

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

XINIAL SYSTEMS GMBH & CO. KG,
Petitioner,

v.

MEDMIX SWITZERLAND AG,
Patent Owner.

IPR2022-01462
Patent 9,010,578 B2

Before JEFFREY N. FREDMAN, MICHAEL L. WOODS, and
CYNTHIA M. HARDMAN *Administrative Patent Judges*.

FREDMAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Xinial Systems GmbH & Co. KG (“Petitioner”), on September 14, 2022, filed a Petition to institute *inter partes* review of claims 1–3, 9–13, 16, and 17 (“the challenged claims”) of U.S. Patent No. 9,010,578 B2 (Ex. 1001, “the ’578 patent”). Paper 2 (“Pet.” or “Petition”). Medmix Switzerland AG (formerly known as Sulzer Mixpac AG) (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

A decision to institute under § 314 may not institute on fewer than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). In addition, if the Board institutes trial, it will “institute on all grounds in the petition.” PTAB Consolidated Trial Practice Guide, 5–6 (Nov. 2019); *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

Having considered the arguments and evidence presented in the Petition and the Preliminary Response, for the reasons described below, we institute *inter partes* review.

II. REAL PARTIES-IN-INTEREST

Petitioner identifies Kettenbach GmbH and Co. KG, Kettenbach LP, Libertaum GmbH & Co. KG, Libertaum Beteiligungs GmbH, 31med GmbH, 4Kettenbach Inc., and Management Inc. as the real parties-in-

interest. Pet. 92. Patent Owner identifies Medmix Switzerland AG as the real party-in-interest. Paper 5, 2.

III. RELATED MATTERS

The Petition states that the '578 patent is involved in litigation in the Eastern District of New York, specifically *Sulzer Mixpac AG v. Kettenbach GmbH and Co. KG et al*, No. 2:21-cv-06613, filed on Nov. 26, 2021. Pet. 93.

IV. THE '578 PATENT

The '578 patent issued April 21, 2015, from a PCT application filed June 29, 2010. Ex. 1001, codes (45), (22). The '578 patent claims the priority benefit of an EP 09405177 application filed August 9, 2012. *Id.*, code (30).

As background, the '578 patent¹ explains the “invention relates to a discharge arrangement comprising a cartridge or syringe for at least two components and comprising an accessory part, with one connecting component of a connecting device being arranged on the syringe or cartridge and another on the accessory part.” Ex. 1001, 1:17–21.

The '578 patent explains that the prior art teaches a “discharge arrangement having a connecting device with bayonet closure parts, wherein the bayonet claws are beveled in order to guide the tongue-like projections of the bayonet closure part axially on the accessory part and tighten the latter.” Ex. 1001, 1:25–28. The '578 patent further explains that the prior art teaches a “discharge arrangement comprising a two-component cartridge

¹ We cite to the '578 patent using column and line numbers, not the Exhibit page numbers.

the circumference and whose incline and shape correspond substantially to the ramps on the accessory part.

Id. at 5:22–27, 6:14–17.

The '578 patent further teaches that even with the prior art disclosures it is still desirable to make some improvements to a discharge arrangement of this kind in order to further increase its user friendliness. Proceeding from this prior art, a first object is to produce a reliable and rapid connection between the cartridge and the accessory part in such a way that, with little force being applied, the accessory part can be secured sealingly on the cartridge and can also be lifted from the cartridge.

Ex. 1001, 2:12–20.

V. ILLUSTRATIVE CLAIMS

The '578 patent includes one independent claim (claim 1), which is challenged here. Claim 1 is illustrative of the other challenged claims and reads (with bracketed letters added to identify the elements):

1. [1P] A discharge arrangement, comprising:
 - [1A] an accessory part with at least two inlets;
 - [1B] a cartridge for at least two components,
 - [1C] wherein the cartridge has at least two chambers for in each case one of the components and has at least two outlets, complementary to the inlets, for the components,
 - [1D] wherein each of the outlets is adapted to be plugged into one of the inlets, or vice versa; and
 - [1E] a connecting device with a first connecting component, which is arranged on the accessory part, and a second connecting component, which is complementary to the first connecting component and is arranged on the cartridge,
 - [1F] wherein one of the connecting components comprises a socket and the other connecting component comprises a connector part that is adapted to be inserted into the socket along a longitudinal direction,
 - [1G] wherein first engagement parts of a rotational guide placed at an incline to the longitudinal direction are provided on an outer circumference of the connector part, and

- [1H] corresponding second engagement parts of the rotational guide are provided on the inner circumference of the socket,
- [1I] wherein the connecting components are adapted to be rotated into each other over an effective connecting section along the rotational guide after the connector part has been plugged into the socket,
- [1J] wherein one of the engagement parts comprises guide grooves and the other engagement parts cooperating with the guide grooves comprise at least two ramps, which are designed corresponding to the guide grooves, and
- [1K] wherein the guide grooves and the at least two ramps are adapted to be brought increasingly into engagement with each other while being guided in the axial direction and to be disengaged from each other while being guided over an effective connecting section in the axial direction, such that, when the connection is established, the accessory part is positively guided towards the cartridge in a constrained manner, and such that, when the connection is released, the accessory part is lifted from the cartridge in a positively guided manner to cause a constrained lifting.

Ex. 1001, 9:48–10:23.

VI. PROSECUTION HISTORY

The Examiner initially rejected the claims in a non-final action as anticipated or obvious over Keller '196² (Ex. 1009) alone or with Keller '631³. Ex. 1002, 281–282. Appellant amended the claims and argued the claims were not anticipated or obvious. Ex. 1002, 308.

In the Final Office Action, the Examiner entered a new rejection that found the claims obvious over Colin⁴ with Keller '631. Ex. 1002, 316. Next, there was an interview with the Examiner and the filing of a request for continued examination. Ex. 1002, 324, 327. Applicant submitted an

² Keller, WO 2008/113196 A1, published Sept. 25, 2008.

³ Keller, US 6,135,631, issued Oct. 24, 2000.

⁴ Colin et al., US 5,033,610, issued July 23, 1991.

amendment. Ex. 1002, 334. The Examiner entered a new non-final rejection with indefiniteness, anticipation over An,⁵ and obviousness grounds over various combinations of An, Keller '631, Keller '624⁶, and Keller '631. Ex. 1002, 348. In response, Applicant filed an amendment and perfected priority to German Patent Application No. 09405177.8. Ex. 1002, 376, 388. The Examiner issued the application. Ex. 1002, 416.

VII. ASSERTED GROUNDS

Petitioner asserts that claims 1–3, 9–13, 16, and 17 are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)
1–3, 9–13, 16, 17	103	Keller '574, ⁷ Yu ⁸
1–3, 16	103	Heusser, ⁹ Yu
10, 11, 13, 17	103	Heusser, Yu, Keller '574

Petitioner also relies on the declaration of Bruce K. Gates, Ph.D., in support of the asserted grounds. Ex. 1003. Patent Owner has filed rebuttal evidence including Drake¹⁰ and Keller '737¹¹ and a Declaration by Daniel P. Brown, Ph.D. (Ex. 2001).

VIII. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner proposes that a person of ordinary skill in the art (“POSITA”) at the time of the invention “would have had a minimum of a bachelor’s degree in mechanical engineering, chemical engineering, or similar field, and *one year of experience* designing or using apparatuses

⁵ An, US 8,746,509 B2, issued June 10, 2014.

⁶ Keller, WO 2007/098624 A1, published Sept. 7, 2007.

⁷ Keller, US 6,769,574, issued Aug. 3, 2004.

⁸ Yu, CA 1,238,023, issued June 14, 1988.

⁹ Heusser et al., US 6,161,730, issued Dec. 19, 2000.

¹⁰ Drake, US 4,538,920, issued Sept. 3, 1985.

¹¹ Keller, EP 1,440,737 A1, published Jan. 24, 2003 (German language).

intended to store, mix, and/or discharge one or more stored substances.”
Pet. 9 (citing Ex. 1003 ¶¶ 65–66; emphasis added).

