

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN ROOT TECHNOLOGY CO., LTD.,
Petitioner,

v.

WILLOW BLOSSOM HOLDCO LIMITED
and WILLOW INNOVATIONS, INC.,
Patent Owner.

IPR2025-00554
Patent 11,806,454 B2

Before MEREDITH C. PETRAVICK, GRACE KARAFFA OBERMANN,
and BARRY L. GROSSMAN, *Administrative Patent Judges*.

GROSSMAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). Petitioner has the burden of proving unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e).

Based on the evidence and arguments presented by the parties, and the findings and conclusions in this Decision, we determine that Shenzhen Root Technology Co., Ltd. (“Petitioner” or “Shenzhen”) has established by a preponderance of the evidence that claims 17–19 and 21–33 (the “challenged claims”) of U.S. Patent No. 11,806,454 B2 (Ex. 1001, “the ’454 patent”) would have been obvious based on the asserted references and undisputed testimonial evidence, and, thus, are *not* patentable.

A. Background and Summary

Petitioner filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 17–19 and 21–33 of the ’454 patent.

Willow Blossom Holdco Limited and Willow Innovations, Inc. (collectively “Patent Owner” or “Willow”) *did not* file a Preliminary Response. Patent Owner did file, however, a request for discretionary denial under 35 U.S.C. §§ 325(d) and 314(a). Paper 7. This request was denied by the Acting Under Secretary of Commerce for Intellectual Property and Acting Director of the United States Patent and Trademark Office. Paper 9. This case was then “referred to the Board to handle the [case] in the normal course, including by issuing a decision on institution addressing the merits and other nondiscretionary considerations, as appropriate.” *Id.* at 2.

The Board issued a decision instituting an *inter partes* review on all challenged claims and all asserted grounds of unpatentability. Paper 16.

Patent Owner did *not* file a Response after our Decision to Institute. Patent Owner, thus, did *not* file any declaration testimony from an expert witness. Because there was no Patent Owner Response, there also was no Petitioner Reply or Patent Owner Sur-reply filed by the parties.

Neither party requested an oral argument. This is the same as in a related case with the same parties. *See* IPR2025-00560, Ex. 3002, 3003 (emails from counsel in IPR2025-00560 confirming that neither party requested an oral argument).

Additionally, we note that there is no evidence, such as a deposition transcript, indicating that Patent Owner cross-examined Mr. Ryan Bauer. Mr. Bauer provided a detailed, 169-page expert report providing, on behalf of Petitioner, his opinions about the issues in this proceeding. *See* Exhibit 1003. Mr. Bauer's testimonial evidence in this proceeding remains un rebutted.

We do not draw any adverse inference from Patent Owner's decision to rest its case on the merits of its patent. Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence and that burden never shifts to Patent Owner. 35 U.S.C. § 316(e); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) ("In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable."). The burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) ("In an *inter partes* review, the burden of persuasion is on the petitioner to prove 'unpatentability by a preponderance of the evidence,' and that burden never shifts to the patentee.").

We determine Petitioner has met its burden of proof on all challenged claims and on all asserted grounds.

B. Real Parties-in-Interest

Petitioner identifies itself as a real party-in-interest. Pet. 103. Petitioner states that Petitioner also was known as “Shenzhen Lutejiacheng Network Technology Co., Ltd., which changed its name to Shenzhen Lute Innovation Technology Co., Ltd., in September 2023.” *Id.* In addition to itself, Petitioner states that the following companies also are real parties-in-interest: Hong Kong Lute Technology Co., Ltd.; Shenzhen Conglin E-Commerce Co., Ltd.; Shenzhen Jinruihang Technology Co, Ltd.; Shenzhen Xitao Network Technology Co., Ltd.; and ROOT Technology Ltd. *Id.* at 104

Patent Owner identifies Willow Blossom Holdco Limited and Willow Innovations, Inc. as real parties-in-interest. Paper 5, 2.

C. Related Matters

The parties state that the ’454 patent is the subject of the following district court proceeding: *Shenzhen Root Technology Co., Ltd. v. Chiaro Technology, Ltd.*, case no. 2-23-cv-00631 (WAWD). Pet. 104; Paper 5, 2. This case has been stayed by Order of the U. S. Bankruptcy Court for the District of Delaware. *See* Ex. 1027 (“Suggestion of Bankruptcy” filed in the related litigation); Ex. 3001 (“Joint Status Report” filed in the related litigation) (including attached Order (Ex. A) automatically staying the Western District of Washington District Court litigation).

We have *not* been informed by the parties that the Washington District Court stay has been lifted.

We note as related matters that patents challenged in IPR2025-00560, IPR2024-01296, and IPR2024-00953 involve similar breast pump technology and the same Parties.

The following chart summarizes the related IPR proceedings.

PROCEEDING	PATENT	PETITIONER	STATUS
IPR2025-00554	11,806,454	Shenzhen Root Technology	This proceeding
IPR2024-01296	11,413,380	Shenzhen Root Technology	All claims, 1–46, unpatentable in a FWD
IPR2024-00953	11,413,380	Shenzhen Root Technology	Pet. denied; parallel, 2 nd ranked petition to IPR2024-01296
IPR2024-00560	11,813,381	Shenzhen Root Technology	All claims, 1–29, unpatentable in a FWD

D. The '454 patent

We make the following findings of fact concerning the '454 patent.

The '454 patent is titled “Wearable Breast Pump System.” Ex. 1001, code (54). The disclosed technology relates to “a wearable, electrically powered breast pump system for extracting milk from a mother.” *Id.* at 1:21–23.¹ Breast pumps often augment or replace nursing a baby for many reasons. Ex. 1003 ¶ 34. “They can be used to address milk supply (either under or over-supply), separation of the mother-baby dyad, milk

¹ Citations to the '454 patent are in the format of column:line(s).

elimination, building stored milk reserves, donation (i.e., milk banking), breast mastitis, etc.” *Id.*

Breast pump systems, in general, are well-known, as disclosed in the '454 patent. *Id.* at 1:30–2:4. These known systems include fully integrated wearable breast pump systems. *Id.* at 2:7–8.

As stated in the '454 patent, in the known, fully integrated wearable systems:

there is a need for an improved way to provide an easy and flexible connection between a suction tube and a wearable milk collection device. There is also a need to provide an unobstructed view of the interior chamber of the wearable milk collection device, in order to achieve a correct nipple alignment and to ensure the system is properly operating, such that milk is entering the interior of the device.

Id. at 2–5–12.

Figure 1A, reproduced below, shows a wearable breast pump system, made up of a pair of milk collection hubs 10, an air line 12 and a separate combined control and air pump unit 11, 13 that is external to the milk collection hubs. Ex. 1001, 5:4–7 (“The system comprises a pair of milk collection hubs 10, a combined control and air pump unit 11, and an air tube connection component 12.”).

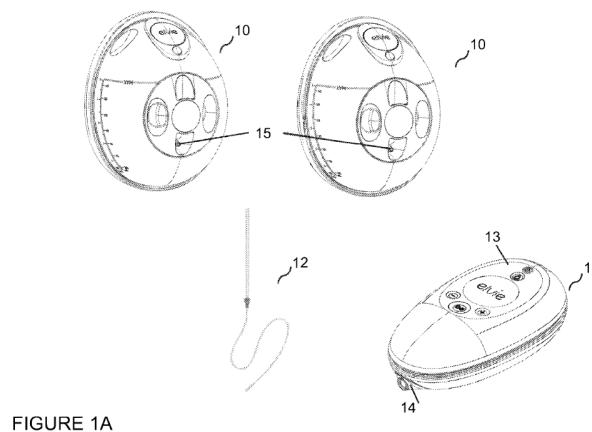


Figure 1A shows a wearable breast pump system, made up of a pair of milk collection hubs, an air line and a separate combined control and air pump unit that is external to the milk collection hubs. Ex. 1001, 2:59–62.

Figure 1B, annotated by Mr. Ryan Bauer, Petitioner’s expert witness (Ex. 1003 ¶ 54), is reproduced below and shows the wearable breast pump system with the milk collection hubs connected via the air line to the combined control and air pump unit. Ex. 1001, 2:63–65.

