.* at 3:59–67.

Zahiri also teaches that the plate may include holes for pins “designed to temporarily lock” the plate in position “so that it creates a user friendly condition for a surgeon to place the disclosed device at a desired location.” Ex. 1007, 3:11–18; *see also id.*, Fig. 8 (holes 235a-d).

iii. *Myerson*

Myerson is a United States patent application published on October 26, 2006. Ex. 1008, code (43). Petitioner asserts, and Patent Owner does not dispute, that Myerson qualifies as prior art under 35 U.S.C. § 102(b). Pet. 12.

Myerson describes “[a] fixation plate for use in fusion of the metatarsal-phalangeal joint” with a number of screw holes. Ex. 1008, code

(57). Myerson discloses an embodiment in which at least some of these “screw holes are designed to receive locking screws, such as by the incorporation of locking screws . . . within the screw hole.” *Id.* ¶ 22. According to Myerson, “[t]he locking threads can be of a variety of known configurations as dictated by the particular cortical locking screw.” *Id.*

E. Ground 4: obviousness over Arnould and Zahiri

Petitioner contends claims 32, 33, and 36–39 would have been obvious over Arnould and Zahiri. *See* Pet. 57–88. As explained below, Petitioner has shown by a preponderance of the evidence that these claims would have been obvious over Arnould and Zahiri.

i. Claim 32

Petitioner contends that Arnould teaches or reasonably suggests all of the steps of the method in claim 32, including placement of a bone plate that spans a first and second bone separated by a joint (i.e., plate 10 having holes 15₃ and 15₄ aligned with the phalanx and holes 15₁ and 15₂ aligned with the metatarsal as depicted in Arnould’s Figures 1 and 4), insertion of a first fixation member through a first hole of a plate into a first bone (i.e., screws 4 extending through holes 15₃ and 15₄ into the phalanx as depicted in Arnould’s Figures 1 and 4), insertion of a second fixation member through a second hole into a second bone (i.e., screws extending holes 15₁ and 15₂ into the metatarsal as depicted in Arnould’s Figures 1, 2, and 4), and insertion of a third fixation member seated in a third hole and extending through a thickness of the plate into both bones such that its free end resides in the second bone and is not attached to any portion of the plate (i.e., screw 30 with head 32 seated in the concave surface of hole 25 and extending into the

phalanx and metatarsal as depicted in Arnould's Figures 1 and 4.). Pet. 63–73 (citing evidence).

We find Petitioner's arguments and evidence persuasive. Arnould teaches a method of fusing a joint, e.g., the "metatarsal-phalangeal joint particularly . . . the joint between the first metatarsal and the first phalanx of the big toe," using the bone plate depicted in Arnould's figures. Ex. 1006 ¶ 1. As shown in Arnould Figure 1, reproduced below, bone plate 10 is positioned to span a joint between a first and second bone, specifically the phalanx P on the right and the metatarsal M, and has holes aligned with each of those bones (limitation 32[a]).

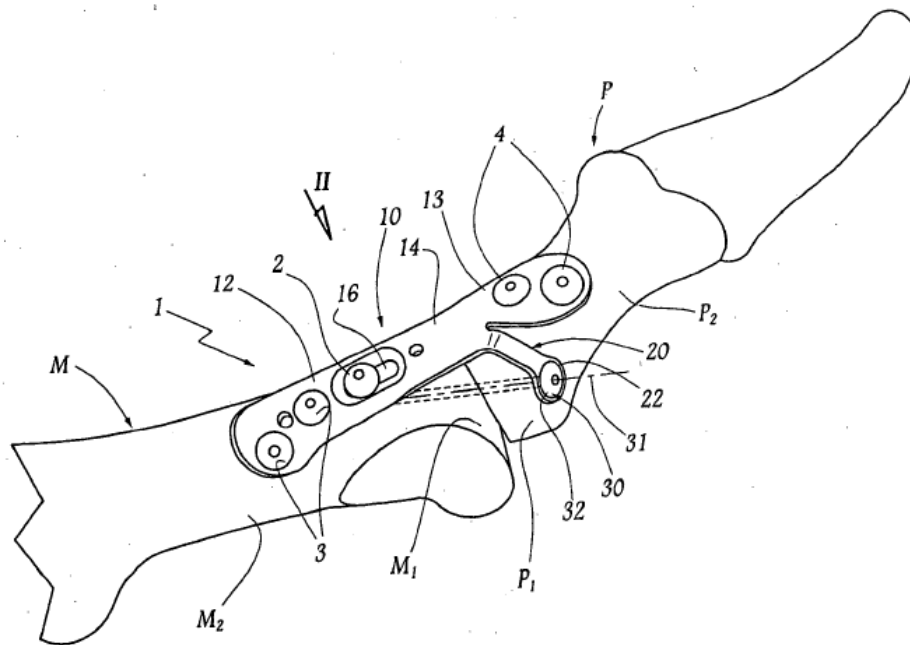
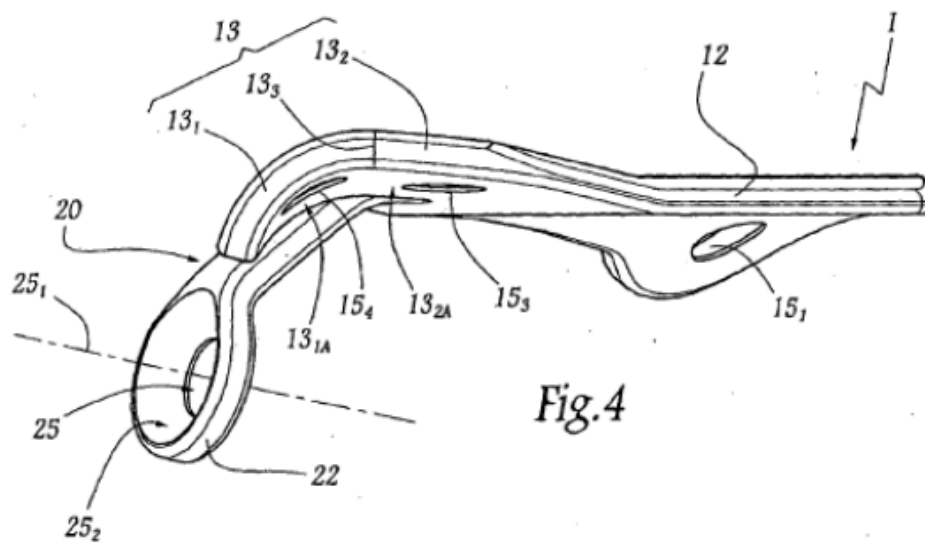


Fig.1

As shown in the figure, screws 4 (i.e., "fixation member[s]" as recited in claim 32) are inserted through holes in the plate 10 into the first bone P (limitation [32b]) and screws 3 are inserted through holes in the plate 10 into the second bone M (limitation [32c]). *Id.* ¶¶ 33–34. Screw 30 is inserted through a hole in plate 10 into the first and second bone such that the free