Patent Owner proposes that the POSITA “would have a bachelor’s degree in mechanical engineering, chemical engineering, or equivalent training, and approximately *5 years of experience* working in the field of polymer science and application, particularly with plural component meter mix dispensers.” Prelim. Resp. 20 (emphasis added).

While we appreciate that the parties differ on the number of years of experience, we do not find a difference that affects our Decision. The parties may provide briefing at trial, if appropriate, to explain why adoption of one definition over the other changes the remaining analysis.

We also note the level of ordinary skill in the art usually is evidenced by the prior art references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

IX. CLAIM CONSTRUCTION

We interpret claim terms using “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b) (2020). Thus, claim terms “are generally given their ordinary and customary meaning” as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (citations omitted) (en banc).

Here, we construe only those claim terms that require analysis to determine whether to institute *inter partes* review. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc.*

v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 803 (Fed. Cir. 1999)); *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’”).

Petitioner asserts that the “term ‘mutually complementary coding means’ [which appears in claim 13] is presumptively governed by pre-AIA 35 U.S.C. § 112, ¶6. . . . and the Board should treat it as a means-plus-function term.” Pet. 10.

Patent Owner states “[n]o claim construction is necessary.” Prelim. Resp. 19.

We agree with Patent Owner because on the current record, there is no controversy over the meaning of the term and Petitioner does not identify any way that claim construction impacts the decision. If the parties believe that further argument on any claim term’s interpretation is needed to resolve any disputed issue, they may and are encouraged to provide such argument in briefing permitted in trial.

X. ANALYSIS

A. Introduction

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

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) objective evidence of nonobviousness.¹² *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

The obviousness inquiry also typically requires an analysis of “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). A petitioner cannot prove obviousness with “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Rather, a petitioner must articulate a sufficient reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

We analyze the asserted grounds of unpatentability in accordance with these principles to determine whether Petitioner has met its burden to establish a reasonable likelihood of success at trial.

¹² At this stage of the proceeding, the parties do not present arguments or evidence related to objective indicia of nonobviousness. Therefore, objective evidence of nonobviousness does not constitute part of our analysis in this Decision

B. Overview of the Asserted Prior Art

1. *Keller '574 (Ex. 1005)*

Keller '574¹³ is an issued US patent that describes a “a dispensing assembly having coded attachment of an accessory to a dispensing device, particularly attachment of a mixer to a multiple component cartridge.”

Ex. 1005, 1:21–24. Keller '574 explains that:

There exists a need to connect and attach a mixer or accessory to a multiple component cartridge or dispensing device in a predetermined orientation, such as when cartridge outlets or mixer inlets are of a different size for different relative mixing ratios or when special high ratio mixers are used for greater mixing efficiency and when mixers or accessories are refitted for reuse.

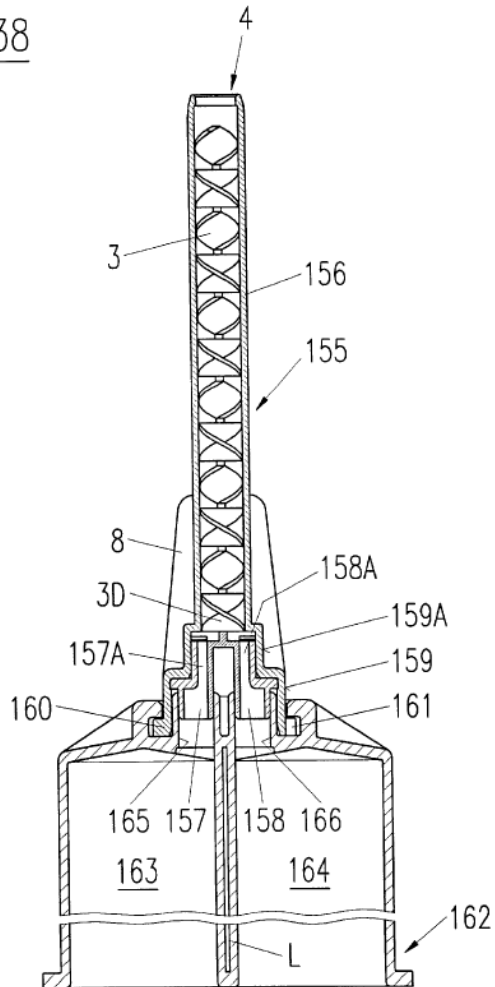
Ex. 1005, 1:46–53. Keller '574 teaches “a cartridge for a mixer having a plurality of inlets. The cartridge includes a plurality of chambers each having an outlet formed at a threaded flange for engagement with the inlets of the mixer, the threaded flange receiving a threaded coupling ring.”

Ex. 1005, 2:48–52.

Figure 38 of Keller '574, reproduced below, “shows a mixer-cartridge assembly with a mixer **155** with a mixer housing **156**, outlet **4** and integral internal mixer parts comprising two separate inlets **157** and **158** ending into a disc-shaped flange.” Ex. 1005, 11:45–48.

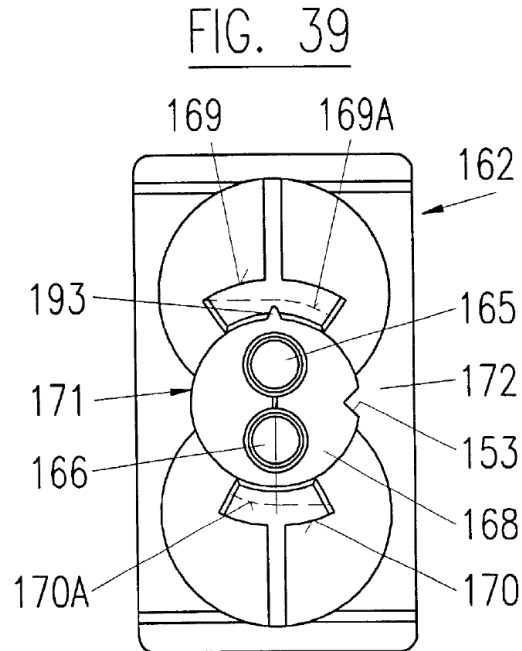
¹³ We cite to the Keller '574 column and line numbers, not the Exhibit page numbers.

FIG. 38



Keller '574 explains that the “mixer housing **156**” comprises “two lateral ends of which are formed as bayonet lugs **160** and **161**” that “have inclined parts, not shown, so as to enforce the locking and sealing ability by an axial force. Corresponding inclined parts, not shown, may also be located on the corresponding surface of the cartridge sector shaped bayonet sockets.” Ex. 1005, 11:56–12:12.

In Figure 39 of Keller '574, reproduced below, “the bayonet means at the cartridge comprises two diametrically opposed sector-shaped bayonet sockets **169** and **170** acting as bayonet prongs for the bayonet lugs of the mixer.” Ex. 1005, 12:18–21.



As shown in Figure 39, Keller '574 teaches “the passages of the bayonet sockets **169** and **170** commence as straight passages but become curved from the mid point onwards so as to achieve a greater strength against bayonet lug axial forces.” Ex. 1005, 12:26–29.

2. *Yu (Ex. 1006)*

Yu¹⁴ is an issued Canadian patent that “relates to improvements in the mounting of a removable nozzle.” Ex. 1006, 1. Yu teaches “that the difficulties previously experienced in the mounting of the nozzle can be overcome by forming a coarse thread connection between the nipple and nozzle which will seat the nozzle on the nipple in response to a rotation of less than 90°.” Ex. 1006, 3.

¹⁴ We cite to the Yu page numbers, not the Exhibit page numbers.