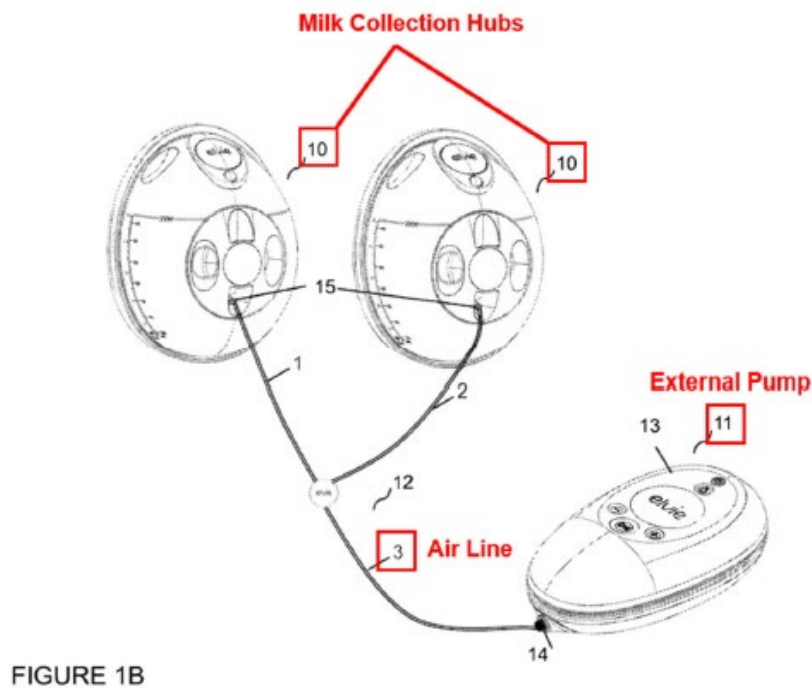


Figure 1B shows the wearable breast pump system with the milk collection hubs connected via the air line to the combined control and air pump unit. Ex. 1001, 2:63–65. Annotations identify the milk collection hubs, external pump, and air line.

Figures 2 and 3 from the '454 patent, annotated by Mr. Bauer (Ex. 1003 ¶¶ 55, 57), are reproduced below.

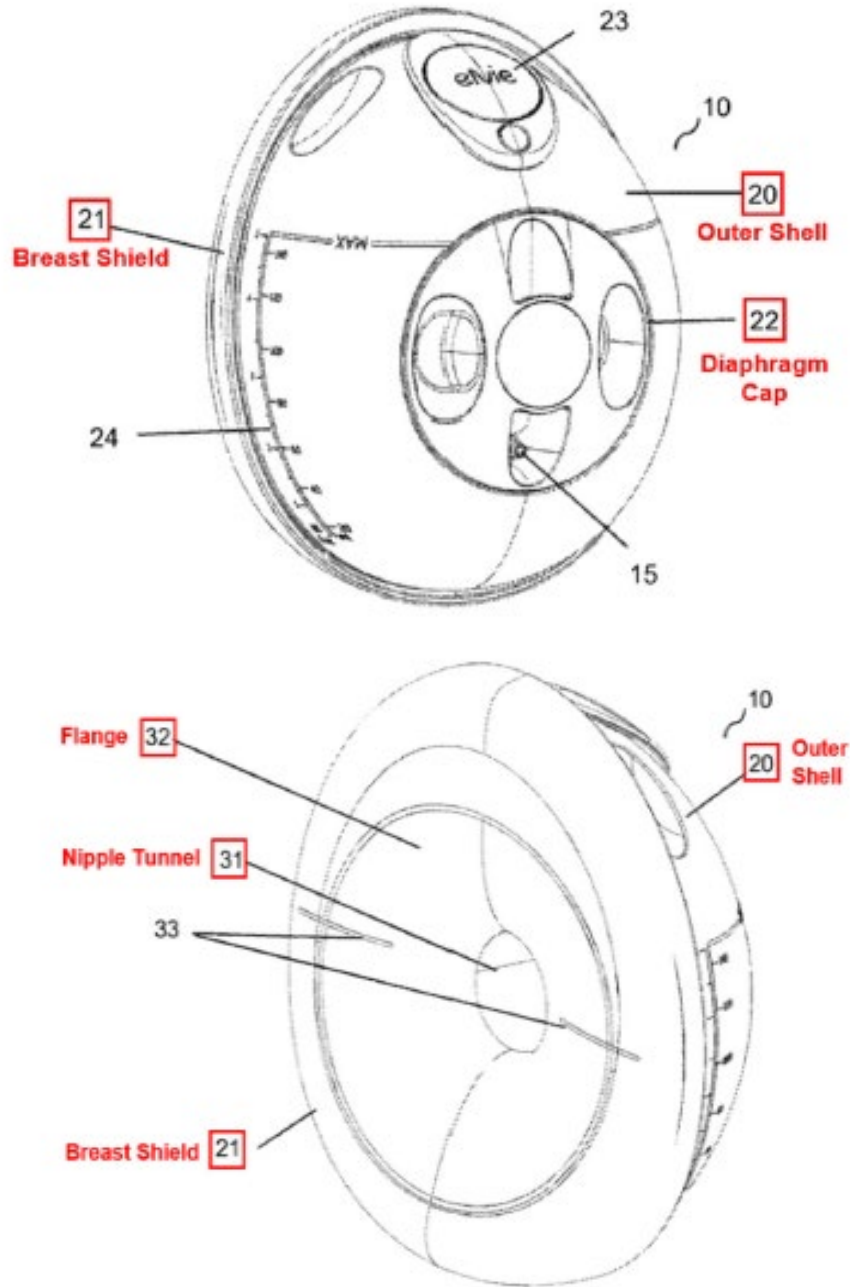


Figure 2 (on top) and Figure 3 (below Figure 2) show a perspective front view and rear view, respectively, of milk collection hub 10. Ex. 1001, 2:66–3:2. Annotations identify several elements of the disclosed invention.

As shown in Figures 2 and 3,

milk collection hubs 10 are both identical and are configured to be discreet and to be comfortably held inside a bra, with the outer shell 20 having a curved shape that is configured to contact the inner surface of the bra. The outer shell 20 fits or latches onto a breast shield 21 that forms the rear surface of the hub 10. The breast shield 21 is made up of a breast flange 32 and a nipple tunnel 31; the interior volume between the outer shell 20 and the breast shield 21 defines a chamber in which milk is collected. The breast flange 32 contacts the user's breasts. The outer shell 20 is directly removable from the breast shield in normal use or normal dis-assembly to enable cleaning of the interior volume in which milk is collected.

Ex. 1001, 5:41–53.

Figure 6 from the '454 patent, annotated by Mr. Bauer (Ex. 1003 ¶ 56), is reproduced below.

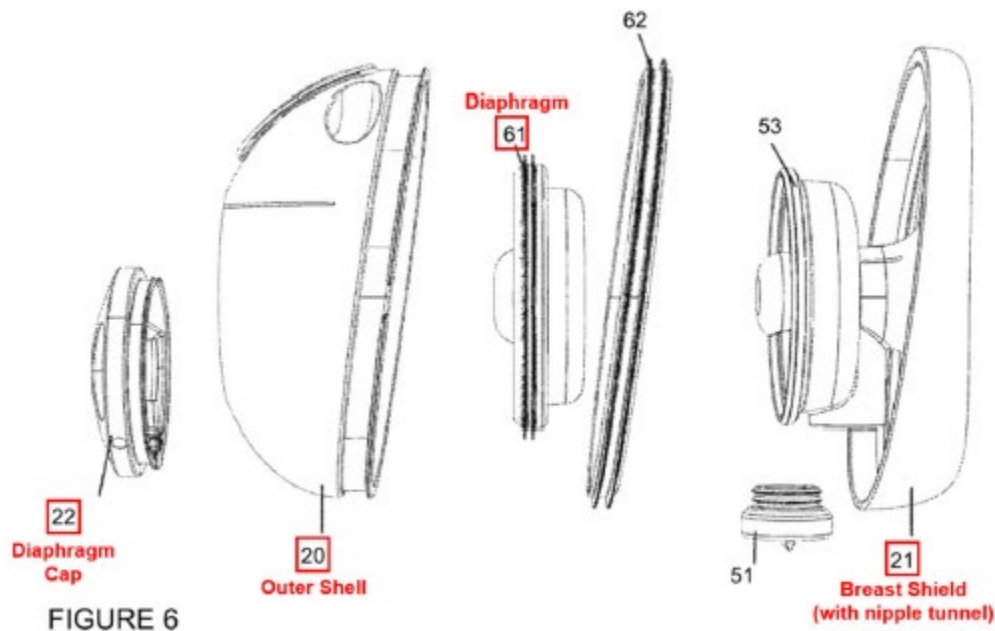


Figure 6 is an exploded view of the milk collection hub. Ex. 1001, 3:6. As shown in Figure 6, wearable milk collection hub 10 further includes breast shield 21, outer shell 20, diaphragm 61 and diaphragm cap 22.

Id. at 8:22–26. Annotations identify several elements of the disclosed invention.

Diaphragm cap 22 forms “an air-tight seal to the flexible diaphragm 61.” *Id.* at 8:26–27. An airtight seal between breast shield 21 and outer shell 20 is provided by removable seal member 62. *Id.* at 8:27–29.