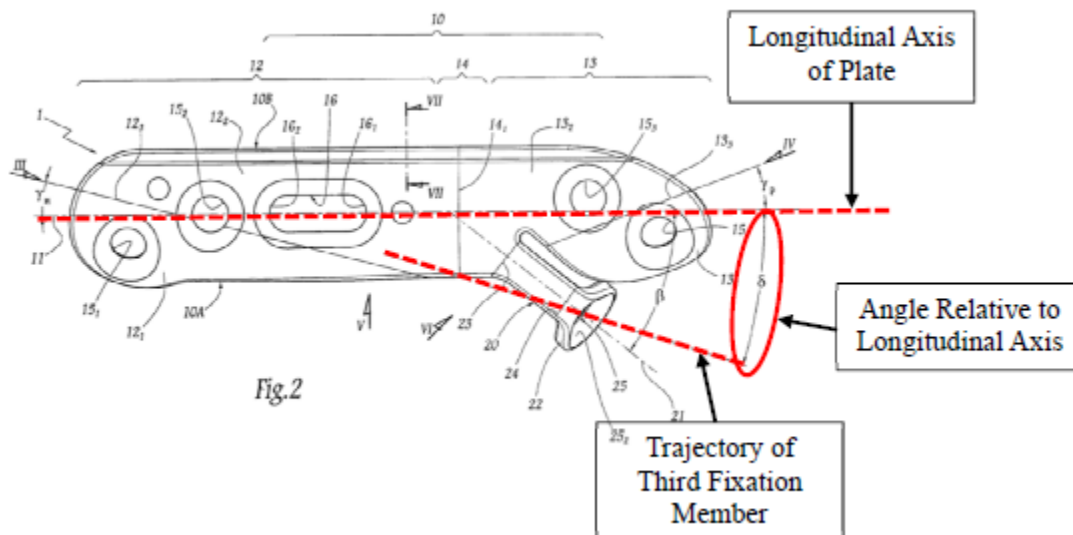
end resides in the second bone and the head 32 of screw 30 resides in the hole (limitation [32d]). *Id.* ¶ 32. Moreover, as shown in Figure 1, screw 30 is the only fixation member that extends across the joint (limitation [32g]).

Arnould also teaches that the hole through which screw 30 extends is configured as recited in limitations [32e] and [32f]. Figure 4 of Arnould, reproduced below, shows hole 25, which Petitioner maps to the “third hole” in claim 32.



As shown in the figure, “the edge 25₂ of this hole has, on the side facing the head 32 of the screw [30], a concave surface which is substantially complementary to an associated surface delimited by this screw head.”

Ex. 1006 ¶ 27. In other words, when the screw is fully inserted, the head of the screw is seated within the hole (limitation [32e]). *Id.* Moreover, hole 25 is angled relative to the longitudinal axis and extends through a thickness in the plate as recited in limitation [32f]. This can be seen in the annotated version of Figure 2 of Arnould offered by Petitioner and reproduced below.



Petitioner adds red dotted lines demonstrating that the trajectory of the third fixation member (i.e., screw 30) through hole 25 is angled relative to the longitudinal axis of the plate.

Patent Owner contends that Arnould does not teach or suggest limitation [32f] because “while the trajectory of screw 30 may be angled, it does not follow that hole 25 is necessarily angled.” Resp. 59. According to Patent Owner, “screw hole 25 is not angled ‘through a thickness of the plate,’ nor would a POSITA consider screw hole 25 to be angled ‘through a thickness of the plate’ as required by the claim. Rather, screw hole 25 appears to have the same geometry as screw holes 15₁, 15₂, 15₃, and 15₄.” *Id.* at 59–60 (citing Ex. 1006, Figs. 1, 2, 4–6; Ex. 2005 ¶¶ 188–89).

We disagree with Patent Owner. The claim does not require that the third hole be at any particular angle, nor does it require that the hole limit the trajectory of the third fixation member to a particular angle relative to the longitudinal axis. All that is required is that the hole be “angled relative to a longitudinal axis of the plate through a thickness of the plate.” Ex. 1001, 5:16–18. Such a configuration is unequivocally shown in Arnould’s figures.

Figure 2 of Arnould shows that hole 25 is disposed at an angle to the longitudinal axis 11 of the plate.⁷ Arnould explains that angle δ in Figure 2 is the angle of axis 31 (labeled in Figure 1) of screw 30 relative to the longitudinal axis 11 of the plate. Ex. 1006 ¶ 27. Arnould teaches that the concave surface of hole 25 “is substantially complementary to an associated surface delimited by” the head of screw 30 such that when the screw “is fully inserted into the hole 25, its head 32 comes to rest and wedge[s] against at least a portion of the edge 25₂, even if its axis 31 is inclined in relation to the axis 25₁ of the hole.” Ex. 1006 ¶ 27. Thus, Arnould teaches that the axis 25₁ of hole 25 (labeled in Figure 4) may be “inclined in relation” to the axis of the screw or it may not be—in which case the axis of screw 30 and the axis of hole 25 would be at the same angle, i.e., angle δ , to the longitudinal axis 11 of the plate *Id.* In either event, the axis of Arnould’s third hole is angled relative to the longitudinal axis of the plate and extends through the thickness of the plate, as recited in limitation [32f].

Arnould additionally discloses this limitation because the inner surface of hole 25 is angled relative to the longitudinal axis of the plate. As shown in Figure 4 of Arnould, the diameter of hole 25 on the outer surface of the plate is larger than the diameter of the hole on the inner surface, resulting in a “concave surface” on the interior of hole 25. *See, e.g.*, Ex. 1006, Fig. 4, ¶ 27. As shown in Figure 4, this concave surface is “angled

⁷ Figure 2 depicts angle β , which is described as the angle of the leg 20 relative to the longitudinal direction of the plate body, and angle δ , which is described as the angle of the longitudinal axis of screw 30 to the plate body. Ex. 1006 ¶¶ 25, 27.

relative to a longitudinal axis of the plate through a thickness of the plate” as recited in limitation [32f].

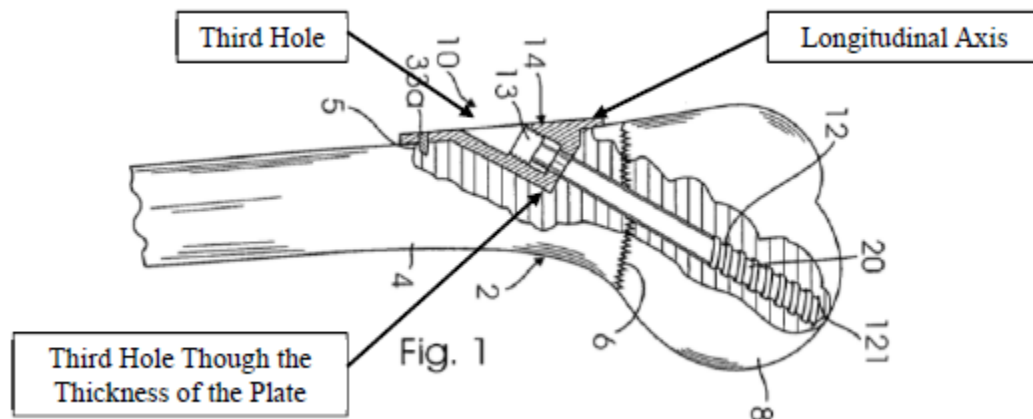
The testimony Patent Owner cites from Mr. Leinsing does not show otherwise. Mr. Leinsing’s testimony appears to be premised on limitations not recited in the claim itself. *See* Ex. 2005 ¶¶ 188–89 (asserting that “[a]ngle β [in Arnould Fig. 2] is formed by the longitudinal direction 11 and longitudinal direction 21 of leg 20, not hole 25” and that “hole 25 is not an ‘angled hole’ as claimed”). Neither Patent Owner, nor Mr. Leinsing, squarely addresses the fact that Arnould’s figures show that both hole 25 and the concave inner surface of that hole are disposed at an angle to the longitudinal axis of the plate. *Id.* In contrast, Mr. Sherman’s testimony is consistent with the figures and written description in Arnould. Ex. 1002 ¶¶ 218–20. Accordingly, we find Mr. Sherman’s testimony on this point to be more credible than the competing testimony from Mr. Leinsing.