Figure 3 of Yu is reproduced below:

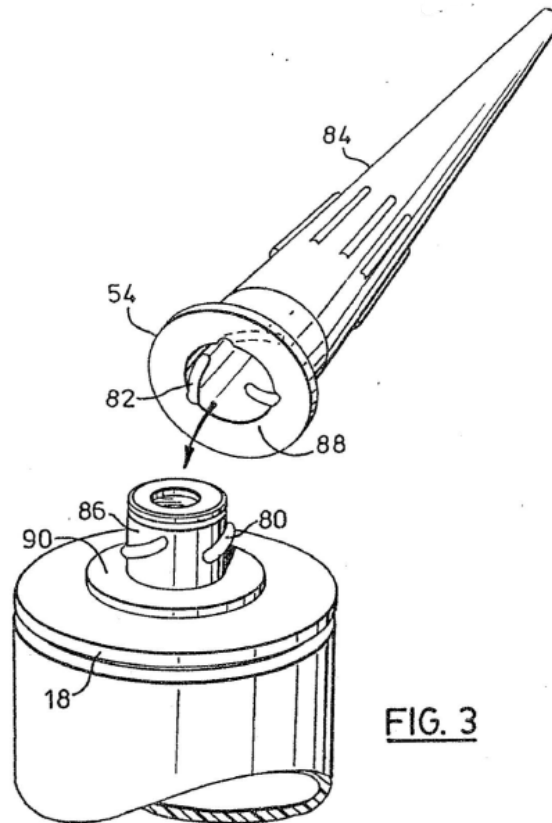


Figure 3 shows

coarse male thread elements 80 and female thread grooves 82 respectively. The threads 80 and grooves 82 have three starts which are spaced 120° from one another and extend through an arc of 60° . In use, the nozzle 84 can be positioned on the nipple 86 and by rotating the nozzle through 60° its [sic] free end 88 will be wedged against the shoulder 90 of the end wall 18.

Ex. 1006, 11. Yu explains that “that it is not necessary to provide an interlock between the nozzle and the nipple which is sufficient to resist the pressure within the cartri[d]ge in use because the flange 54 of the nozzle is engaged by the tangs of the caulking gun.” Ex. 1006, 9. Yu states the tangs of “the caulking gun serves to prevent the nozzle from becoming separated from the body during the caulking operation.” Ex. 1006, 9.

3. *Heusser*¹⁵ (Ex. 1007)

Heusser is an issued US patent that describes “a mixing dispensing of a plurality of flowable components from a multiple chambered vessel and . . . uses of the apparatus.” Ex. 1007, 1:5–8. Figures 2 and 3 of Heusser are reproduced below:

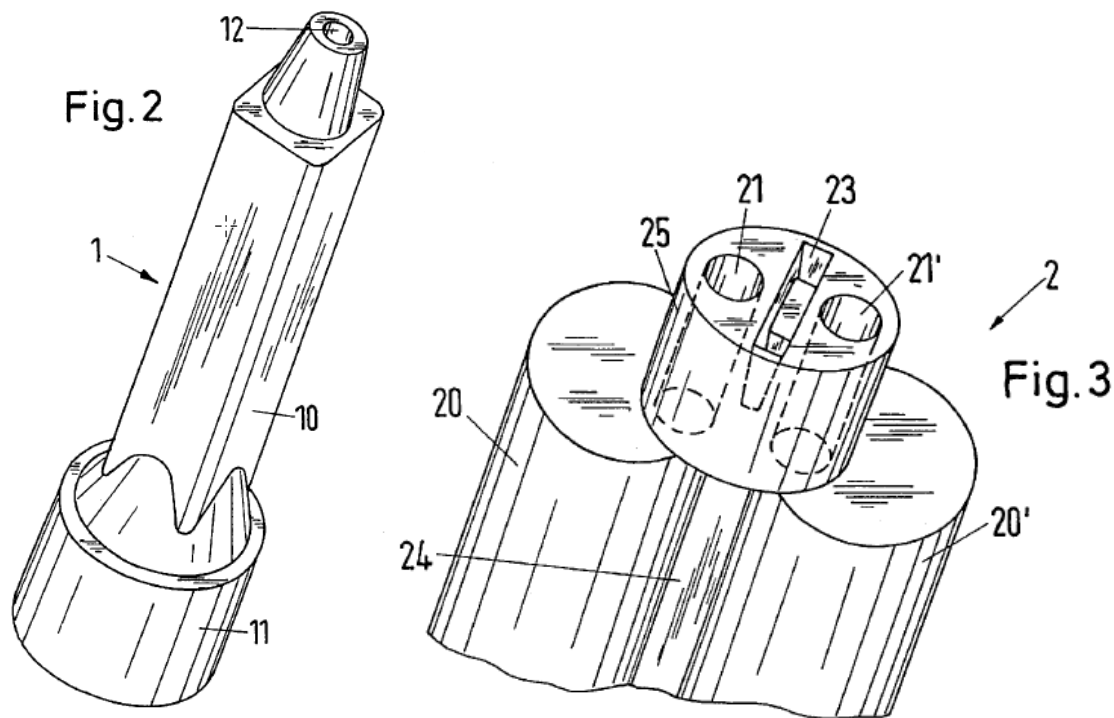


Figure 2 shows “a housing 1 which can be placed onto a vessel 2 with an outlet opening 12 at its tip for mixed components, with the housing 1 having a transition part 11 which can be coupled onto the vessel 2.” Ex. 1007, 2:43–47. Figure 3 shows a cartridge that “comprises two chambers 20, 20’ (partition wall 24) for the Storage of two components to be mixed and a connection part 22 with an inner screw thread 25 (not shown) which forms the counterpart to the outer screw thread 15; of the coupling-on means 15.” Ex. 1007, 2:57–62.

¹⁵ We cite to the Heusser column and line numbers, not the Exhibit page numbers.

C. Ground 1: Obviousness Over Keller '574 and Yu

Petitioner contends that claims 1–3, 9–13, 16, and 17 would have been obvious Keller '574 and Yu. Pet. 11–56. Petitioner provides a more detailed analysis on independent claim 1 and then explains where the claim limitations of dependent claims 2, 3, 9–13, 16, and 17 are found within the prior art. *Id.* at 44–56.

Our discussion below focuses largely on claim 1. We begin with Petitioner's contentions on claim 1, and then move to our analysis, which addresses Patent Owner's counterarguments. We note that Patent Owner has not, at this time, provided separate argument on the patentability of the challenged dependent claims.

1. *Analysis of Claim 1*

a) [1P]: "A discharge arrangement, comprising:"

Petitioner asserts "Keller ['574] discloses 'a mixer-cartridge assembly' (discharge arrangement), including a mixer 155 and a cartridge 162. Ex. 1005, 11:45-12:17, Fig. 38; Ex. 1003, ¶92." Pet. 26.

b) [1A]: "an accessory part with at least two inlets;"

Petitioner asserts that Keller ['574] teaches "mixer 155 includes 'two separate inlets 157 and 158' that are inlets to the accessory part. Ex. 1005, 11:45-51, Figs. 38, 40; Ex. 1003, ¶93." Pet. 26.

c) [1B]: "a cartridge for at least two components,"

Petitioner asserts "Keller ['574] discloses a cartridge 162, depicted below, having 'two cylindrical containers 163 and 164.' Ex. 1005, 12:13-16, Fig. 38. Each container 163, 164 houses a separate chemical component (e.g., a chemical fluid material). Ex. 1005, 1:21-24, 5:34-37, 6:54-58, 17:40-50, 18:48-49; Ex. 1003, ¶94." Pet. 27.

- d) *[1C]: “wherein the cartridge has at least two chambers for in each case one of the components and has at least two outlets, complementary to the inlets, for the components,”*

Petitioner asserts “Keller [’574]’s ‘cartridge 162 has two cylindrical containers 163 and 164,’ or chambers, that contain the chemical components described for [1B]. *Supra* § IV.A.4.c; Ex. 1005, 12:13-16, 17:40-50; Ex. 1003, ¶95.” Pet. 28. Petitioner asserts that “[e]ach of these container chambers also has an outlet associated with it (i.e., female outlets 165 and 166). Ex. 1005, 12:13-16; Ex. 1003, ¶95.” Pet. 28. Petitioner asserts “[t]hese outlets are complementary to the inlets on the accessory part—they ‘receiv[e] and seal[] over the separate male inlets 157 and 158.’ Ex. 1005, 12:13-16, Figs. 38.” Pet. 29.