In operation, once the system is activated, a pumping cycle begins. The air-pressure pump turns on and creates negative air pressure during a first phase of the pumping cycle, referred to as pumping time (P).

Id. at 13:9–12. When negative air pressure is applied to milk collection hubs 10, flexible diaphragm 61 flexes and negative air pressure is conveyed to the inside of nipple tunnel 31, to pull the breast and/or nipple, thus drawing milk from the nipple. *Id.* at 13:12–15. During this first phase of pumping cycle (P), air-pressure pump 161 is configured to be on for a pre-defined amount of time in order to provide a target negative air pressure. *Id.* at 13:15–18.

After the target negative air pressure has been reached, air-pressure pump 161 turns off, and air is bled into the system via solenoid valve 162 during the second phase of the pumping cycle, referred to as bleed time (B). *Id.* at 13:20–25. At the end of the bleed time, the system is therefore reset to ambient pressure. *Id.*

E. Illustrative Claim

The '454 patent contains 33 claims. Claims 1, 8, 17, and 28 are independent claims. Independent claims 1 and 8 are directed to a “wearable milk collection hub.” *E.g., see id.* at 23:51 (for claim 1). Independent claims 17 and 28 are directed to a “breast pump system.” *E.g., see id.* at 25:17 (for claim 17). Petitioner challenges only the “breast pump system” claims, claims 17–19 and 21–33. Claim 17 is illustrative and is

reproduced below in Petitioner’s chart with bracketed labels employed by Petitioner to facilitate analysis and discussion. *See* Pet. v.

Claim 17	
[17pre]	A breast pump system comprising:
[17a-1]	a control unit comprising:
[17a-2]	a battery, and
[17a-3]	a pump configured to be powered by the battery and to generate negative air pressure; and
[17b]	a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:
[17c-1]	a breast shield comprising:
[17c-2]	a breast flange; and
[17c-3]	a nipple tunnel extending from the breast flange;
[17d]	a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel;
[17e]	an outer shell comprising a rear end configured to removably attach to the breast shield and, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and
[17f]	a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end, the diaphragm cap forms a central region on a front surface of the outer shell.

See also Ex. 1001, 25:17–39 (claim 17 in the ’454 patent).

Independent claim 28 is substantially similar to claim 17. It differs primarily in that claim 28 states “at least a part of the diaphragm is arranged concentric with the nipple tunnel,” which is not included in claim 17. *See* Ex. 1001, 26:34–36; *see also* Section III.C.3 of this Decision providing a chart comparing claims 17 and 28 and highlighting the minor differences.

F. Prior Art and Asserted Grounds

All challenges are based on Section 103. There are two basic grounds, each relying on different “primary” references. The two basic grounds are the “Furrer”-based grounds (labeled by Petitioner as Grounds 1A–1F) (Pet. 1–2), and the “Park, Silver”-based grounds (labeled by Petitioner as Grounds 2A–2F) (*id.* at 2). Within these two basic grounds, Petitioner relies on the same “secondary” references for the dependent claims in each ground.

Petitioner asserts that one or more of the challenged claims would have been obvious on the following twelve grounds:

Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
17, 18, 21, 22, 24, 25, 27, 28, 30–32	103	Furrer
17, 18, 21, 22, 24, 25, 27, 28, 30–32	103	Furrer, Alvarez
17–19, 21–25, 27–32	103	Furrer, Alvarez, Pollen
22, 31	103	Furrer, Alvarez, Pollen, Weniger
25	103	Furrer, Alvarez, Pollen, Rigert
26, 33	103	Furrer, Alvarez, Pollen, Kasting
17–19, 21, 23, 24, 27–30, 32	103	Park, Silver
22, 31	103	Park, Silver, Weniger
25, 27–30, 32	103	Park, Silver, Rigert
31	103	Park, Silver, Rigert, Weniger
26, 33	103	Park, Silver, Kasting

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 296–07 (2011), took effect on September 16, 2011. The changes to 35 U.S.C. §§ 102 and 103 in the AIA do not apply to any patent application filed before March 16, 2013. Because the application for the patent at issue in this proceeding was filed after March 16, 2013, we refer to the AIA version of the statute.

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
33	103	Park, Silver, Rigert, Kasting

Petitioner also relies on the Declaration testimony of Mr. Ryan Bauer. *See* Ex. 1003.³ Petitioner refers to the “Furrer” based grounds as Grounds 1A–1F. Pet. 1–2. Petitioner refers to the “Park, Silver” based grounds as Grounds 2A–2F. *Id.* at 2. Petitioner also provides the following chart (*id.*) identifying each of the asserted references.

Reference	Filing Date	Publication Date
US 10,149,929 (Furrer)	Dec. 12, 2013	Dec. 1, 2018
US 2015/0283311 (Alvarez)	Feb. 6, 2015	Oct. 8, 2015
US 2015/0217035 (Pollen)	Apr. 14, 2015	Aug. 6, 2015
US 2004/0087898 (Weniger)	Nov. 1, 2002	May 6, 2004
US 2018/0021491 (Rigert)	Feb. 9, 2016	Jan. 25, 2018
US 7,677,423 (Kasting)	Feb. 14, 2006	Mar. 16, 2010
PCT WO2016/186452 (Park)	May 18, 2016	Nov. 24, 2016
US 2011/0071466 (Silver)	Sep. 17, 2010	Mar. 24, 2011

³ Mr. Bauer earned a Bachelor’s degree in Mechanical Engineering and a Master’s degree in Product Development. Ex. 1003 ¶ 4. He currently is a Director of Medical Device & Pharmaceutical Solutions at Siemens AG. Ex. 1006, 1 (Mr. Bauer’s CV). His experience in research is summarized in his curriculum vitae. *See id.* at 1–4. Mr. Bauer has experience in engineering analysis and project management of breast pumps and accessories (*id.* at 3), managed a product development department within the breastfeeding business to support new product initiatives (*id.* at 2) and was responsible for development of new strategic breast pump architecture and global product launch (*id.*).

II. ANALYSIS

A. Legal Standards

Obviousness is a legal question based on underlying findings of fact. *Guardant Health, Inc. v. Univ. of Washington*, No. 2024-1129, 2026 WL 184334, at *4 (Fed. Cir. Jan. 23, 2026) (citing *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021)). A claim is unpatentable as obvious “if the 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.” 35 U.S.C. § 103(a). *Id.* The underlying factual determinations, include: (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 available, evidence such as commercial success, long felt but unsolved needs, and failure of others.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007) (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To support this conclusion, however, it is not enough to show

⁴ There is no objective evidence of non-obviousness on the evidentiary record before us.

merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*

In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason *why* a person of skill in the art would have made the combination. *Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017).

Moreover, in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 164 (Fed. Cir. 1985) (“It is elementary that the claimed invention must be considered as a whole in deciding the question of obviousness.”); *see Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983) (“[T]he question under 35 U.S.C. § 103 is not whether the differences *themselves* would have been obvious. Consideration of differences, like each of the findings set forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention *as a whole* would have been obvious.”).

As a factfinder, we also must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post*

reasoning.” *KSR*, 550 U.S. at 421; *see also*, *Metalcraft of Mayville*, 848 F.3d at 1367 (“And while we understand that ‘[t]he obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation,’ we also recognize that we cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention.”).

Applying these general principles, we consider the evidence and arguments before us, recognizing Petitioner’s burden.

B. Level of Ordinary Skill in the Art

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“the level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention”). “This reference point prevents . . . factfinders from using their own insight or, worse yet, hindsight, to gauge obviousness.” *Id.*

Moreover, the governing statute, 35 U.S.C. § 103, and the *Graham* analysis require a factual determination of the level of ordinary skill in the art. “Without that information, a . . . court [and the Patent Trial and Appeal Board] cannot properly assess obviousness because the *critical question* is whether a claimed invention would have been obvious at the time it was made to one with ordinary skill in the art.” *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986) (emphasis added); *see also Ruiz v. A.B. Chance*, 234 F.3d 654, 666 (Fed. Cir. 2000) (“The determination of the level of skill in the art is an integral part of the *Graham* analysis.”).

Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. *Env't Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima*, 261 F.3d at 1355.

Petitioner asserts that a person of ordinary skill in the art would have had “bachelor’s degree in mechanical engineering or a similar field and at least two years of experience designing human breast pump equipment. More education could substitute for experience and vice versa.” Pet. 3–4 (citing Ex. 1003 ¶¶ 30–33).

Mr. Bauer’s Declaration testimony states he considered some of the factors listed above. Ex. 1003 ¶ 32. Mr. Bauer testifies that based on his background and experience, in his opinion, the level of ordinary skill is as stated by Petitioner. *Id.* ¶ 33.