For these reasons, Petitioner has demonstrated that Arnould teaches or suggests all of the limitations of claim 32. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 32 would have been obvious over Arnould alone.

We also address Petitioner’s alternative theory that claim 32 would have been obvious over the combination of Arnould and Zahiri.⁸ For this theory, Petitioner relies on Zahiri as additional evidence that a third hole

⁸ The Petition explains that the proposed combination of Arnould with Zahiri is an alternative basis for the unpatentability of claim 32, i.e., “[t]o the extent that Arnould is found to not explicitly disclose” limitation [32f]. Pet. 70; *see also* Reply 25 (explaining that Arnould meets the requirements of claim 32 “without turning to the disclosure of Zahiri, which renders [Patent Owner’s] challenges to the combination with Zahiri irrelevant”).

configured as recited in limitations [32e] and [32f] would have been obvious. *See* Pet. 67–68, 70–71, 72–73. Petitioner illustrates its contentions with an annotated version of Figure 1 of Zahiri, which is reproduced below.



Petitioner annotates Figure 1 above to identify what it calls Zahiri’s “third hole,” which is angled relative to the longitudinal axis of plate 14 such that a screw inserted through the hole is positioned at an angle extending through two bone parts. *Id.* at 71. Petitioner contends “a POSITA would have readily looked to Zahiri for a way to improve the placement” and “integrity of the angled fixation screw” by using “the seated head of the lag screw from Zahiri.” *Id.* at 67–68, 70–71. In other words, Petitioner proposes modifying hole 25 in Arnould’s plate to incorporate the angled hole with a seated screw head configuration depicted in in Figure 1 of Zahiri (referred to hereinafter as “Zahiri’s angled hole configuration”). *See id.* According to Petitioner, a POSITA would have been motivated to make this combination because Zahiri teaches that this arrangement “allows a sufficient amount of force to be applied between bone parts while dissipating the force so that it does not damage the bone parts” and a POSITA would have known that “bone plates configured for arthrodesis [like those taught in Arnould] and bone plates

configured to fuse bone fractures [like those taught in Zahiri] would be used interchangeably.” *Id.* at 58–59 (citing Ex. 1007, 5:65–6:11; Ex. 1002 ¶ 193).

We again find Petitioner’s arguments and evidence persuasive. Figure 1 of Zahiri shows “plate 14” having an angled hole extending through the thickness of the device with a screw inserted to join two bone parts wherein the free end of the screw resides in the second part and is not attached to the plate. Ex. 1007, Fig. 1, 4:58–67. The head of the screw is seated in the hole as recited in limitation [32e], the hole is disposed at an angle relative to the longitudinal axis of the device as recited in limitation [32f]. Zahiri teaches that this configuration is desirable because it dissipates compression forces, which avoids “failure by loosening of the device” and keeps the bone cortex “healthy and intact.” *Id.* at 5:65–6:7. Moreover, Mr. Sherman provides testimony, which we credit, explaining that “bone plates configured for arthorodesis and bone plates configured to fuse bone fractures [like Zahiri’s plate] have been used interchangeably for decades.” Ex. 1002 ¶ 193. Thus, even if Arnould did not itself teach or suggest a third hole configured as recited in limitations [32e] and [32f], Petitioner has shown that its proposed combination of Arnould and Zahiri does and articulated reasoning with rationale underpinning demonstrating that a POSITA would have been motivated to make that combination with a reasonable expectation of success.

Patent Owner contends that Zahiri is not analogous art to the ’713 patent and therefore cannot be combined with Arnould because Zahiri “discloses only a ‘guide plate’” and not “a ‘bone plate,’ as properly defined.” Resp. 35–36. According to Patent Owner, Zahiri’s plate is not a “bone plate” because it “is designed to be positioned on only one side of a

fracture – it does not span any fracture, let alone a joint.” *Id.* at 36; *see also* Sur-reply 23 (arguing that “under the proper construction of ‘bone plate’ . . . Zahiri is *not* a ‘bone plate’”). Moreover, Patent Owner contends that “[t]he Zahiri device does not itself serve as structural support to immobilize the bone segments” and is designed for a “specific procedure.” *See id.* at 36–37.

We disagree with Patent Owner for several reasons. First, the narrow construction of “bone plate” that Patent Owner proposes to distinguish Zahiri is not supported by the record. *See supra* § III.C. We agree with Petitioner that the ordinary meaning of “bone plate” includes plates like those described in Zahiri. *Id.* Second, even if Patent Owner’s construction were correct, the scope of analogous art is broader than Patent Owner contends. A reference is considered to be analogous art if it is in the “same field of endeavor” as the patent at issue. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Here, the Specification states that “[t]he invention relates to the technical field of orthopedic implants.” Ex. 1001, 1:18–19. Zahiri falls squarely within this field of endeavor, describing “fixation devices for compressing bone fractures of a human being.” Ex. 1007, 1:9–11; *see also, e.g., id.* at Fig. 1 (depicting the use of Zahiri’s plate as an orthopedic implant to fix two bone parts). The differences Patent Owner identifies in Zahiri’s device do not show otherwise.

In this regard, the testimony of Mr. Sherman (Ex. 1002 ¶ 191) on this point to be more credible than the competing testimony offered by Mr. Leinsing (*see* Ex. 2005 ¶¶ 124–31, 166). Mr. Sherman persuasively testifies that “Arnould and Zahiri disclose bone plates with diagonal fixation members configured to compress the intersection of a first and second bone or across a fracture,” demonstrating Arnould and Zahiri “are therefore in

analogous fields of invention” to the ’713 patent. Ex. 1002 ¶ 191.

Mr. Leinsing, on the other hand, asserts that Zahiri’s plate is not a bone plate because it is located on only one side of a fracture and therefore does not “span[] both sides of a bone discontinuity.” *See* Ex. 2005 ¶¶ 124–26, 131. For this reason, Mr. Leinsing concludes Zahiri is non-analogous art. *Id.* ¶ 131. Because we find Zahiri discloses a “bone plate” according to the ordinary meaning of that term, Mr. Leinsing’s testimony is unconvincing. *See supra* § III.C. (explaining that the ordinary meaning of “bone plate” does not exclude plates located on only one side of a joint or fracture). But even if we agreed with Patent Owner’s and Mr. Leinsing’s interpretation of bone plate, Zahiri’s plate is still an orthopedic implant and therefore analogous art because it is within the same field of endeavor as the ’713 patent.

Patent Owner’s argument that Zahiri teaches away from a combination with Arnould is also unavailing. *See* Resp. 54–57. Patent Owner asserts that unlike Arnould’s plate, Zahiri’s “rigid guide plate . . . does not allow a surgeon to conform the plate to the anatomy” and “[d]ue to the fixed angle design of Zahiri’s device, the surgeon cannot select the angle of insertion of the lag screw to adapt to the individualized needs of a particular patient.” *Id.* at 56. But those distinctions do not rise to the level of a teaching away. *See Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013) (quoting *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009)) (“A reference does not teach away . . . if it . . . does not criticize, discredit, or otherwise discourage investigation into the invention claimed.”). Moreover, Petitioner’s combination is premised on modifying hole 25 in Arnould’s plate to have

Zahiri’s angled holed configuration. That combination would retain Arnould’s flexible plate, while fixing or at least limiting the angle of screw 30 through the hole. However, Petitioner explains that “Zahiri discloses providing plates with a variety of angles in a kit so the surgeon can choose the plate that will maximize fixation based on the particular needs of the patient.” Reply 21; *see also* Ex. 1007, 3:59–64, 9:1–4 (teaching that the hole may configured in a range of angles to accommodate the device’s use “for a variety of fractures, fusion procedures and osteotomies”). Thus, a POSITA could compensate for the fixed angle and, in any event, the fact that one embodiment may be preferable in some instances does not teach away from the proposed combination. *See UCB, Inc. v. Actavis Labs. UT, Inc.*, 65 F.4th 679, 692 (Fed. Cir. 2023) (explaining that a teaching that one composition is “optimal or standard” or that expresses a “preference” for something does not teach away from other options) (internal quotations omitted).