- e) *[1D]: “wherein each of the outlets is adapted to be plugged into one of the inlets, or vice versa; and”*

Petitioner asserts “[e]ach of Keller [’574]’s male inlets 157, 158 is adapted to be plugged into one of female outlets 165, 166 . . . Ex. 1005, 12:13-16, 5:55-64, Fig. 38; Ex. 1003, ¶96.” Pet. 30.

- f) *[1E]: “a connecting device with a first connecting component, which is arranged on the accessory part, and a second connecting component, which is complementary to the first connecting component and is arranged on the cartridge,”*

Petitioner asserts “Keller [’574] discloses a mixer 155 with a larger diameter 159 and two bayonet lugs 160, 161, as well as a cartridge 162 with two bayonet sockets 169, 170. Ex. 1005, 11:56-60, 12:18-22, Figs. 38-40; Ex. 1003, ¶97.” Pet. 31. Petitioner asserts

it would have been obvious to modify Keller [’574] by applying Yu’s male-thread-element design to Keller [’574]’s two bayonet lugs and by applying Yu’s female-thread-groove design to the

corresponding passages in Keller ['574]'s two bayonet sockets. Ex. 1003, ¶97. Under this combination, the mixer 155 would still have the larger diameter 159 component, but the two bayonet lugs would be replaced with two protruding male threads positioned at an inclined angle, and the passages in these thread-groove sockets would be angled such that they complement and receive the male threads. Ex. 1003, ¶97. The male threads and larger diameter component 159 combine to form a “first connecting component” on the mixer 155 (accessory part), and the cartridge's thread-groove sockets and angled passages inside them combine to form a “second connecting component.” Ex. 1003, ¶97. The first and second connecting components, together, form a “connecting device.” Ex. 1003, ¶97.

Pet. 31.

g) [1F]: “wherein one of the connecting components comprises a socket and the other connecting component comprises a connector part that is adapted to be inserted into the socket along a longitudinal direction,”

Petitioner asserts that Keller '574 discloses “one connecting component with two thread-groove sockets 169, 170 that form a socket for larger diameter 159, which is a connector part on the other connecting component. Ex. 1005, 11:51-53, 12:18-32, Figs. 38-40; Ex. 1003, ¶99.” Pet. 31–32. Petitioner asserts a “POSITA would have understood that larger diameter 159 is adapted to be inserted into the socket formed by thread-groove sockets 169, 170 along a longitudinal direction in the Keller ['574]/Yu apparatus.” Pet. 33–34 (citing Ex. 1003, ¶100).

- h) [1G]: “wherein first engagement parts of a rotational guide placed at an incline to the longitudinal direction are provided on an outer circumference of the connector part, and”*

Petitioner asserts that

Keller [’574]’s two bayonet lugs 160, 161 are provided on an outer circumference of larger diameter 159. Ex. 1005, 11:56-60, 12:8-12, 12:18-25, Figs. 38, 40; Ex. 1003, ¶102. Yu’s male thread elements 80 are first engagement parts of a rotational guide placed at an incline to the longitudinal direction and are provided on an outer circumference of the nipple 86. Ex. 1006, 4, 12, 16 (disclosing that male thread elements 80 “extend through an arc of 60°” and are one part of a coarse thread connection that “will seat the nozzle on the nipple in response to a rotation”), Fig. 3; Ex. 1003, ¶102.

Pet. 35. Petitioner asserts the combination of Keller ’574 and Yu suggests that “the inclined male thread elements are similarly provided on an outer circumference of larger diameter 159 and disclose first engagement parts of a rotational guide placed at an incline to the longitudinal direction, rendering [1G] obvious. Ex. 1003, ¶103.” Pet. 36.

- i) [1H]: “corresponding second engagement parts of the rotational guide are provided on the inner circumference of the socket,”*

Petitioner asserts “Keller [’574]’s bayonet sockets 169, 170 include passages, into which bayonet lugs 160, 161 are rotated. Ex. 1005, 11:51-53, 12:18-32, Figs. 38-40; Ex. 1003, ¶104.” Pet. 37. Petitioner further asserts that “Yu discloses female thread grooves 82 on the inner circumference of the socket, which ‘is proportioned to receive said discharge nipple,’ as depicted in Figure 3, and amounts to a thread-groove socket with a coarse thread connection that ‘will seat the nozzle on the nipple in response to a rotation.’ Ex. 1006, 4, 6, 16, Fig. 3; Ex. 1003, ¶104.” Pet. 37.

- j) [1I]: “wherein the connecting components are adapted to be rotated into each other over an effective connecting section along the rotational guide after the connector part has been plugged into the socket,”

Petitioner asserts “Keller [’574] discloses that bayonet lugs 160, 161 of larger diameter 159 are adapted to be rotated into the passages in bayonet sockets 169, 170 after larger diameter 159 has been plugged into the socket formed by bayonet sockets 169, 170.” Pet. 39. Petitioner asserts

Yu discloses that, to attach the nozzle to the cartridge, the nozzle is first “positioned on the nipple 86” and then rotated 60° such that nipple 86 is rotated into the socket over an effective connecting section along the rotational guide formed by male thread elements 80 and female thread grooves 82 after the top portion of nipple 86 (where the nipple lacks male thread elements) has been plugged into the socket. Ex. 1006, 12, Fig. 3; Ex. 1003, ¶107.

Pet. 39–40.

- k) [1J]: “wherein one of the engagement parts comprises guide grooves and the other engagement parts cooperating with the guide grooves comprise at least two ramps, which are designed corresponding to the guide grooves, and”

Petitioner asserts “in the combined Keller [’574]/Yu apparatus, the female thread grooves comprise guide grooves, and the male thread elements constitute multiple ramps that rotate into and cooperate with the female thread grooves (i.e., the male thread elements are designed corresponding to the thread grooves). Ex. 1006, 16.” Pet. 41.

- l) [1K]: “wherein the guide grooves and the at least two ramps are adapted to be brought increasingly into engagement with each other while being guided in the axial direction and to be disengaged from each other while being guided over an effective connecting section in the axial direction, such that, when the connection is established, the accessory part is positively guided towards the cartridge in a constrained manner, and such that, when the connection is released, the accessory part is lifted from the cartridge in a positively guided manner to cause a constrained lifting.”

Petitioner asserts

Keller [’574]’s bayonet lugs 160, 161 and bayonet sockets 169, 170 can be brought increasingly into engagement with each other while being guided in the axial direction such that, when the connection is established, mixer 155 is positively guided towards cartridge 162 in a constrained manner. Ex. 1005, 12:8-12, 12:18-29; Ex. 1003, ¶110. A POSITA would have also understood that mixer 155 is removed from cartridge 162 by reversing the attachment steps, which involves counter-rotating bayonet lugs 160, 161 out of bayonet sockets 169, 170. Ex. 1003, ¶110.

Pet. 42. Petitioner asserts “Yu’s ‘female thread grooves 82’ and ‘coarse male thread elements 80’ are adapted to be brought increasingly into engagement with each other—Yu discloses that the female thread grooves are ‘adapted to threadably engage the male thread elements’ upon ‘rotating the nozzle through 60.’ Ex. 1006, 12, 16.” Pet. 42. Petitioner asserts “Yu also discloses that removing the nozzle merely requires ‘rotat[ing] the nozzle through 60° in the opposite direction,’ which disengages the guide grooves and the ramps from each other. Ex. 1006, 12; Ex. 1003, ¶112.” Pet. 43.

m) *Reasons to Combine*

Petitioner asserts “applying Yu’s coarse thread design to Keller [’574] adds a mechanical advantage that applies *both* when the mixer is being

attached and removed from the cartridge. Ex. 1003, ¶85.” Pet. 21.

Specifically, Petitioner asserts:

Keller [’574] uses inclined surfaces to help guide the mixer toward the cartridge during attachment. Ex. 1005, 12:8-12. And Keller ’196 uses inclined surfaces to help guide the mixer away from the cartridge during removal. Ex. 1009 (Keller ’196), 8:30-33. But Yu provides this benefit *during both attachment and removal*, which would have motivated a POSITA to use this design. Ex. 1003, ¶89. Indeed, it was standard in the art to use multi-start threads on cartridges to allow an accessory part to be attached and detached through rotation. *See* Ex. 1017 (using Luer locks to achieve this functionality for syringes); Ex. 1003, ¶89.