Based on the prior art, the sophistication of the disclosed technology in the ’454 patent, and Mr. Bauer’s undisputed testimony, we adopt Petitioner’s definition of the level of ordinary skill.

C. Claim Construction

We construe each claim “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) (2021). Under this standard, claim terms are generally given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc) (“We have frequently stated that the words of a claim ‘are generally given their ordinary and customary meaning.’” (citations omitted)).

Petitioner asserts that “[a]ll claim terms should be construed according to the *Phillips* standard,” and that “no formal claim constructions are necessary for purposes of resolving controversies in this proceeding. Pet. 3. We agree.

Given the lack of dispute on this record, we do not perceive the need to construe any claim limitation. Claims must be construed “only to the extent necessary to resolve the controversy.” *AstraZeneca AB v. Mylan Pharms. Inc.*, 19 F.4th 1325, 1345 (Fed. Cir. 2021) (quoting *Vivid Techs., Inc. v. American Science & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); see also *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“Because we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy,’ we need not construe the claim preambles here where the construction is not ‘material to the [obviousness] dispute.’” (citations omitted)).

III. GROUNDS 1A, 1B⁵
CLAIMS 17, 18, 21, 22, 24, 25, 27, 28, 30–32
IN VIEW OF FURRER, ALVAREZ

Grounds 1A and 1B each challenge the same claims, claims 17, 18, 21, 22, 24, 25, 27, 28, 30–32. Ground 1A relies solely on Furrer (Ex. 1004). Pet. 7–29. Ground 1B relies on Furrer and Alvarez (Ex. 1005). *Id.* at 29–34.

Ground 1A relies on the Declaration testimony of Mr. Bauer to establish that, based on the prior art and the level of ordinary skill, the motivation for adding the element of a “control unit comprising a battery and a pump configured to be powered by the battery to generate negative air pressure,” would have been obvious to a person of ordinary skill, a degreed engineer with 2 years of experience designing human breast pump equipment. Pet. 10–12 (citing Ex.003 ¶¶ 90–93). Ground 1B relies on Alvarez for the disclosure of the battery/pump limitation and relies on Mr. Bauer’s testimony for his opinion that adding the controller/pump/battery configuration of Alvarez to the system of Furrer would have been obvious to a person of ordinary skill and explaining why he reached that opinion. Pet. 30–33 (citing Ex. 1003 ¶¶ 138, 143, 145).

We view Ground 1A and Ground 1B as essentially identical in scope and result. *See Shockwave Med., Inc. v. Cardiovascular Sys., Inc.*, 142 F.4th 1371, 1380 (Fed. Cir. 2025) (Petitioner “properly relied on general background knowledge to supply missing claim limitations (which Shockwave does not argue were novel to the invention) and used AAPA as

⁵ For consistency with the identification of the asserted grounds and Petitioner’s arguments, we use Petitioner’s alpha-numeric identification of the asserted grounds. As shown in the chart in Section I.F of this Decision, there are twelve distinct asserted grounds.

evidence of that general background knowledge. The IPR petition did not violate § 311(b).”).

First, we summarize the disclosures of Furrer and Alvarez.

A. Furrer (Ex. 1004)

We make the following findings of fact regarding Furrer.

Furrer is titled “Breast Shield Unit with Media Separation.” Ex. 1004, code (54). Furrer discloses a “breastshield unit,” for use with a “breastpump” for expressing human breastmilk. Ex. 1004, 1, 59–60. The disclosed “breastshield unit” is designed for receiving a mother's breast and a “media separation device for transferring a vacuum into the interior of the breastshield.” *Id.* at 1:61–63.

Figures 3 and 4 from Furrer, annotated by Petitioner (Pet. 7), are reproduced below. *See also* Ex. 1003 ¶¶ 61–63 (Mr. Bauer’s Declaration testimony summarizing Furrer’s disclosure and also providing additional annotated Figures 3, 4 from Furrer).

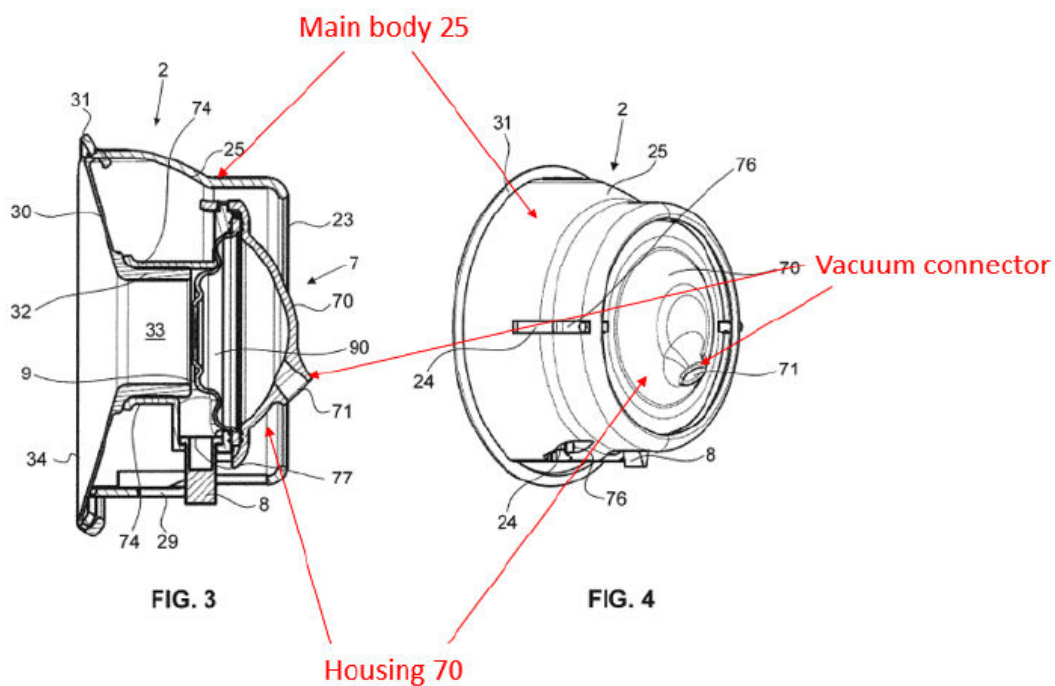


Figure 3 is a longitudinal section view through a breastshield unit. Ex. 1004, 4:27–31. Figure 4 is a perspective view of the breastshield unit. *Id.* at 4:32–33.

Furrer’s breast pump system includes “[a] vacuum connector 71 for connection to a vacuum pump (not shown)” via “a suction line.” Ex. 1004, 5:37–40. Furrer’s vacuum pump “can be driven manually or by motor.” *Id.* at 5:40–41.

As shown in the annotated figures, and as described in Furrer (*Id.* at 4:57–5:58), breastshield 2 has a dimensionally stable or stiff main body 25. “Media separation” device 7, shown as membrane 9, is held in main body 25. Main body 25 includes milk attachment part 28 with a milk outlet opening, which serves as a connection to milk collection container 5 (shown in Figures 1 and 2). Breastshield insert 3 includes breast pad 30. Breast pad 30 serves the purpose of being placed onto a mother's breast, with the nipple of the breast extending into stub 32.

Vacuum connector 71 for connection to a vacuum pump (not shown) is present on the housing 70 of the media separation device 7. Furrer discloses that this connection can be made directly or by a suction line. Furrer also discloses that the vacuum pump can be driven manually or by motor.

Based on the disclosed structure and system, a milk flow path is formed through which expressed breast milk can pass from receiving area 33 through the milk outlet opening 77, valve 8 and milk outlet 28 of main body 25 into milk collection container 5.

B. Alvarez (Ex. 1005)

We make the following findings of fact regarding Alvarez.

Alvarez is titled “Method, Apparatus, and System for Expression of Human Breast Milk.” Ex. 1005, code (54). Figure 1 from Alvarez is reproduced below.

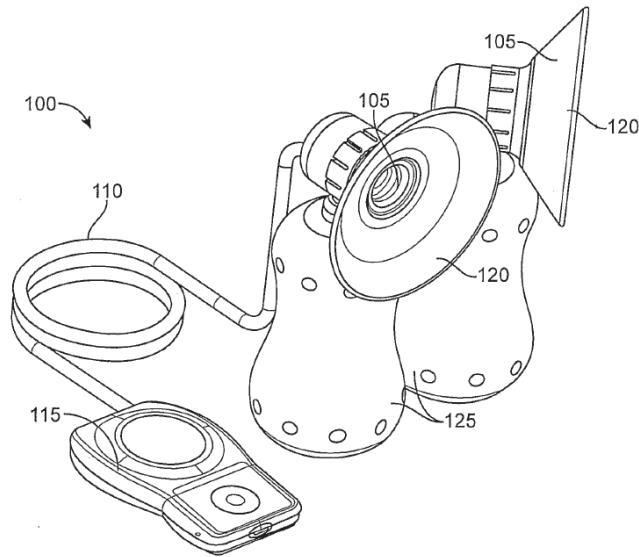


Figure 1 from Alvarez is a perspective view of the disclosed system for the expression and collection of human breast milk. Ex. 1005 ¶¶ 44, 67. As shown, Alvarez discloses:

Pumping device 100 (also known as an “expression apparatus”) includes breast interfaces 105, a tube 110, and a controller 115 (sometimes also referred to as a “pendant unit”) operatively coupled to breast interfaces 105 through tube 110. Breast interfaces 105 include resilient and conformable flanges 120, for engaging and creating a fluid seal against the breasts, and collection vessels 125.