Patent Owner’s remaining arguments against the combination of Arnould and Zahiri are also unavailing. Patent Owner contends there would have been no reasonable expectation of success because “adding the bulky Zahiri barrel to Arnould’s thin, bendable leg simply would not work.” Resp. 58 (citing Ex. 2005 ¶¶ 177–78). The problem with Patent Owner’s argument is that it assumes the bodily incorporation of Zahiri’s barrel without consideration of a POSITA’s exercise of ordinary skill to apply Zahiri’s teachings to Arnould’s bone plate. It is well-established that a POSITA is understood to exercise “ordinary creativity” and is “not an automaton.” *See KSR*, 550 U.S. at 421. Indeed, as our reviewing court recently observed, “a skilled artisan may be motivated to combine particular features of different references, e.g., to secure some benefits at the expense

of others, even when bodily incorporation would be impossible or inadvisable.” *Axonics, Inc. v. Medtronic, Inc.*, No. 2022-1451, 2022-1452, slip op. at 12 (Fed. Cir. July 7, 2023).

This is the case here where Petitioner is proposing a relatively minor change to Arnould’s plate, i.e., modifying the existing hole 25 in Arnould’s plate to incorporate Zahiri’s angled hole configuration. There is no indication this configuration would not work if adapted to and sized for the dimensions of Arnould’s plate and the anatomy of the metatarsal-phalangeal joint through the exercise of a POSITA’s ordinary creativity. Indeed, Mr. Sherman offers testimony, which we credit, demonstrating that plates for fusing fractures and joints were known to be interchangeable. *See* Ex. 1002 ¶ 193. We find that evidence sufficient under the facts of this case to demonstrate that a POSITA would have had a reasonable expectation of success. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 32 would also have been obvious over the combination of Arnould and Zahiri.

ii. Claim 33

Claim 33 depends from claim 32 and additionally recites that “the third hole is angled by about between 30° and 60° with respect to the longitudinal axis of the plate.” Ex. 1001, 5:20–22.

Petitioner cites Arnould’s teaching that angle δ is “less than 45” degrees. Pet. 74 (citing Ex. 1006 ¶ 27). For the combination of Arnould and Zahiri, Petitioner cites evidence that Zahiri also discloses an angle that “encompasses the claimed range.” *See id.* at 75–77 (citing Ex. 1007, Fig. 4,

3:59–67; Ex. 1002 ¶¶ 229–31). Patent Owner does not dispute Petitioner’s showing for claim 33 separately from its arguments for claim 32.⁹

We agree with Petitioner that Arnould and Zahiri disclose ranges for the angle of the third hole relative to the longitudinal axis of the plate that overlap with the range in claim 33. This overlap is sufficient to show that the range in claim 33 would have been obvious. *See E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1006 (Fed. Cir. 2018) (explaining that “a prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art” and “such overlap creates a presumption of obviousness”) (quotations omitted). Accordingly, Petitioner has shown by a preponderance of the evidence that claim 33 is unpatentable as obvious over Arnould and Zahiri.

iii. Claim 36

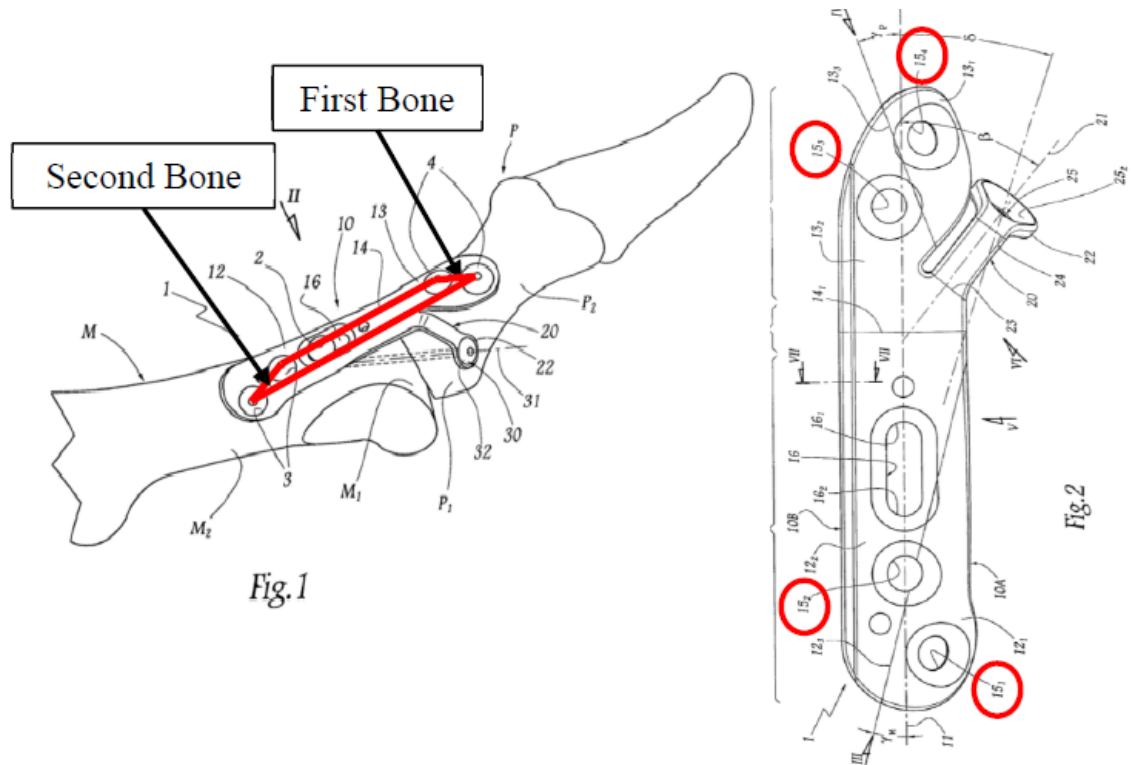
Claim 36 depends from claim 32 and additionally recites:

wherein the plate includes a plurality of holes arranged according to the corners of a triangle or of a quadrilateral, and the method further comprises inserting fixation members into each of the plurality of holes so that some of the fixation members extend into first bone while some of the fixation members extend into the second bone.

Ex. 1001, 6:3–9.

⁹ Petitioner relies on its showing for claim 32 for each of the limitations the dependent claims incorporate by reference from claim 32. To the extent Patent Owner reasserts its arguments for claim 32 for the dependent claims, we find those arguments unavailing for the same reasons discussed above in our analysis of claim 32.

Petitioner contends that Arnould discloses this limitation. Pet. 78–79. Petitioner illustrates its contention with the annotated versions of Figures 1 and 2 of Arnould, reproduced below. *Id.* at 78.



The annotated figures above show “four holes 15₁-15₄ configured in a quadrilateral orientation” and marked with red circles in Figure 2, which “receive screws 3 and 4” highlighted by the red parallelogram Petitioner adds to Figure 1. *Id.* Petitioner explains that “[h]oles 15₁ and 15₂ are configured to receive screws 3 and attach to the metatarsal (second bone), and holes 15₃ and 15₄ are configured to receive screws 4 and attach to the phalanx (first bone).” *Id.* at 79. Petitioner additionally relies on Zahiri’s disclosure of a similar “rectangular (i.e., quadrilateral) orientation” of holes for anchoring its plate to the bone. *See id.* at 79–80.