Pet. 23–24. Petitioner asserts “a POSITA would have known that Yu’s design would also accommodate the types of materials discharged by the Keller [’574] apparatus (i.e., there would be an expectation of success in the combination in terms of the material being discharged). Ex. 1003, ¶91.”

Pet. 25. Petitioner asserts “for reinforcement, Yu discloses ‘tang’s on the dispenser that engage the nozzle during dispensing ‘to prevent the nozzle from becoming separated from the body during the caulking operation.’

Ex. 1006, 10. If desiring such reinforcement, a POSITA would have been motivated to use these tangs on the Keller [’574] apparatus. Ex. 1003, ¶91.”

Pet. 25. Lastly, Petitioner asserts a “POSITA would have considered the Yu modification predictable and reasonably expected its success because threads were straightforward to implement and commonly understood to provide a mechanical advantage when moving two components relative to each other axially. Ex. 1003, ¶90.” Pet. 24.

We address Patent Owner’s arguments below.

2. *Patent Owner's Arguments*

Patent Owner asserts for claim 1 that

In both Keller '574/Yu and Heusser/Yu combinations, Yu's "coarse thread" design does not address the fundamental issue that both Keller '574 and Heusser have - ensuring that an attached mixer is able to resist "high backpressures" when dispensing. Ex. 2001, ¶¶65, 67; *see also* Ex. 1005, 2:13-17; Ex. 1007, 3:61-65; Ex. 1008, [0007].

Prelim. Resp. 22. Patent Owner asserts that "Petitioner's throwaway inclusion of Yu's tangs is, itself, deficient on its face and would not work according to Yu's own disclosure." Prelim. Resp. 24. Patent owner asserts that

The Petition does not identify where or how Yu's tangs would be applied to Keller '574's apparatus. The Petition and Dr. Gale focus instead on how only Yu's coarse threads would apply to Keller '574's bayonet lugs and sockets. Petition at 20-21; Ex. 1003, ¶84. Crucially, when actually applying the Keller '574-Yu combination to the claims, Petitioner never even mentions Yu's tangs (let alone suggests adding a flange to Keller '574's mixer nozzle to work with Yu's tangs). *See* Petition at 31-32 (adding Yu's coarse threads), 35-36 (Yu's male thread elements), 37-38 (Yu's female thread elements), 39-44.

Prelim. Resp. 24. Patent Owner asserts "Yu requires a flange on the nozzle that projects out laterally 'so as to be engageable by a retaining wall of the caulking gun in use.' Ex. 1006, 6 (threaded); 5 (snap-fit); FIG. 3; Ex. 2001, ¶75." Prelim. Resp. 25. Patent Owner asserts "the tangs of the caulking gun only work to stop the nozzle from coming off from the cartridge nipple during use '**because the flange 54 of the nozzle is engaged by the tangs of the caulking gun.**' Ex. 1006, 10." Prelim Resp. 26.

Patent Owner's argument on this record is not persuasive because Petitioner explains that "Yu discloses 'tangs' on the dispenser that engage the nozzle during dispensing 'to prevent the nozzle from becoming separated

from the body during the caulking operation.’ Ex. 1006, 10.” Pet. 25. Petitioner points out, in discussing Keller ’574, that the ““upper surface of the lugs’ and ‘the corresponding surface’ of the two ‘bayonet sockets’ may be inclined ‘to enforce the locking and sealing ability by an axial force.’ *Id.*, 12:8-12.” Pet. 11.

On this record, we agree with Petitioner that the ordinary artisan concerned with separation of the nozzle during operation, whether due to backpressure or other reasons, would have found it obvious based on Yu’s teaching to include Yu’s tangs to engage the nozzle and lock and seal at locations disclosed by Keller ’574. On this record, Patent Owner does not persuasively explain why the ordinary artisan would have found these disclosures of a locking location in Keller ’574 and tangs in Yu insufficient to select tang locations in Keller ’574 that would function to enforce locking and sealing of the combined device.

Patent Owner asserts the “Petitioner’s alleged combination of just Yu’s coarse threads with Keller ’574’s apparatus would undesirably change Keller ’574 apparatus’ principle of operation. A POSITA would therefore not be motivated to modify Keller ’574 as the Petition proposes. Ex. 2001, ¶79.” Prelim. Resp. 27. Patent Owner asserts “Keller ’574’s devices, like other devices in the field, rely upon the cartridge retaining the mixer via an interlocking mechanism of the cartridge and mixer to avoid leakage or worse during dispensing, instead of on some external mechanism.” Prelim. Resp. 28. Patent Owner asserts

In stark contrast, Yu’s approach must rely upon an external mechanism to provide an interlock. Yu expressly requires an external caulk gun’s tangs to engage with a flange on the nozzle seated on a single-component cartridge to retain the nozzle during use “to resist the pressure within the cartridge in use” by

engaging “the flange 54 of the nozzle ... during the caulking operation.” *See* Ex. 1006, 6, 10[□], 12.

Prelim. Resp. 28–29. Patent Owner asserts

Petitioner’s combination keeps “nearly all of Keller [’574]’s structure” but for “applying Yu’s male-thread-element design to Keller’s two bayonet lugs and Yu’s female-thread-groove design to the corresponding passages in Keller [’574]’s two bayonet sockets.” Petition at 20; Ex. 1003, ¶84. Keller ’574’s resulting mixer-cartridge configuration would no longer be able to resist the “high backpressures” during dispensing. Ex. 2001, ¶¶84-85.

Prelim. Resp. 29.

Patent Owner’s argument on this record is not persuasive for two reasons. First, Petitioner explains “that both Keller [’574] and Yu are designed to discharge thick materials capable of clogging the discharge outlets. Ex. 1005, 1:30-58, 17:54-65; Ex. 1006, 2-3; Ex. 1003, ¶91 (explaining that Keller [’574]’s discharge apparatus can be used to dispense a variety of different materials, including dental impression materials and caulk).” Pet. 25. Petitioner asserts “Keller [’574] and Yu both address the importance [of] minimizing leakage . . . Ex. 1005, 5:55-64, 16:52-55; Ex. 1006, 2; Ex. 1003, ¶91.” Pet. 25. As Petitioner points out, Yu specifically teaches a solution to the concern about backpressure by using tangs, when Yu states

It is to be noted that it is not necessary to provide an interlock between the nozzle and the nipple which is sufficient to resist the pressure within the cartri[d]ge in use because the flange 54 of the nozzle is engaged by the tangs of the caulking gun and thus the caulking gun serves to prevent the nozzle from becoming separated from the body during the caulking operation.

Ex. 1006, 9; *cf.* Pet. 25.

We therefore, on this record, find that the evidence better supports Petitioner’s position that inclusion of the tangs of Yu in the device of Keller

[’574] would address concerns regarding backpressure, an issue recognized by both references. *See* Ex. 1005, 16:52–55; Ex. 1006, 9.

Second, Petitioner’s declarant, Dr. Gale, notes that “a POSITA would have considered the Yu modification predictable and would have had a reasonable expectation of success because threads were straightforward to implement and commonly understood to provide a mechanical advantage when moving two components relative to each other axially.” Ex. 1003

¶ 90. Dr. Gale notes

incorporating Yu’s male thread elements and female thread grooves, where both the upper *and* lower surfaces are inclined, into Keller [’574]’s discharge apparatus would have been a routine modification of familiar elements according to known methods to predictably yield a quick and efficient way to securely attach and remove Keller [’574]’s mixer from the cartridge, similar to Yu’s nozzle and cartridge. Ex. 1005, 12:8-12; Ex. 1006, 12, Fig. 3.

Ex. 1003 ¶ 90. That is, Dr. Gale evidences that mechanical advantage would have provided a reason for combining the disclosures of Keller [’574] and Yu and that this mechanical advantage reason was both predictable and well within the skill of the ordinary artisan.

Patent Owner’s declarant, Dr. Brown, agrees that “Keller ’574, Yu and Heusser are all ‘designed to discharge materials that are thick and capable of clogging the discharge outlets.’ Ex. 1003, ¶¶ 91 and 139.”