Id. ¶ 69.

Alvarez also discloses that “[c]ontroller 115 houses the power source and drive mechanism for pumping device 100, and also contains hardware for various functions, such as controlling pumping device 100, milk production quantification, and communication with other devices.” *Id.* Additionally, Alvarez discloses that tube 110 transmits suitable energy

inputs, such as mechanical energy inputs, from controller 115 to breast interfaces 105. *Id.* Breast interfaces 105 convert the energy inputs into vacuum pressure against the breasts, resulting in the expression of milk into collection vessels 125. *Id.*

C. Analysis of Independent Claim 17

In Ground 1A, Petitioner provides a clause-by-clause analysis of independent claim 17 mapping each element or limitation of claim 17 to what Petitioner asserts is the corresponding disclosure in Furrer. Pet. 9–21.

Throughout its analysis of claim 17, Petitioner cites the written description and drawings of Furrer and the Declaration testimony of Mr. Bauer for evidentiary support. *Id.*

1. Independent Claim 17

a) [17pre] A breast pump device comprising:

Petitioner asserts that “[t]o the extent the preamble is limiting, Furrer describes ‘a breastshield unit for use with a breastpump for expressing human breastmilk.’” Pet. 10 (citing Ex. 1004, 1:16–18, 4:57–6:17; Ex. 1003, ¶¶ 61–63, 88–89). We agree. There can be no reasonable dispute that Furrer discloses a breast pump device, as asserted by Petitioner.

b) [17a-1]–[17a-3] a control unit comprising: a battery, and a pump configured to be powered by the battery and to generate negative air pressure; and:

Petitioner asserts that Furrer’s breast pump system includes “[a] vacuum connector 71 for connection to **a vacuum pump** (not shown)” via “a suction line.” *Id.* at 10 (citing Ex. 1004, 5:37–62 (emphasis added by Petitioner)). Petitioner also asserts “Furrer’s vacuum pump is motorized (‘can be driven ... by motor’) and applies ‘cyclically changing

underpressure’ via the vacuum connector 71.” *Id.* (citing 5:40–41 and 59–62). Based on this disclosure, Petitioner asserts “a POSITA would have recognized that this motorized vacuum pump would have included, or at least plainly suggested, a conventional pump control unit so as to safely and repeatably achieve Furrer’s ‘cyclically changing’ negative pressure from the disclosed vacuum pump. Pet. 10 (citing Ex. 1003 ¶¶ 90–93; Ex. 1004, 5:40–41; 59–62). Additionally, Petitioner asserts that “this suggestion in Furrer is fully consistent with Furrer’s explanation that such ‘motor-driven breastpumps are commercially available.” *Id.* at 11 (citing Ex. 1004, 1:22–33). Based on these assertions, Petitioner concludes that “Furrer discloses or renders obvious the claimed control unit. *Id.* (citing Ex. 1003 ¶ 90).

Mr. Bauer testifies that a “POSITA would have recognized that such ‘motor driven breastpumps’ that would have served as the motor driven vacuum pump in Furrer’s system are, or at least plainly suggest, control units.” Ex. 1003 ¶ 90.

Mr. Bauer also testifies that:

Furrer does not expressly state that its electric pump includes and is “powered by” a “battery.” However, this would have been obvious to a POSITA based on Furrer’s disclosure alone. In particular, as discussed above, Furrer discloses that its vacuum pump is motorized and of the type of motor-driven pumps that were commercially available at the time [*see, e.g.*, Ex.1004, 5:40–41 (“[t]he vacuum pump can be driven manually or by a motor.”)]. There were only two power sources available for commercially-available motor-driven pumps at the time, as was well-known to a POSITA: those powered by a power cord that plugs into an outlet and battery power.

Id. ¶ 92.

We also note that the term “control unit” in claim 17 recites no specific function or structure. It is a collective label for the claimed battery and pump.

In Ground 1B, relying on Furrer and Alvarez, Petitioner asserts for these same clauses [17a-1]–[17a-3] that Alvarez expressly discloses use of a battery as a power source. Pet. 33. Petitioner concludes it would have been obvious to use the battery suggested by Alvarez “to provide the claimed control unit comprising the battery and pump to generate negative air pressure.” *Id.*

Mr. Bauer further testifies:

For electric-powered breast pumps, the only two options for providing electricity to the pump was either via a wire plugged into an outlet or via a battery, as would have been well-known to a POSITA. It would have been obvious for a POSITA to utilize a battery as the power source for Furrer’s pump as it was one of the two available options and would have provided known benefits.

Ex. 1003 ¶ 93. As to why a person of ordinary skill would have chosen the option of a battery powered breast pump, Mr. Bauer testifies that:

Selection of battery power for Furrer’s pump would have beneficially provided a portable system that was usable during travel. Additionally, such a configuration would have allowed the user to move freely about a room, or be positioned in a location within a room without being tethered to a wall plug, allowing the user to, for example, sit or lay in the most convenient location while using the system without having to worry about being close to an outlet. Such mobility provided by selecting battery power for Furrer’s pump would have particularly aligned with Furrer’s suggestion for a ‘hands-free’ and discrete solution.

Id. (internal citations omitted); *see also* Ex. 1003 ¶¶ 138, 143, 145 (further discussing the motivation to combine Furrer and Alvarez in the context of Ground 1B).

We find Mr. Bauer’s testimonial evidence persuasive and undisputed as to why a person of ordinary skill, a degreed engineer with two years of experience designing human breast pump equipment, would modify Furrer to use a battery as a power source, and have a reasonable degree of confidence that it would work successfully.

Concerning the proposed combination of Furrer and Alvarez, Mr. Bauer testifies why a person of ordinary skill would combine Furrer and Alvarez, explaining that:

a POSITA⁶ would have turned to the teachings of Alvarez to implement Furrer’s vacuum pump using a conventional pump controller having a portable, battery-powered pump to not only increase portability and to allow the user to move about when using the device but also to provide improved control for the system.

Ex. 1003 ¶ 138.

Mr. Bauer also testifies:

a POSITA would have recognized that Alvarez advantageously provides details for such a conventional vacuum pump suitable for safely and controllably delivering negative pressure using a “[c]ontroller 115 [that] “houses the power source and drive mechanism for pumping device 100, and also contains hardware for various functions, such as controlling pumping device 100, milk production quantification, and communication with other devices.

⁶ “POSITA” is a patent law acronym for a “person of ordinary skill in the art.”

Id. ¶ 139 (citing Ex. 1005 ¶ 69). Mr. Bauer further explains that Alvarez discloses that a “pump unit 2100 [disclosed in Alvarez] preferably include[es] a controller and processor 2104 as well as a motor 2102 for actuating the device.” *Id.* (citing Ex. 1005 ¶ 115); *see also id.* ¶¶ 140–142 (providing “second,” “third,” and “fourth” reasons why a person of ordinary skill would have been motivated to combine Furrer and Alvarez).

Mr. Bauer concludes from his analysis that “a person skilled in the art would have reasonably expected success in making these modifications,” which he described as “simple” and “straightforward.” *Id.* ¶ 142.

Based on the disclosures in Furrer and Alvarez discussed above, and Mr. Bauer’s testimony, and without any evidence or argument to the contrary, we determine that Furrer, alone or in combination with Alvarez, discloses the claimed control unit comprising a battery and a pump.

c) [17b] a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

Petitioner asserts Furrer discloses the claimed wearable milk collection hub in the form of breastshield 2, shown in Figures 3 and 4, in which the breastshield is worn in a bra und

er the clothes. Pet. 12 (citing Ex. 1004, 1:47–52, 3:5–10 (“...worn under a bra”), 7:25–31; Ex. 1003 ¶¶ 94–96).

Regarding the claimed “air line,” Petitioner asserts Furrer’s device forms “[a] milk flow path...through which expressed breast milk can pass from the receiving area 33 through the milk outlet opening 77...into the milk collection container 5.” *Id.* at 12–13 (citing Ex. 1004, 5:43–49). Furrer’s system includes “[a] vacuum connector 71 for connection to a vacuum pump (not shown)” via “a suction line.” *Id.* at 13 (citing Ex. 1004, 5:37–40).