Patent Owner disputes Petitioner’s showing based on its interpretation of claim 36. Patent Owner asserts:

Claim 36 can be broken down in two parts: (1) “the plate includes a plurality of holes arranged according to the corners of a triangle or quadrilateral” and (2) “inserting fixation members into each of the plurality of holes so that some of the fixation members extend into first bone while some of the fixation members extend into the second bone.” Part (2) informs a POSITA that claim 36 requires more than one “plurality of holes arranged according to the corners of a triangle or quadrilateral.”

Resp. 22. According to Patent Owner, claim 36 requires more than one plurality of holes arranged in a triangle or quadrilateral because “part (2) recites ‘inserting fixation members into *each of* the plurality of holes.’” *Id.* Patent Owner further contends that “because part (2) of claim 36 specifies that ‘*some* of the fixation members extend into *first* bone while *some* of the fixation members extend into the *second* bone,’” one would understand that the claim is referring to at least one plurality of holes on the first bone and at least one plurality of holes on the second bone. *Id.* at 23. Moreover, Patent Owner urges that “[a] POSITA would understand that ‘each of the plurality of holes’ must be on the same side of the bone discontinuity in order to provide the ‘stability of mounting’ described in the ’713 patent.” *Id.* at 22 (quoting Ex. 1001, 2:53–55).

In reply, Petitioner argues that neither the claim language, nor the Specification, support Patent Owner’s interpretation. According to Petitioner, the claim “requires ‘a plurality of holes arranged according to the corners of a triangle or of a quadrilateral,’ not more than one plurality of holes” and “inserting fixation members into ‘the plurality of holes,’ which is the singular plurality previously claimed.” Reply 9. For this reason, Petitioner urges that the “fixation members inserted into the singular plurality of holes must have some extending into the first bone while others

extend into the second bone” and therefore “the triangular or quadrilateral configuration of holes must span the joint so that the screws can extend into both bones.” *Id.* at 9–10. Petitioner contends that Patent Owner’s interpretation renders the word “some” meaningless because Patent Owner “wants to read the claim as requiring all the fixation members for one plurality of holes be on one end and all of the other on the other end.” *Id.* Petitioner argues “[t]his does not comport with the plain language” of the claim and is inconsistent with the interpretation Patent Owner advanced in its preliminary infringement contentions in the related district court proceeding. *Id.* (citing Ex. 1026, 32, 36).

In its sur-reply, Patent Owner argues that the final infringement contentions “developed in consultation with Mr. Leinsing” show that Patent Owner has “interpreted claim 36 in a manner consistent with this proceeding.” Sur-reply 13 (citing Ex. 2024, 34–37). Patent Owner further contends that Petitioner’s interpretation renders portions of the claim superfluous “because with a single ‘plurality of holes’ configuration, it would never be possible to have a triangular hole configuration with ‘some of the fixation members extend[ing] into the first bone’ while ‘some of the fixation members extend into the second bone.’” *Id.* at 13–14.

We determine that Petitioner has the better position. “An indefinite article ‘a’ or ‘an’ in patent parlance carries the meaning of ‘one or more’.” *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008) (quoting *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000)). Indeed, our reviewing court has explained this

is best described as a rule, rather than merely as a presumption or even a convention. The exceptions to this rule are extremely limited: a patentee must evince a clear intent to limit “a” or

“an” to “one.” The subsequent use of definite articles “the” or “said” in a claim to refer back to the same claim term does not change the general plural rule, but simply reinvokes that non-singular meaning. An exception to the general rule that “a” or “an” means more than one only arises where the language of the claims themselves, the specification, or the prosecution history necessitate a departure from the rule.

Id. (internal citations omitted).¹⁰ Here, claim 36 recites “*a* plurality of holes arranged according to the corners of *a* triangle or of *a* quadrilateral.” Thus, according to this rule of claim construction, claim 36 encompasses one or more plurality of holes arranged according to the corners of one or more triangles or one or more quadrilaterals.

The claim language in what Patent Owner calls part (2) of claim 36 is entirely consistent with this interpretation. The phrase “each of” indicates that fixation members are inserted into “each of the plurality of holes,” i.e., a fixation member is inserted into each hole at the corner of the triangle or quadrilateral. This reading is more plausible than Patent Owner’s interpretation, which creates a requirement for at least a second set of holes when the antecedent in part (1) refers to only “a” plurality of holes. Similarly, the requirement that “some” fixation members extend into each bone does not suggest that there must be more than one set of holes. Rather, the more natural reading in this context is that “some” means one or more.

¹⁰ In *Baldwin*, the Federal Circuit rejected an argument that the use of the indefinite article “a” in the phrase “a pre-soaked fabric roll” limited the claim to a single roll. *See* 512 F.3d at 1344. Patent Owner in this case raises a different argument, seeking to limit the phrase “a plurality of holes” to require more than one plurality. However, the general rule that “a” means “one or more” applies with equal, if not more, force here where we are asked to interpret claim 36 such that the singular meaning of the indefinite article would be excluded.

For a single triangular configuration of holes spanning the two bones, this means that claim 36 requires, at minimum, one screw in one bone and two screws in the other. Indeed, this is exactly how Patent Owner interpreted this claim language in the initial infringement contentions that Petitioner cites. *See* Ex. 1026, 33.¹¹

Nor do we see a reason to depart from the general rule that “a” means one or more elsewhere in the intrinsic record of the ’713 patent. All of the figures in the Specification depict a linear arrangement of holes. *See* Ex. 1001, Figs. 1–4. The only passage in the Specification Patent Owner identifies as relevant to claim 36 states that the holes “can be aligned or arrayed, all or in part, according to the corners of a triangle or of a quadrilateral. These provisions, in triangle or quadrilateral, of the screws, improve the stability of the mounting.” Ex. 1001, 2:50–54. This passage says nothing about Patent Owner’s alleged requirement that there be more than one set of holes in a triangle or quadrilateral pattern. To the contrary, the Specification, like claim 36, uses the indefinite article “a” to refer to “a triangle” and “a quadrilateral,” which as a general matter would encompass a single triangular or single quadrilateral set of holes. Moreover, neither party identifies anything in the prosecution history relating to the interpretation of claim 36. Thus, there is nothing in the intrinsic record of the ’713 patent that supports Patent Owner’s attempt to depart from the “general rule” that “a” means “one or more,” much less does the intrinsic record evince the “clear intent” required to “necessitate a departure from th[at] rule.” *See Baldwin*, 512 F.3d at 1342.

¹¹ The fact that Patent Owner subsequently changed these contentions does not suggest that its initial interpretation was incorrect or unreasonable.

The testimony Patent Owner cites from Mr. Leinsing is unpersuasive. *See* Resp. 22, 63 (citing Ex. 2005 ¶¶ 96–101, 194–97). As an initial matter, this testimony is extrinsic evidence and therefore does not provide a convincing reason to construe claim 36 as Patent Owner suggests. *See Baldwin*, 512 F.3d at 1342 (“An exception to the general rule that “a” or “an” means more than one only arises where the language of *the claims themselves, the specification, or the prosecution history* necessitate a departure from the rule.”) (emphasis added). Second, this testimony is largely conclusory, repeating Patent Owner’s claim construction arguments above, and concluding, without further explanation, that “a POSITA would recognize that each grouping of holes that makes up the ‘plurality of holes arranged according to the corners of a triangle or quadrilateral’ must be on the same side of the bone discontinuity.” *See* Ex. 2005 ¶¶ 100–101. Third, Mr. Leinsing does not attempt to reconcile his testimony with the fact that claim 36 recites only “a” plurality of holes as antecedent. Accordingly, we do not find Mr. Leinsing’s testimony credible regarding the proper interpretation of claim 36.