Ex. 2001 ¶ 29. Dr. Brown disagrees on the motivation issue and argues tangs as essential to operation of the mixer resulting from the combination of Keller ’574 and Yu, and asserts that Dr. Gale did not precisely identify where tangs would have been placed. Ex. 2001 ¶¶ 69, 72. However, what Dr. Brown does not state is that addition of tangs to the combined Keller ’574 and Yu mixer would be unpredictable or would require extraordinary

skill. Nor did Dr. Brown state that an artisan would have found it difficult to add tangs when informed by Yu that tangs were on option if backpressure were a concern.

Thus, on the current record, the evidence does not support a finding that modifying Keller '574 with Yu's threads would have required anything other than ordinary skill. The current evidence shows this would have been a predictable modification and that should any backpressure issues exist, Yu provided a known solution to add tangs.

Patent Owner asserts "Petitioner's suggested combination would, therefore, render Keller '574 'inoperable for its intended purpose,'" because

Petitioner's modification would remove the very interlocking mechanism that Keller '574 relies upon – the bayonet lugs and socket – to maintain the mixer on the cartridge during use without leakage. *See* Petition at 20, 35-38. Petitioner instead proposes replacing Keller '574's existing interlocking mechanism with only Yu's coarse threading, which Yu itself acknowledges is not able to "resist the pressure within the cartridge in use." *See* Ex.1006, 10; Ex. 2001, ¶89.

Prelim. Resp. 31–32.

We remain unpersuaded by this argument, on the current record, because it posits that backpressure would necessarily result in leakage and that the tangs of Yu are not employed in the combined mixer of Keller '574 and Yu. And while Dr. Brown points out that high backpressures may occur during dispensing and mixing in some circumstances, Dr. Brown does not provide supporting evidence that coarse threads such as those of Yu necessarily result in leakage. *See, e.g.,* Ex. 2001 ¶ 65. And Patent Owner's argument also assumes that Yu's tangs are not employed in this argument, while Yu recognizes that when pressure is a concern, tangs are employed.

Ex. 1006, 10. Thus, the evidence of record does not support a finding that the combination of Yu and Keller '574 would result in an inoperable device.

Patent Owner contends “Yu is not analogous art to Keller '574 or Heusser, let alone the '578 patent. A reference may be used in an obviousness determination ‘only when analogous to the claimed invention.’ *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).” Prelim. Resp. 40. Patent Owner asserts “Yu is non-analogous art to the '578 patent because it relates to single component cartridge systems – not multiple component systems like Keller '574, Heusser, or the '578 patent. Ex. 2001, ¶101.” Prelim. Resp. 41. Patent Owner contends, as to pertinence, that:

An inventor seeking to solve the problems set forth in the '578 patent would not have looked to Yu with its single-cartridge, caulk gun approach. They would have recognized that applying Yu's coarse thread solution would remove the very interlocking mechanism that the '578 patent already had to achieve “leaktight attachment of a mixer to a cartridge.” Ex. 2001, ¶¶107-108.

Prelim. Resp. 45–46.

We find this unpersuasive on the current record. “Prior art is analogous if it is from the same field of endeavor or if it is reasonably pertinent to the particular problem the inventor is trying to solve.” *Circuit Check Inc. v. QXQ Inc.*, 795 F.3d 1331, 1335 (Fed. Cir. 2015).

As to the field of endeavor, *Bigio* requires us “to determine the appropriate field of endeavor by reference to explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

The '578 patent teaches that the “present invention relates to a discharge arrangement comprising a cartridge or syringe for at least two

components and comprising an accessory part.” Ex. 1001, 1:17–19. The ’578 patent specifically identifies that “a first object is to produce a reliable and rapid connection between the cartridge and the accessory part in such a way that, with little force being applied, the accessory part can be secured sealingly on the cartridge and can also be lifted from the cartridge.” Ex. 1001, 2:15–20.

Thus, the field of endeavor is rapid and reliable connections between a cartridge and an outlet. Ex. 1003 ¶¶ 33–36. This conclusion is also supported by Patent Owner’s declarant, Dr. Brown, who states “the ’578 patent discloses ‘improvements to a discharge arrangement ... in order to further increase its user friendliness.’ Ex. 1001, 2:12-15.” Ex. 2001 ¶ 39. Despite Dr. Brown’s statement that “Yu relates to a single component cartridge, not simply a ‘discharge arrangement’ generally” (Ex. 2001 ¶ 101), Dr. Brown also states “I agree with Dr. Gale, who states that Keller ’574, Yu and Heusser are all ‘designed to discharge materials that are thick and capable of clogging the discharge outlets.’ Ex. 1003, ¶¶ 91 and 139.” Ex. 2001 ¶ 29.

We agree with both declarants that the Specification established the appropriate field of endeavor as discharge arrangements comprising a cartridge and outlet designed to discharge materials and that the ’578 patent, Keller ’574, Yu, and Heusser are all within that field.

As to pertinence, “a reference is only reasonably pertinent when it ‘logically would have commended itself to an inventor’s attention in considering his problem.’” *Circuit Check*, 795 F.3d at 1335 (citing *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992)). As already noted, the object of the ’578 patent involved a connection that can be secured and lifted “with little force being applied.” Ex. 1001, 2:15–20. Yu directly relates to

securing a connection with little force, explaining the problem when “the interference fit is a very tight fit, considerably difficulty can be experienced in attempting to remove the nozzle.” Ex. 1006, 1. Yu finds that these “difficulties previously experienced in the mounting of the nozzle can be overcome by forming a coarse thread connection between the nipple and nozzle which will seat the nozzle on the nipple in response to a rotation of less than 90°.” Ex. 1006, 3.

On the current record, as properly framed, the evidence above demonstrates that Yu is reasonably interpreted as analogous art to the ’578 patent, Keller ’574, and Heusser, because all of these references are pertinent to addressing the problem of discharging materials from a cartridge while securing a nozzle to the cartridge.

Patent Owner asserts that “Yu’s tangs are expressly intended to ‘prevent the nozzle from becoming separated’ from the cartridge, such that a POSITA would have understood that those same tangs would prevent Keller ’574’s or Heusser’s mixer tip from separating from the cartridge. Ex. 2001, ¶111.” Prelim. Resp. 49.

On the current record, we find this argument unpersuasive as the entire intent of the tangs in Yu is to prevent separation while in use, as Yu notes “[t]o remove this nozzle, it is merely necessary to rotate the nozzle through 60° in the opposite direction. It will be noted that the flange 54 is again provided on the nozzle so that the nozzle may be retained by means of the tangs of the caulking gun.” Ex. 1006, 11. On this record, the ordinary artisan would have recognized that Yu expressly teaches the nozzle may be removed by simple rotation, and the tangs would not prevent this separation based on this teaching in Yu.

Patent Owner asserts “[w]ithout the additional interlock that Yu requires, Yu’s coarse threads with Heusser’s apparatus would result in the mixer tip being **unconstrainedly** dislodged from the cartridge during dispensing. *See, e.g.*, Ex. 1010, 1:13-34.” Prelim. Resp. 53.

We find this argument unpersuasive on the current record because both Keller ’574 and Yu teach constraints, as already discussed. Petitioner explains that “Yu discloses ‘tang[s]’ on the dispenser that engage the nozzle during dispensing ‘to prevent the nozzle from becoming separated from the body during the caulking operation.’ Ex. 1006, 10.” Pet. 25. Petitioner points out, in discussing Keller ’574, that the “‘upper surface of the lugs’ and ‘the corresponding surface’ of the two ‘bayonet sockets’ may be inclined ‘to enforce the locking and sealing ability by an axial force.’ *Id.*, 12:8-12.” Pet. 11. These components, when used as suggested by the prior art of Keller ’574 and Yu, constrain the mixing tip and prevent it from being unconstrainedly dislodged during dispensing.

Based on the preliminary record, Petitioner has met its institution burden and demonstrated to a reasonable likelihood that it will prevail in showing the claim 1 would have been obvious over Keller ’574 and Yu.