We agree and adopt as a finding of fact that Furrer discloses a wearable collection hub and air line, as stated in claim 17.

- d) *[17c-1]–[17c-3] a breast shield comprising: a breast flange; and a nipple tunnel extending from the breast flange;*

Petitioner asserts Furrer discloses the claimed breast shield in the form of “breastshield insert 3 having breast pad 30 (the claimed breast flange) and stub 32 that extends from the breast pad 30 and defines a ‘receiving area 33 for receiving the nipple’ (the claimed nipple tunnel).” Pet. 13 (citing Ex. 1004, 5:11–34, annotated Figs 1, 3; Ex. 1003 ¶¶ 97–100).

We agree with this analysis and adopt it as our finding of fact.

- e) *[17d] a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel;*

Petitioner asserts that Furrer’s media separation membrane 9 provides the claimed diaphragm. Pet. 14 (citing Ex. 1004, 5:50–6:17; Ex. 1003 ¶¶ 101–103).

Mr. Bauer testifies that Furrer describes the membrane 9 functions to ensure that a cyclically changing “underpressure” applied via the vacuum connector 71 is transferred into the [nipple] receiving area 33. Ex. 1003 ¶ 103 (citing Ex. 1004, 5:59–6:12).

We agree with this analysis and adopt it as our finding of fact.

- f) *[17e] an outer shell comprising a rear end configured to removably attach to the breast shield and, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and.*

Petitioner asserts that Furrer’s main body 25 in combination with housing 70 provides the claimed outer shell. Pet. 16–19 (citing Ex. 1004, 5:11–24; Ex. 1003 ¶¶ 104–109. Petitioner illustrates its mapping of Furrer’s

disclosure to the elements and limitations of this clause 17e with several annotated figures from Furrer and the '454 patent. *Id.*

We agree with Petitioner's assertions and adopt them as our finding of fact.

g) *[17f] a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end, the diaphragm cap forms a central region on a front surface of the outer shell.*

Petitioner asserts Furrer's housing 70 provides the claimed diaphragm cap that forms a central region on a front surface of the outer shell. Pet. 19–21 (citing Ex. 1004, 4:57–63, 5:35–58, 6:8–12, 6:24–30; Ex. 1003 ¶¶ 110–116). Petitioner again relies on several annotated figures to illustrate its assertions. *Id.*

We agree with Petitioner's assertions and adopt them as our finding of fact.

h) Conclusion for Claim 17

Based on the arguments and evidence, we determine Petitioner has established by a preponderance of the evidence that it would have been obvious to a person of ordinary skill to modify Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B) as proposed in the Petition and supporting evidence, including the arguments and evidence as to why a person of skill in the art would have made the combination with a reasonable expectation of success. Accordingly, we determine that independent claim 17 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

2. *Dependent Claims 18, 21, 22, 24, 25, 27*

a) *Dependent claim 18*

Claim 18 depends on claim 17 and further states: “wherein the breast shield comprises an outer edge configured to be received by the rear end of the outer shell.” Ex. 1001, 25:40–42.

Petitioner asserts that Furrer discloses several arrangements in which Furrer's breastshield insert 3 has an outer edge received by the rear end of Furrer's main body, or outer shell, 25. Pet. 21 (citing Ex. 1003 ¶ 117). Petitioner also provides the following annotated Figures 2, 3, 5, and 7 to illustrate Furrer's disclosed structure. *See id.* at 21–22.

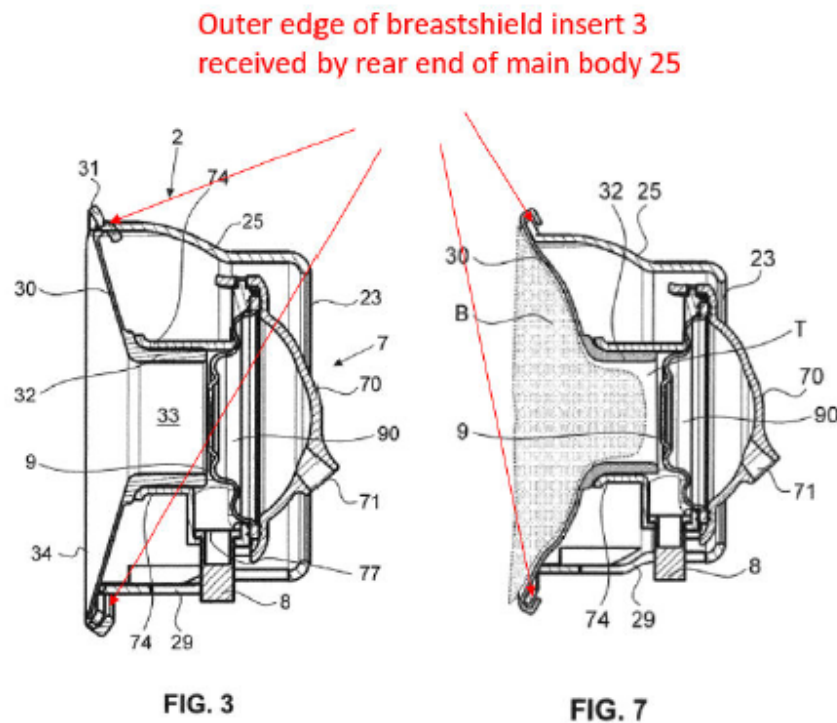


Figure 3 in Furrer “shows the breastshield unit.” Figure 7 in Furrer “shows the breastshield unit according to FIG. 3 when placed on the mother’s breast.” The annotations, in red, highlight the “[o]uter edge of breast shield insert 3 received by rear end of main body 25.” Pet. 21–22.

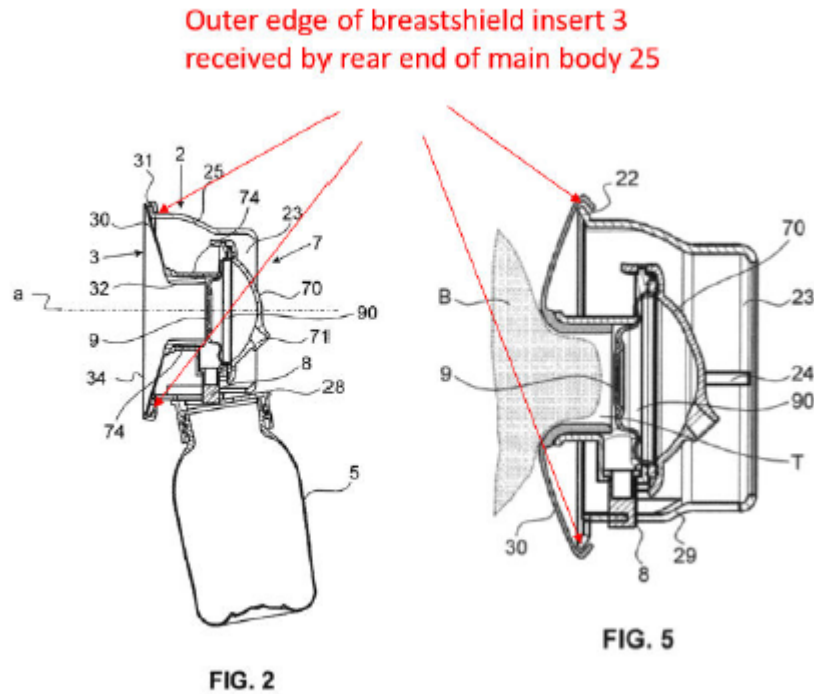


Figure 2 in Furrer shows a longitudinal section through a breast shield unit mounted on milk collection container. Figure 5 in Furrer shows a breast shield unit “placed on a mother’s breast.” The annotations, in red, highlight the “[o]uter edge of breast shield insert 3 received by rear end of main body 25.” Pet. 21–22.

We agree with Petitioner’s assertions and characterization of Furrer’s disclosure, supported by Mr. Bauer’s cited testimony, and adopt them as our finding of fact.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 18 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

b) Claim 21

Claim 21 depends on claim 17 and further states that the breast pump system of claim 17, further comprises “a milk port through which the expressed milk flows into the chamber.” Ex. 1001, 25:59–61.

Petitioner asserts “Furrer’s device includes a milk port formed between the stub 32 and membrane 9 through which the expressed milk flows into the chamber.” Pet. 23 (citing Ex. 1003 ¶¶ 118–120).

Mr. Bauer’s cited testimony, and the Furrer reference support, Petitioner’s assertion.