For these reasons, we interpret claim 36 to encompass one or more pluralities of holes arranged according to the corners of a triangle or quadrilateral, wherein fixation members are inserted into each of those holes with some of the fixation members extending into the first bone and some extending into the second bone.

Petitioner has shown that Arnould teaches this limitation.¹² As demonstrated by Petitioner’s annotations to Figure 2 of Arnould, holes 151–

¹² We do not need to reach Petitioner’s additional argument that Zahiri separately teaches the additional limitation recited in claim 36.

15₄ of plate 10 are arranged according to the corners of a quadrilateral. Ex. 1006, Figs. 1–2. Arnould teaches that screws 4 are inserted into holes 15₃ and 15₄ and extend into the phalanx and screws 3 are inserted into holes 15₁ and 15₂ and extend into the metatarsal. *Id.* at Fig. 1, ¶¶ 33–34. Thus, Arnould teaches that some of the fixation members inserted into these holes extend into a first bone and some of those fixation members extend into the second bone. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 36 is unpatentable as obvious over Arnould and Zahiri.

iv. Claim 37

Claim 37 depends from claim 36 and additionally recites:

wherein the plate is curved so as to adapt to the curvature of at least one of the first and second bones, and the method further comprises inserting a plurality of fixation members into the plurality of holes so that at least one of the plurality of fixation members is angled with respect to another of the plurality of fixation members.

Ex. 1001, 6:11–16.

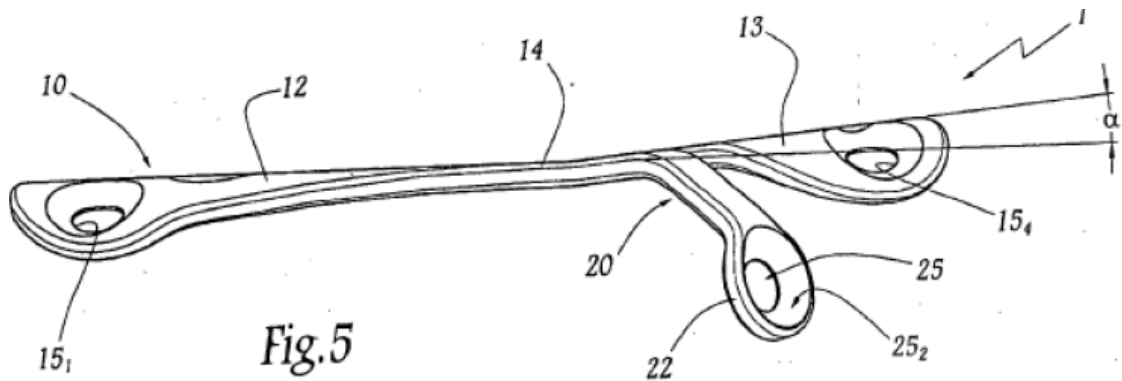
Petitioner contends that Arnould discloses this limitation. Pet. 80–82. According to Petitioner, Arnould’s bone plate is contoured “to secure the metatarsal and phalangeal and to conform to the upper surface of the diphyseal portion of the metatarsal.” *Id.* (citing Ex. 1006, Figs. 3–6, ¶¶ 15, 39). Petitioner further asserts that the screws 3 and 4 as well as screw 30 in Figure 1 of Arnould are angled relative to each other. *Id.* at 82; *see also* Reply 26–27 (arguing that “Arnould discloses a countered plate that would result in the identified fixation members in each end going in at different angles from one another”).

In addition to reasserting its arguments for claims 32 and 36,¹³ Patent Owner contends that “Petitioner’s analysis of claim 37 is flawed.” Resp. 65. According to Patent Owner, “the antecedent basis for the ‘plurality of fixation members’ is found in claim 36,” and therefore screw 30 is “not one of the plurality of fixation members Petitioner identified in claim 36.” *Id.*

We find Petitioner’s arguments and evidence persuasive. Arnould teaches a bone plate that is “shaped to conform to the upper surface of the diaphyseal portion M₂ of the metatarsal M – that is to say, to come into contact with this diaphysis while partially covering it in a fitted manner, as shown in Figure 1.” Ex. 1006 ¶ 15; *see also id.* ¶ 39 (teaching that the plate is “cut in accordance with predetermined contours in order to secure the metatarsal 12 and phalangeal 13 parts”). Thus, Arnould teaches a plate curved to adapt to the curvature of the first and second bones as recited in claim 37.

Because of this contour, at least some of screws 3 and screws 4 will be angled with respect to each other when inserted into their respective holes. For example, Figure 5 of Arnould, reproduced below, provides a side view of Arnould’s plate with the longitudinal axis extending along the plane of the page.

¹³ For the same reasons discussed above, these arguments are also unavailing for claim 37.



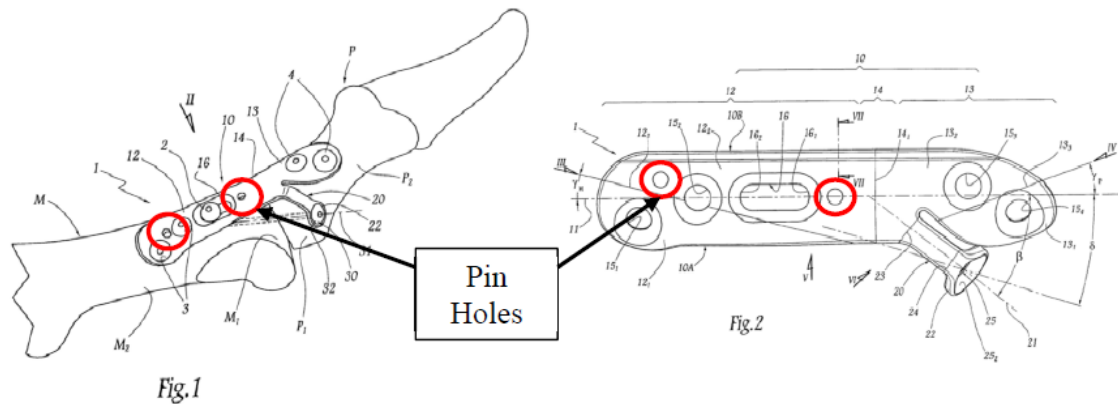
As shown in the figure above, holes 15₁ and 15₄ are positioned below the other holes along the plate's longitudinal axis. When screws 3 and 4 are inserted into these holes, as shown, e.g., in Figure 1 of Arnould, those screws will be at an angle relative to the screws inserted in the holes along the longitudinal axis. *See also, e.g., id.* at Fig. 4 (depicting hole 15₄ at an angle to hole 15₃). Thus, even accepting Patent Owner's argument that the antecedent for the plurality of holes recited in claim 37 excludes consideration of hole 25 and screw 30, Petitioner has demonstrated that at least some of screws 3 and 4 will be angled with respect to each other and thus meet the limitations recited in claim 37. Accordingly, Petitioner has shown by a preponderance of the evidence that claim 37 is unpatentable as obvious over Arnould and Zahiri.

v. *Claim 38*

Claim 38 depends from claim 37 and additionally recites the step of "inserting a temporary fixation pin into a hole in the plate to temporarily affix the plate to bone." Ex. 1001, 6:16–18.