D. Ground 2: Obviousness Over Heusser and Yu

Petitioner contends that claims 1–3 and 16 would have been obvious over Heusser and Yu. Pet. 56–82. Petitioner provides a more detailed analysis on independent claim 1 and then explains where the limitations of dependent claims 2, 3, and 16 are found within the prior art. *Id.* at 82–83.

Our discussion below focuses largely on claim 1. We begin with Petitioner’s contentions on claim 1, and then move to our analysis, which addresses Patent Owner’s counterarguments. We note that Patent Owner has

not, at this time, provided separate argument on the patentability of the challenged dependent claims.

1. *Analysis of Claim 1*

a) *[1P]: “A discharge arrangement, comprising:”*

Petitioner asserts “Heusser discloses an ‘apparatus for carrying out a mixing dispensing of a plurality of flowable components from a multiple chambered vessel.’ Ex. 1007, 1:5-8.” Pet. 62.

b) *[1A]: “an accessory part with at least two inlets;”*

Petitioner asserts that “Heusser discloses a transition piece 3 ‘rotatably arranged in the transition part 11, which produces separate supply passages 31, 31' from outlet openings 21, 21' of the vessel 2 to the mixer structure 4 and which permits a flowing of the components only through these supply passages 31, 31'.’ Ex. 1007, 2:42-56.” Pet. 64.

c) *[1B]: “a cartridge for at least two components,”*

Petitioner asserts “Heusser’s vessel 2 “is a cartridge” with ‘two chambers 20, 20'’ that store the ‘two components to be mixed’ (e.g., ‘a discrete flowable component in each chamber of the multiple chambered vessel’). Ex. 1007, 2:56-62, 4:27-31; Ex. 1003, ¶143.” Pet. 65.

d) *[1C]: “wherein the cartridge has at least two chambers for in each case one of the components and has at least two outlets, complementary to the inlets, for the components,”*

Petitioner asserts

Heusser’s vessel 2 “comprises two chambers 20, 20'” that store the “two components to be mixed.” Ex. 1007, 2:56-62. Each chamber houses “a discrete flowable component” and also has an “outlet opening[] 21, 21'” associated with it that is complementary to the two sleeve-shaped positioning means 33 that form the inlets on the accessory part. Ex. 1007, 2:42-62, 3:30-39, 4:27-31, Figs. 3, 5; Ex. 1003, ¶144.

Pet. 65.

- e) [1D]: “wherein each of the outlets is adapted to be plugged into one of the inlets, or vice versa; and”

Petitioner asserts “Heusser discloses two sleeve-shaped positioning means 33 that are the inlets to the accessory part and are adapted to be plugged into one of the outlet openings 21, 21' on the cartridge, as depicted in Figure 5. Ex. 1007, 3:30-39; Ex. 1003, ¶145.” Pet. 66.

- f) [1E]: “a connecting device with a first connecting component, which is arranged on the accessory part, and a second connecting component, which is complementary to the first connecting component and is arranged on the cartridge,”

Petitioner asserts

Heusser discloses a transition part 11 (on housing 1) that has an outer screw thread 15', and a connection part 22 (on vessel 2) that has an inner screw thread 25. Ex. 1007, 2:42-62, Fig. 5; Ex. 1003, ¶146. The transition part 11 and connection part 22 can be coupled together via these screw threads. Ex. 1007, 2:42-62.

Pet. 67. Petitioner further asserts

it would have been obvious to modify Heusser by using Yu's male thread elements in place of the inner screw thread 25 on connection part 22, and by using Yu's female thread grooves in place of the outer screw thread 15' on transition part 11. Ex. 1003, ¶147. On the resulting Heusser/Yu apparatus, the female thread grooves and transition part 11 combine to form a “first connecting component” on housing 1 (accessory part), and the male thread elements and connection part 22 combine to form a “second connecting component” on vessel 2 (cartridge). Ex. 1003, ¶147. The first and second connecting components, together, form a “connecting device.” Ex. 1003, ¶147.

Pet. 67–68. Petitioner asserts “the modified inclined thread-and-groove arrangement described in the previous paragraph makes the first and second connecting components ‘complementary.’ Ex. 1003, ¶148.” Pet. 68.

- g) *[1F]: “wherein one of the connecting components comprises a socket and the other connecting component comprises a connector part that is adapted to be inserted into the socket along a longitudinal direction,”*

Petitioner asserts that Heusser combined with Yu discloses “discloses a connecting component made of the female-grooved transition part 11 that forms a socket for connection part 22, which is a connector part on the other connecting component that is adapted to be inserted into the transition part 11 (socket) along a longitudinal direction.” Pet. 69 (citing Ex. 1003 ¶ 149; Ex. 1007, Fig. 5).

- h) *[1G]: “wherein first engagement parts of a rotational guide placed at an incline to the longitudinal direction are provided on an outer circumference of the connector part, and”*

Petitioner asserts that:

As depicted in Figure 5 of Heusser, inner screw thread 25 is provided on an outer circumference of connection part 22. Ex. 1007, Fig. 5. A POSITA would have understood that these threads are placed at an incline to the longitudinal direction so that, as housing 1 is rotated relative to vessel 2, the threads move housing 1 axially towards, or away from, vessel 2. Ex. 1007, 2:56-62; Ex. 1003, ¶151.

Pet. 71. Petitioner asserts “Yu’s male thread elements 80 are first engagement parts of a rotational guide placed at an incline to the longitudinal direction and are provided on an outer circumference of the nipple 86, as depicted in Figure 3 of Yu. Ex. 1006, 4, 12, 16.” Pet. 72.

- i) *[1H]: “corresponding second engagement parts of the rotational guide are provided on the inner circumference of the socket,”*

Petitioner asserts

as depicted in Figure 5 of Heusser, outer screw thread 15' is provided on the inner circumference of transition part 11. Ex. 1007, Fig. 5. A POSITA would have understood that these threads are placed at an incline to the longitudinal direction so that, as housing 1 is rotated relative to vessel 2, the threads move housing 1 axially towards, or away from, vessel 2. Ex. 1007, 2:56-62; Ex. 1003, ¶154.

Pet. 73. Petitioner further asserts

Yu discloses female thread grooves 82 on the inner circumference of the socket, which “is proportioned to receive said discharge nipple,” as depicted in Figure 3, and amounts to a thread-groove socket with one part of a coarse thread connection that “will seat the nozzle on the nipple in response to a rotation.” Ex. 1006, 4-6, 16; Ex. 1003, ¶155.

Pet. 74.

- j) *[1I]: “wherein the connecting components are adapted to be rotated into each other over an effective connecting section along the rotational guide after the connector part has been plugged into the socket,”*

Petitioner asserts

in Yu, to attach the nozzle to the cartridge, the nozzle is first “positioned on the nipple 86” and then rotated 60° such that nipple 86 is rotated into the socket over an effective connecting section along the rotational guide formed by male thread elements 80 and female thread grooves 82 after the top portion of nipple 86 (where the nipple lacks male thread elements) has been plugged into the socket. Ex. 1006, 12, Fig. 3; Ex. 1003, ¶157.

Pet. 76–77.

- k) [1J]: “wherein one of the engagement parts comprises guide grooves and the other engagement parts cooperating with the guide grooves comprise at least two ramps, which are designed corresponding to the guide grooves, and”

Petitioner asserts “in the combined Heusser/Yu apparatus, the female thread grooves comprise guide grooves and the male thread elements cooperating with the female thread grooves comprise at least two ramps, which are designed corresponding to the guide grooves. Ex. 1006, 16.”
Pet. 79.

- l) [1K]: “wherein the guide grooves and the at least two ramps are adapted to be brought increasingly into engagement with each other while being guided in the axial direction and to be disengaged from each other while being guided over an effective connecting section in the axial direction, such that, when the connection is established, the accessory part is positively guided towards the cartridge in a constrained manner, and such that, when the connection is released, the accessory part is lifted from the cartridge in a positively guided manner to cause a constrained lifting.”