Mr. Bauer testifies that “Furrer’s device includes a milk port formed between the stub 32 and membrane 9 through which the expressed milk flows into the chamber.” Ex. 1003 ¶ 118 (citing Ex. 1004, 5:59–6:4). The cited disclosure in Furrer makes clear that a milk outlet opening is arranged in breastshield insert receiver 74 of the membrane 9. Ex. 1004, 5:43–49. As Furrer explains, a milk flow path is formed through which expressed breast milk can pass from receiving area 33 through milk outlet opening 77, valve 8, and milk outlet 28 of main body 25 into milk collection container 5. *Id.*

Furrer also discloses that membrane 9 “moves to and fro between two positions.” *Id.* at 6:5–12. The first position is not shown in the figures. It is directed away from the breast and is reached when an underpressure is applied. *Id.* In this first position, membrane 9 is located in the rear area of pump chamber 90, i.e. at the rear wall of housing 70. The second position is shown in Figure 3. *See* Pet. 23 (providing an annotated Figure 3 that specifically identifies the disclosed structure.).

Mr. Bauer testifies that a “POSITA would have recognized that in the undepicted “first position” [in Figure 3], the membrane 9, together with the

stub 32, defines a milk port through which the expressed milk flows into the chamber.” Ex.1003 ¶ 120.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 21 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

c) Claim 22

Claim 22 depends on claim 21 and further states “the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state. Ex. 1001, 26:1–3.

As correctly asserted by Petitioner, Furrer shows that in the relaxed state or “second position,” membrane 9 “protrudes into th[e] receiving area 33” to extend over and adjacent to the milk port. Pet. 24 (including another annotated Figure 3 to illustrate the disclosed structure and citing Ex. 1004, 6:11–17 and Ex. 1003 ¶ 121 for evidentiary support).

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 22 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

d) Claim 24

Claim 24 depends on claim 17 and further states “the diaphragm cap comprises an air port configured to receive an end of the air line.” Ex. 1001, 26:7–9.

As correctly asserted by Petitioner, “Furrer’s housing 70 (diaphragm cap) includes ‘vacuum connector 71 for connection to a vacuum pump...via a suction line.’” Pet. 25 (including another annotated Figure 3 to illustrate

the disclosed structure and citing Ex. 1004, 5:35–40 and Ex. 1003 ¶ 122 for evidentiary support).

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 24 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

e) Claim 25

Claim 25 depends on claim 24 and further states “the diaphragm cap is configured such that the air port can be located above the nipple tunnel.” Ex. 1001, 26:10–12.

Petitioner provides two alternative arguments for dependent claim 25.

First, Petitioner asserts that because “Furrer teaches that both the housing 70 and membrane 9 have a circular shape and that guide slits 24 are positioned symmetrically across from each other in the main body 25” Furrer’s housing 70 is “**configured** such that the air port **can be** located above the nipple tunnel 33.” Pet. 25–26 (citing Ex. 1004, Figs. 4 and 6). According to Petitioner, “a POSITA would have readily understood from Furrer’s depictions in FIGS. 3–6 that the housing 70 was capable of being inserted such that guide lugs of housing 70 are inserted into the opposite guide slits 24 (e.g., opposite from the orientation shown in FIGS. 4 and 6) such that the housing 70 is rotated 180 degrees from the depicted configuration and the vacuum connector 71 ‘can be’ positioned above the nipple tunnel 33.” *Id.* (citing Ex. 1003 ¶¶ 123–124). Mr. Bauer’s cited testimony supports Petitioner’s assertions.

Second, and alternatively, Petitioner asserts it would have been obvious to modify Furrer’s device such that vacuum connector 71 is

positioned above (rather than below) nipple tunnel 33. Pet. 26 (citing Ex. 1003 ¶ 125). According to Petitioner, Furrer’s device is designed to be “worn under a bra,” and therefore such a modification would have been a “more comfortable design that would have allowed the connecting suction line to protrude out of the top of the bra, rather than from the bottom of the bra, which would have been uncomfortable for users with respect to many bra designs (such as those having an underwire).” *Id.* (citing Ex. 1004, 1:47–52, 3:5–10, 7:25–31; Ex. 1003 ¶ 125 for evidentiary support).

Mr. Bauer’s testimony supports Petitioner’s assertions. Ex. 1003 ¶¶ 123–125.

Based on the arguments and undisputed evidence, we determine Petitioner has established, in both the first and second alternative arguments, by a preponderance of the evidence, that claim 25 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

f) Claim 27

Claim 27 depends on claim 17 and further states that “at least a part of the diaphragm is arranged concentric with the nipple tunnel.” Ex. 1001, 26:17–19.

Petitioner provides the following annotated Figure 3 from Furrer to illustrate that Furrer discloses this same structure. *See* Pet. 27.

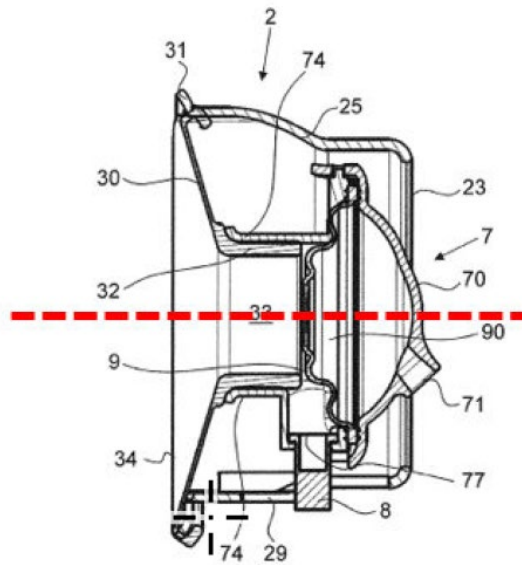


FIG. 3

Figure 3, annotated in red with a centerline showing that at least a part of diaphragm 9 is concentric with the nipple tunnel in Furrer. Ex. 1004, 5:33–34 (“the stub 32 forms, with its hollow interior, a receiving area 33 for receiving the nipple”).

Mr. Bauer’s testimony supports Petitioner’s assertions. Ex. 1003 ¶¶ 126.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 27 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

3. *Independent Claim 28*

Independent claim 28 is substantially identical to independent claim 17, as shown in the chart below, with differences highlighted.⁷ As shown in the chart below, claim 28 differs from claim 17 primarily in that claim 28 states “at least a part of the diaphragm is arranged concentric with the nipple tunnel,” which is *not* included in claim 17. *See* Ex. 1001, 26:34–36. This exact additional clause in claim 28, however, is included in dependent claim 27, which depends on independent claim 17.

Claim 17 includes one additional clause, not in claim 28, which is that “the diaphragm cap forms a central region on a front surface of the outer shell.” *See* clause [17f] in the chart below. This exact additional clause, however, is included in claim 30, which depends on claim 28.

Independent Claim 17	Independent Claim 28
17[pre] A breast pump system comprising:	[28pre] A breast pump system comprising:
[17a-1] a control unit comprising: [17a-2] a battery, and [17a-3] a pump configured to be powered by the battery and to generate negative air pressure; and	[28a-1] a control unit comprising: [28a-2] A battery, and [28a-3] a pump configured to be powered by the battery and to generate negative air pressure; and
[17b] a wearable milk collection hub configured to connect to the control unit via an air line, the wearable	[28b] a wearable milk collection hub configured to connect to the control unit via an air line, the wearable

⁷ In comparing independent claims 17 and 28, for consistency, we have used the bracketed labels and paragraphs employed by Petitioner to facilitate analysis and discussion. *See* Pet. v, vii.

milk collection hub comprising:	milk collection hub comprising:
[17c-1] a breast shield comprising: [17c-2] a breast flange; and [17c-3] a nipple tunnel extending from the breast flange;	[28c-1] a breast shield comprising: [28c-2] a breast flange; and [28c-3] a nipple tunnel extending from the breast flange;
[17d] a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel;	[28d] a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel, at least a part of the diaphragm is arranged concentric with the nipple tunnel;
[17e] an outer shell comprising a rear end configured to removably attach to the breast shield and, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and	[28e] an outer shell comprising a rear end configured to removably attach to the breast shield, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and
[17f] a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end, the diaphragm cap forms a central	[28f] a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end.

region on a front surface of the outer shell.	
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Our analyses and conclusions for claims 17 and 27 apply to claim 28. Accordingly, based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence that claim 28 would have been obvious and thus is unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

4. *Dependent Claims 30–32*

As stated above and shown in the chart above comparing claims 17 and 28, claim 30, which depends on claim 28, merely repeats a phrase in clause [17f].

Dependent claim 31 depends on claim 28 and further includes “a milk port through which the expressed milk flows into the chamber, wherein the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.” This clause is merely the combination of clauses from claims 21 and 22, which depend, directly or indirectly, from claim 17. We have analyzed claims 21 and 22 above. *See* Sections III.C.2.(b), (c) of this Decision.