Petitioner contends this limitation would have been obvious in view of Arnould. Pet. 83. Petitioner asserts that Arnould's "figures show pin holes that are used to temporarily secure the plate with k-wires during the

implantation process.” Pet. 59–60, 82–83. Petitioner provides annotated versions of Figures 1 and 2 of Arnould, reproduced below, to illustrate this contention. *Id.* at 60.



In the annotated figures, Petitioner adds red circles to identify the pin holes shown in Figures 1 and 2 of Arnould. Petitioner acknowledges that “Arnould does not explicitly describe the use of k-wires,” but argues that a POSITA would recognize these holes in Arnould’s plate to be “pin holes” intended for this purpose because “K-wires are commonly used for temporary placement and immobilization of bone plates so that the surgeon can correctly position and align a plate.” *Id.* at 83 (citing Ex. 1002 ¶¶ 194, 240).

Petitioner also asserts that Zahiri “discloses additional pins that ‘are designed to temporarily lock in the plate by applying the pins to penetrate through the hole of the plate and partially into the inside of the bone segment so that it creates a user friendly condition for a surgeon to place the disclosed device at a desired location.’” Pet. 83 (quoting Ex. 1007, 3:10–18); *see also id.* (annotating Figure 8 of Zahiri to identify “pin holes” in Zahiri’s plate). According to Petitioner, such “[u]se of temporary fixation pins was common at the time of invention, and would have been readily utilized by a

POSITA given the explicit disclosure in Zahiri and the desire to temporarily secure Arnould's plate." *Id.* at 84 (citing Ex. 1002 ¶ 242).

Patent Owner argues that "Petitioner concedes, 'Arnould does not explicitly describe the use of k-wires,' and "the holes that Petitioner refers to [in Figures 1 and 2] are never discussed in Arnould." Resp. 65–66 (quoting Pet. 82, citing Ex. 2005 ¶ 203).

Regarding Petitioner's argument that it would have been obvious to incorporate Zahiri's temporary guide pins and holes, Patent Owner argues that combination is "based on impermissible hindsight." Resp. 57. According to Patent Owner, "the Arnould plate is not at risk for unwanted torqueing or spinning because (1) it is contoured to the metatarsal and phalanx, with a leg wrapping around the phalangeal epiphysis, and (2) Arnould discloses a way to align the plate prior to insertion of the cross screw by inserting screw 2 into oblong hole 16 without tightening the screw head against the edge of the hole, allowing displacement only in the direction 11 relative to the metatarsal M." *Id.* (citing Ex. 1006 ¶ 31; Ex. 2007 ¶¶ 65, 44–45). For these reasons, Patent Owner contends that "proper alignment and partial immobilization during implantation is obtained in Arnould *without* the need for Zahiri's temporary fixation features." *Id.* at 58 (citing Ex. 2007 ¶¶ 63–66, 44–45; Ex. 2005 ¶ 182).

In Reply, Petitioner points out that Patent Owner does not dispute that both Arnould and Zahiri disclose pin holes as recited in claim 38. Reply 27. Petitioner urges that "the oblong holes [Patent Owner and its declarants] Dr. Holmes and Mr. Leinsing refer to allow for movement of the plate along the longitudinal axis (direction 11 shown in Figure 2), not stabilization of the plate." *Id.* According to Petitioner, the fact that Arnould also "includes the

smaller holes [identified in Petitioner’s annotated figures] indicates k-wires or other temporary fixation devices would be used and would assist with placement.” *Id.*

In its Sur-reply, Patent Owner reiterates its position, urging that Petitioner “conceded that Arnould does not disclose claim 38,” and there is “no credible evidence that . . . a POSITA **would** have been motivated to include Zahir’s so-called ‘temporary pin holes.’” Sur-reply 32–33.

We find Petitioner’s arguments and evidence persuasive. Mr. Sherman testifies that: (1) k-wires were “commonly used for temporary placement and immobilization of bone plates so that the surgeon can correctly position and align a plate”; and (2) a POSITA would have understood Arnould’s figures to “show pin holes that are intended to be used to temporarily secure the plate with k-wires during the implantation process.” Ex. 1002 ¶¶ 194, 240. Neither of Patent Owner’s declarants dispute this testimony. *See* Tr. 64:3–11 (Patent Owner’s counsel acknowledging there is “no testimony that [Mr. Sherman] is wrong” on these two points). Mr. Leinsing points out that “the holes that Mr. Sherman refers to are never discussed in Arnould,” which is true. Ex. 2005 ¶ 203. However, the fact that Arnould does not expressly say what the holes Petitioner identifies in Figures 1 and 2 are used for does not rebut Mr. Sherman’s testimony that a POSITA would understand them to be pin holes intended for use with k-wires to temporarily secure the plate to the bone during implantation, which was a common practice in the art. *See* Ex. 1002 ¶¶ 194, 240; *see also* Ex. 2009, 80:15–81:13 (additional testimony regarding the use of k-wires in the art). Accordingly, the preponderance of the evidence supports Petitioner’s argument that Arnould itself reasonably suggests the step recited in claim 38.

Even if Arnould did not itself suggest such a step, we find that it would have been obvious to incorporate Zahiri's temporary fixation pins for use with Arnould's plate. Zahiri discloses the use of pins inserted through holes in the plate to temporarily fix the plate to the bone before the permanent screws are inserted. Ex. 1007, 3:10–18. Zahiri also teaches that those pins are removed after the screws are inserted. *Id.* at 7:63–66. Given that Arnould's plate already has pin holes that Mr. Sherman testifies are intended for use with k-wires, we agree with and credit Mr. Sherman's testimony that a POSITA would have been motivated to incorporate the temporary fixation pins expressly taught in Zahiri to ensure correct placement of Arnould's plate. *See* Ex. 1002 ¶¶ 194–96, 240–42.

Patent Owner's argument that there would have been no need for this combination because Arnould obtains proper placement via other mechanisms is unavailing. As an initial matter, Patent Owner's argument ignores the fact that Arnould's figures depict pin holes in the plate. *See* Ex. 1002, 194 (annotating Figures 1 and 2 of Arnould to identify the "pin holes"). If it were true, as Patent Owner asserts, that there is no need for temporary fixation pins given the configuration of Arnould's plate, then there would be no reason for those pin holes. Yet, those holes are clearly depicted in Arnould's figures, and Patent Owner offers no alternative explanation for their purpose. Moreover, the other mechanisms Patent Owner points to only provide for partial immobilization of the plate. *See* Ex. 1006 ¶ 31 (explaining that the plate is "partially immobilized using the oblong hole 16" and screw 2 "without tightening the screw head against the edge of the hole" so that the "plate body 10 remains displaceable in the direction 11 relative to the metatarsal M"); Ex. 2005 ¶¶ 44–45 (annotating

hole 16 and screw 2 in Figure 1 of Arnould and explaining how this mechanism “partially immobilize[s]” the plate body during surgery while allowing the plate to remain displaceable in direction 11). The fact that Arnould teaches that its plate is partially immobilized using hole 16 and screw 2 does not obviate the motivation to use k-wires or incorporate Zahiri’s temporary fixation pins to further immobilize the plate, either before or after the insertion of screw 2, to ensure correct alignment. For these reasons, we find Mr. Sherman’s testimony (Ex. 1002 ¶¶ 194–97, 240–43) to be more credible than the competing testimony Patent Owner cites from Mr. Leinsing and Dr. Holmes (Ex. 2005 ¶ 182; Ex. 2007 ¶¶ 44–45, 63–66).

Accordingly, Petitioner has shown by a preponderance of the evidence that claim 38 is unpatentable as obvious over Arnould and Zahiri.

vi. Claim 39

Claim 39 depends from claim 32 and additionally recites “the joint is one of the anatomical joints of the human body in the foot or hand.” Ex. 1001, 6:19–20.