Petitioner asserts

Heusser discloses that screw thread 15' and inner screw thread 25 are adapted to be brought increasingly into engagement with each other while being guided in the axial direction and to be disengaged from each other while being guided over an effective connecting section in the axial direction, such that, when the connection is established, housing 1 is positively guided towards vessel 2 in a constrained manner, and such that, when the connection is released, housing 1 is lifted from vessel 2 in a positively guided manner to cause a constrained lifting. Ex. 1007, 2:42-62, Fig. 5; Ex. 1003, ¶160.

Pet. 80. Petitioner asserts “Yu’s ‘female thread grooves 82’ and ‘coarse male thread elements 80’ are brought increasingly into engagement with each other because the female thread grooves ‘threadably engage the male thread elements’ upon ‘rotating the nozzle through 60°.’ Ex. 1006, 12, 16; Ex. 1003, ¶161.” Pet. 80. Petitioner asserts “Yu also discloses that removing the nozzle merely requires ‘rotat[ing] the nozzle through 60° in the opposite direction,’ which disengages the guide grooves and the ramps from each other. Ex. 1006, 12; Ex. 1003, ¶162.” Pet. 81.

m) Reasons to Combine

Petitioner asserts the Heusser and Yu “modified design would have been desirable to a POSITA because the mixer would be attached and removed from the cartridge through a rotation of less than 90°, rather than requiring multiple complete rotations of the mixer relative to the cartridge. Ex. 1003, ¶134.” Pet. 60. Specifically, Petitioner asserts:

A POSITA viewing Yu would have been motivated to improve Heusser’s threaded connection by implementing Yu’s coarse thread connection, allowing Heusser’s housing 1 to be attached to and removed from vessel 2 through a mere 60° relative rotation. Ex. 1003, ¶137. A POSITA would have recognized that this modification would simplify the attachment and removal process by reducing rotations necessary to attach and detach housing 1 and vessel 2, while preserving the mechanical advantage provided by Heusser’s threaded connection that reduces the amount of force needed to attach or remove housing 1. Ex. 1003, ¶137. Combining aspects of these discharge arrangements would have involved substituting one known element for another according to known methods to yield predictable results. Ex. 1003, ¶137.

Pet. 61. Petitioner asserts that Yu “discloses ‘tangs’ on the dispenser that engage the nozzle during dispensing ‘to prevent the nozzle from becoming separated from the body during the caulking operation.’ Ex. 1006, 10. If

desiring such reinforcement, a POSITA would have been motivated to use these tangs on the Heusser apparatus. Ex. 1003, ¶139.” Pet. 62.

We address Patent Owner’s arguments below.

2. *Patent Owner’s Arguments for Heusser and Yu*

Patent Owner asserts

Petitioner’s combination would remove the very mechanism – Heusser’s multiple-turn screw threads – that provides the interlock to resist backpressure and replace it with Yu’s coarse threads that do **not** sealingly maintain the connection during dispensing. Ex. 1006, 10; Ex. 2001, ¶¶94-96. But this replacement would cause Heusser’s device to no longer be able to resist the high backpressures of up to 20 bar (approximately 290 PSI). Ex. 1007, 3:55-65; Ex. 2001, ¶¶92, 96.

Prelim. Resp. 34. Patent Owner asserts a “POSITA would not have looked to Yu’s coarse threads (which do not form an interlock) as a replacement for Heusser’s existing, and interlocking, multiple turn screw thread design. Ex. 2001, ¶96.” Prelim. Resp. 34–35. Patent Owner asserts that “[s]uch a combination would also not have yielded a predictable result or provide a POSITA with a reasonable expectation of success in utilizing the proposed combination. *Id.*” Prelim. Resp. 35.

On this record, we agree with Petitioner that the ordinary artisan concerned with separation of the nozzle during operation, whether due to backpressure or other reasons, would have found it obvious based on Yu’s teaching to include Yu’s tangs to engage the nozzle and lock and to therefore seal from pressure as also desired by Heusser. Ex. 1007, 3:62–65. On this record, Patent Owner does not persuasively explain why the ordinary artisan would have found these disclosures of tangs in Yu insufficient to select tang locations in Heusser that would function to enforce locking and sealing of the combined device.

As to the expectation of success on the current record, Petitioner's declarant Dr. Gale states

A POSITA would have had a reasonable expectation of success with the proposed Yu modification, in my opinion, because threads were commonly understood to provide a mechanical advantage when moving two components relative to each other axially, as is the case in both Heusser and Yu. Heusser already provides a threaded connection comprising inclined threads, so incorporating Yu's male thread elements and female thread grooves would have been a routine modification of familiar elements according to known methods to predictably yield a quick and efficient way to securely attach and remove Heusser's mixer from the cartridge, similar to Yu's nozzle and cartridge. Ex. 1007, 2:56-62.

Ex. 1003 ¶ 138. Dr. Gale further explains, as to the concern regarding leakage, that "for reinforcement, Yu discloses 'tang's' on the dispenser that engage the nozzle during dispensing 'to prevent the nozzle from becoming separated from the body during the caulking operation.' Ex. 1006, 10."

Ex. 1003 ¶ 139.

Patent Owner's declarant Dr. Brown states

that combining Yu's male and female thread elements with Heusser's structure would ruin Heusser's principle of operation (i.e., providing the releasable attachment of a mixer to a multiple component cartridge with a cheap-to-manufacture transition piece between them to allow for quick removal and reuse of the cartridge components, all while remaining sealed against high pressures arising during dispensing). Petitioner's Heusser-Yu structure is unable to resist the high backpressures of an attached mixer, which Yu itself acknowledges its nozzle connection (the coarse thread design) is unable to do.

Ex. 2001 ¶ 97.

On the current record, we find Dr. Gale more persuasive and agree that replacing one type of thread elements in the dispensing device of Heusser with Yu's easier to attach and remove thread elements, along with

incorporating a tang to prevent separation, would likely have been obvious because “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421.

The Petition argues that in a prior appeal (*Ex parte Keller* (No. 95-2880)), “the USPTO *already found it obvious* to modify a dual-chamber dispenser with Yu’s thread design.” Pet. 24. Patent Owner makes a number of arguments distinguishing *Ex parte Keller*. Prelim. Resp. 36–39. As we do not need to rely upon *Ex parte Keller* (No. 95-2880) at this stage of the proceedings to find that Petitioner has demonstrated a likelihood of prevailing, we do not discuss the case.

As to the analogous art argument, we address that in our earlier analysis of the obviousness of claim 1 over Keller and Yu and refer to that analysis here.

Based on the preliminary record, Petitioner has met its institution burden and demonstrated a reasonable likelihood that it will prevail in showing that claim 1 would have been obvious over Keller and Yu.

E. Ground 3 and Analysis of Dependent Claims

Petitioner argues that dependent claims 2, 3, 9–13, 16, and 17 are obvious over Keller and Yu, Heusser and Yu, or Keller, Yu, and Heusser. Pet. 45–56, 82–92. Petitioner cites documentary and testimonial support for its arguments and Patent Owner does not provide any separate rebuttal argument on the challenged dependent claims. *See generally* Prelim. Resp. Patent Owner’s arguments on claim 1 are unavailing as noted above and, on this record, Petitioner is reasonably likely to prevail in showing that one or more of the challenged claims are unpatentable. Also, if trial is instituted, we will institute on all challenged claims and grounds and we have

discussed above that Petitioner has met its burden for instituting on claim 1. *SAS*, 138 S. Ct. at 1354; *PGS Geophysical*, 891 F.3d at 1360.

XI. CONCLUSION

Petitioner has, at this stage, established a reasonable likelihood of prevailing in showing that at least one of the challenged claims is unpatentable. This determination is, however, based on a preliminary record and is not final on any issues of patentability. We will make a final determination on the patentability of the challenged claims, as necessary and applying the preponderance of the evidence standard, based on a fully developed record through trial.

XII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–3, 9–13, 16, and 17 of the ’578 patent is hereby *instituted* on the grounds set forth in the Petition, commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

FURTHER ORDERED that the trial will be conducted in accordance with a separately issued Scheduling Order.

IPR2022-01462
Patent 9,010,578 B2

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