Petitioner asserts that “Arnould discloses a bone plate for arthrodesis of the metatarsophalangeal joint which is a joint within the foot.” Pet. 85 (citing Ex. 1006, Fig. 1, ¶ 5; Ex. 1002 ¶ 244). Patent Owner does not dispute Petitioner’s showing for claim 39 separately from its arguments for claim 32.

We agree with Petitioner that Arnould discloses the use of its bone plate for arthrodesis of a joint in the foot. Ex. 1006, Fig. 1 (depicting implantation of plate 10 across the metatarsal-phalangeal joint), ¶ 5; Ex. 1002 ¶ 244. Accordingly, Petitioner has shown by a preponderance of

the evidence that claim 39 is unpatentable as obvious over Arnould and Zahiri.

F. Ground 5: obviousness over Arnould, Zahiri, and Myerson

Petitioner contends claims 34 and 35 would have been obvious over Arnould, Zahiri, and Myerson. *See* Pet. 86–88. Claim 34 depends from claim 32 and additionally recites that “the first and second holes are locking holes.” Ex. 1001, 5:23–24. Claim 35 depends from claim 34 and further recites that those “holes are threaded.” *Id.* at 6:1–2. For the limitations incorporated from independent claim 32, Petitioner relies on the same showing discussed above for Ground 4. Pet. 87. Petitioner relies on Myerson for its teaching regarding locking and threaded holes. *Id.* at 87–88.

According to Petitioner, “Myerson identifies a known method for securing screws and preventing screws from backing out: use of locking screws with locking threaded holes.” *Id.* at 88 (citing Ex. 1008 ¶ 22). Petitioner argues “a POSITA would have been motivated to combine this teaching from Myerson with Arnould’s plate . . . because the use of locking screws with locking threaded holes [was] a known technique to prevent the screws from backing out” and, therefore, Myerson “provides a solution and a predictable result . . . to the known problem of screws loosening and backing out over time.” *Id.* (citing Ex. 1002 ¶¶ 250–52).

We find Petitioner’s arguments and evidence persuasive. Myerson describes a bone plate for fusion of the “metatarso-phalangeal (MTP) joint,” i.e., the same joint on which Arnould teaches its plate is used. Ex. 1008, code (57), Fig. 1, ¶¶ 1–2. Myerson teaches that in one embodiment, the screw holes in its plate are “designed to receive locking screws, such as by

the incorporation of locking threads . . . within the screw hole.” *Id.* ¶ 22.

Thus, Myerson teaches the additional limitations recited in claims 34 and 35 for use in the same kind of bone plate taught in Arnould.

Moreover, Mr. Sherman testifies that the use of locking screws with locking threaded holes was a predictable solution to the known problem of screws loosening and backing over time. Ex. 1002 ¶¶ 251–52. This testimony is supported by teachings in Myerson and other references cited by Petitioner. *See* Ex. 1004, 2:9–14 (noting that screws can “unscrew[] from the bone pieces and mov[e] out of the fixation plate once and after the fixation plate and screws have been firmly installed in the bones”); Ex. 1008 ¶ 22 (explaining that “[t]he locking threads can be of a variety of known configurations”). Accordingly, we find Mr. Sherman’s testimony credible and persuasive to show that it would have been obvious to incorporate Myerson’s threaded locking holes in Arnould’s plate with a reasonable expectation of success.

In addition to its arguments for claim 32 in Ground 4, which are unavailing for the reasons discussed above, Patent Owner argues that “Petitioner has not demonstrated a motivation to combine Arnould, Zahiri, and Myerson.” Resp. 66. According to Patent Owner,

Petitioner relies on its flawed motivation to combine analysis of Arnould and Zahiri from Ground 4 and separately contends that a POSITA would be motivated to combine the teachings of Myerson to modify the Arnould bone plate. However, Petitioner never demonstrates that a POSITA would have been motivated to combine all three references together.

Id. at 66–67 (internal citations omitted).

We disagree with Patent Owner. While it is true, as Patent Owner points out, that our reviewing court has “reversed Board decisions that found

a motivation to combine where the petitioner presented only threadbare arguments to support its combination, let alone where a party entirely failed to address one of the references it sought to combine,” those are not the situation here. *See* Resp. 67 (quoting *Apple Inc. v. MPH Techs. Oy*, No. 2021-1355, 2022 WL 4103286, at *7 (Fed. Cir. Sept. 8, 2022) (“*MPH Techs*”).¹⁴ Rather, as explained above, Petitioner has articulated sufficient reasoning with rationale underpinning for combining both Zahiri’s angled hole configuration and Myerson’s threaded locking holes with Arnould’s plate.

Moreover, even if Petitioner’s rationale and associated showing for combining Zahiri with Arnould were not sufficient, Petitioner has shown that Arnould alone teaches or suggests all of the limitations of claim 32. *See supra* § III.E.i. Thus, claims 34 and 35 would have been obvious over Arnould and Myerson even without the teachings in Zahiri. Accordingly, Petitioner has shown by a preponderance of the evidence that claims 34 and 35 are unpatentable as obvious over Arnould and Myerson with or without Zahiri.

G. Grounds 1–3

Having determined that all of the challenged claims are unpatentable as obvious over the references in Grounds 4 and 5, we need not reach

¹⁴ In *MPH Techs*, the petitioner did not cite or address a reference, Ahonen, in its grounds for certain dependent claims even though those claims depended from a claim in another ground relying on Ahonen. 2022 WL at *7. Thus, that case dealt with a situation “where a petitioner did not address all of a claim’s limitations in its petition.” *Id.* at *8. Here, however, Petitioner addresses all of the limitations of claims 34 and 35, including those incorporated from claim 32.

Petitioner’s argument that those same claims are also unpatentable as obvious over the references in the Grounds 1–3. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”). Accordingly, we do not reach those grounds.

H. Patent Owner’s Objections to Demonstratives

Patent Owner filed objections to certain demonstrative slides that Petitioner served for the oral hearing. *See* Paper 35, 1–2. Most, if not all, of Patent Owner’s objections are moot because they relate to slides for grounds we do not reach in this decision. In any event, Petitioner’s demonstratives are not evidence and we do not rely on them herein. *See* PTAB Consolidated Trial Practice Guide (Nov. 2019), 84 (explaining that demonstratives are merely “aids to oral argument and not evidence” and therefore “the Board has not found that such objections are helpful in many cases”). Thus, we do not sustain Patent Owner’s objections.

IV. CONCLUSION¹⁵

Petitioner has shown, by a preponderance of the evidence, that claims 32–39 of the ’713 patent are unpatentable.

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
32, 33, 36, 37 ¹⁶	103	Slater		
34, 35, 39 ¹⁷	103	Slater, Myerson		
32, 33, 38 ¹⁸	103	Slater, Zahiri		
32, 33, 36–39	103	Arnould, Zahiri	32, 33, 36–39	
34, 35	103	Arnould, Zahiri, Myerson	34, 35	
Overall Outcome			32–39	

V. ORDER

Accordingly, it is:

ORDERED that Petitioner has shown that claims 32–39 of U.S. Patent 9,078,713 B2 are unpatentable;

Decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), 42.8(b)(2).

¹⁶ As explained above, we do not reach this ground. See *supra* § III.G.

¹⁷ As explained above, we do not reach this ground. See *supra* § III.G.

¹⁸ As explained above, we do not reach this ground. See *supra* § III.G.

FURTHER ORDERED that Patent Owner's objections to Petitioner's Demonstrative Slides (Paper 35) are not sustained; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2022-00487
Patent 9,078,713 B2

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