Dependent claim 32 depends on claim 28 and further includes the limitation that “the diaphragm cap comprises an air port configured to receive an end of the air line.” This limitation is identical to the limitation in claim 24, which depends on claim 17, and which we analyzed above.

Our analyses and conclusions for claims 17, 21, 22, and 24 apply to claims 30–32. Accordingly, based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence that claims 30–32 would have been obvious and thus are

unpatentable based on Furrer (Ground 1A) and Furrer and Alvarez (Ground 1B).

IV. GROUND 1C
CLAIMS 17–19, 21–25, 27–32
IN VIEW OF FURRER, ALVAREZ. POLLEN

Ground 1C adds claims 19, 23, and 29 to the claims challenged in Grounds 1A and 1B. Ground 1C also adds one new reference, Pollen. First we address this new reference.

A. Pollen (Ex. 1006)

We make the following findings of fact concerning Pollen.

Pollen is titled “Superelliptical Breast Funnel.” Ex. 1006, code (54). It discloses, in general, “human breast milk collection systems and more specifically to a vented breast fitting funnel.” *Id.* ¶ 1.

In one of several disclosed embodiments, Pollen discloses breast pump system 10 that includes a milk collection device 12 with means for preventing milk 14 from backflowing to a vacuum pump 16. The general design isolates a sub-atmospheric air flow path 102 from a milk flow path 20. *Id.* ¶ 60.

Pollen’s system 10 operates in an alternating manner of suction periods and pressurized periods. *Id.* ¶ 66. During suction periods, vacuum pump 16 applies suction or air at sub-atmospheric pressure to a remote end 76 of suction tube 48. At least some of the vacuum reaches nipple chamber 36 to draw milk expressed from nipple 38. *Id.* Expressed milk 14 flows from nipple chamber 36, through milk passage 66, and collects at the bottom of charging chamber 46. *Id.* The alternating cycle of suction and pressure is repeated for as long as desired or until storage chamber 42 is filled to some predetermined capacity. *Id.* ¶ 68.

B. Claims 17–19, 21–25, 27–32

For all the claims included in Ground 1C, *except for* clause 17[e] in claim 17, and claims 19, 23, and 29, Petitioner relies on its arguments in Grounds 1A and 1B. *E.g., see* for claim 17, clause 17[e] Pet. 39 (asserting “All other elements of Claim 17 are provided by the Furrer-Alvarez-Pollen system for the same reasons discussed in the predictable Furrer-Alvarez combination of Ground 1B, *supra*.”); for claim 18, *id.* (asserting “Furrer teaches this element as detailed above. *Supra*, Ground 1A. Furthermore, Pollen provides additional evidence”); for claims 24, 25, and 27, *id.* at 43 (asserting solely “*Supra*, Ground 1A”).

The fundamental feature disclosed in Pollen on which Petitioner relies is structure to prevent milk from backflowing to a vacuum pump. Pet. 34 (citing Ex. 1006 ¶ 60). Petitioner asserts a person of ordinary skill would have been motivated to apply the teachings of Pollen to the Furrer-Alvarez combination “to advantageously store expressed milk in a storage chamber formed between the outer shell and breast shield of the resulting device (as suggested by Pollen’s milk storage chamber 42).” Pet. 35 (citing Ex. 1003 ¶¶ 149–155 (providing five reasons why it would have been obvious to combine Pollen, Furrer, and Alvarez); Ex. 1006 ¶ 62); *see also* Ex. 1003 ¶¶ 156–172 (Mr. Bauer’s declaration testimony on motivation to combine the references for the claims in Ground 1C, including annotated figures supplementing his testimony).

Thus, we address below claims 19, 23, and 29.

Claim 19, dependent on claim 17, further states “the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield.”

Claim 23, dependent on claim 21, further includes “a non-return valve configured to be mounted to the milk port.”

Petitioner asserts Pollen discloses a non-return valve mounted to the milk port. Pet. 42 (citing Ex. 1003 ¶¶ 163). According to Petitioner, Pollen discloses “a unidirectional valve 28” that “establishes a milk charging chamber 46 between nipple receptacle 36 and storage chamber 42.” Pet. 42–43 (citing Ex. 1006 ¶¶ 61, 62, 65). The cited disclosure from Pollen states that Pollen’s breast pump system includes a “a unidirectional valve 28 (e.g., a check valve, a duckbill check valve, a reed valve, a ball check valve, a diaphragm check valve, a swing check valve, etc.).” Ex. 1006 ¶ 61. Pollen further discloses:

Valve 28 establishes a milk charging chamber 46 between nipple receptacle 36 and storage chamber 42. In some examples, charging chamber 46 is cycled between positive and negative pressure to draw discrete quantities of expressed milk from nipple receptacle 36. During periods of positive pressure, charging chamber 46 discharges each discrete quantity or charge through valve 28 to storage chamber 42.

Id. ¶ 62.

Mr. Bauer testifies that a person of ordinary skill “would have recognized that the description of a “unidirectional” valve indicates that the valve is a non-return valve.” Ex. 1003 ¶ 163.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 23 would have been obvious and thus is unpatentable based on Furrer, Alvarez, and Pollen.

Claim 29, dependent on claim 28, further states “the interior volume [between the outer shell and the breast shield] is bounded by the rear end of

the outer shell and a front end of the breast shield.” This is the same limitation as in claim 19, which depends on claim 17. Petitioner asserts that the analysis and arguments for claim 19 apply equally to claim 29. We agree. Based on our findings and conclusions for claim 19, we determine Petitioner’s arguments and undisputed evidence establish by a preponderance of the evidence that claim 29 would have been obvious and thus is unpatentable based on Furrer, Alvarez, and Pollen.

V. GROUND 1D
CLAIMS 22, 31
(ADDING WENIGER)

Ground 1D challenges claims 22 and 31. Ground 1D also adds one new reference, Weniger, to the Furrer, Alvarez, and Pollen references relied on in Ground 1C.

A. Weniger (Ex. 1007)

We make the following findings regarding Weniger.

Weniger is titled Breast Pump Assembly. Ex. 1007 code (54). Weniger discloses a breast milk pump assembly for use in connection with electric or manual vacuum sources. *Id.* code 57 (Abstract). Weniger’s assembly is similar to the assemblies in the other applied references, as shown generally in Figures 2 and 3. As disclosed in Weniger, breast pump systems, in general, include “a hood or shield that receives the human female breast, a vacuum source connected to the shield for generating and intermittent vacuum (or negative pressure) within the shield, and a receptacle container for the expressed milk.” *Id.* ¶ 2. The intermittent suction action of the vacuum source serves to pull on the breast and nipple and thereby extract milk. *Id.* The extracted milk typically flows from the shield into a collection container for storage and later use. *Id.* Petitioner

relies on Weniger for its specific disclosure of its diaphragm and the milk flow passage from breast to collection container. Pet. 50–51.

B. Claims 22 and 31

Claims 22 and 31 are identical, with the one caveat that claim 22 depends indirectly on independent claim 17, whereas claim 31 depends on independent claim 28. We have discussed above the fact that independent claim 17 and independent claim 28 are essentially identical.

Claim 22 depends on claim 21, which in turn depends on independent claim 17. Dependent claim 21 adds to independent claim 17 the additional limitation of “a milk port through which the expressed milk flows into the chamber.” Claim 22 dependent on 21 adds the additional limitation that “the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.”

Dependent claim 31, dependent on independent claim 28, adds the additional limitation of “a milk port through which the expressed milk flows into the chamber, wherein the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.” Thus, claim 31 is merely a combination of claims 21 and the 22.

Claims 22 and 31, the only claims challenged in Ground 1D, also were challenged in Ground 1C. In Ground 1C, Petitioner’s sole argument is that “Furrer teaches this element as detailed above.” Pet. 42, 44 (stating for claim 22 “Furrer teaches this element as detailed above. *Supra*, Ground 1A” and stating the same for claim 31 but adding for claim 31 the additional citation “Claim 21 (Ground 1C)”).

Thus, Petitioner has challenged claims 22 and 31 in each of Grounds 1A, 1B, and 1C. In each those Grounds Petitioner, relied on Furrer for

disclosing the limitations in claims 22 and 31. *See e.g.*, for claim 22, *id.* at 24 (Ground 1A), 34 (Ground 1B stating “All other elements of the challenged claims [which includes claim 22] are provided by the Furrer-Alvarez combination for the reasons discussed in Ground 1A, *supra.*”), 42 (Ground 1C stating “Furrer teaches this element as detailed above. *Supra*, Ground 1A.”). The same repetitive reliance on Ground 1A for the limitations in claim 31 also were used in Grounds 1A, 1B, and 1C.

Now, in Ground 1D, for claims 22 and 31, Petitioner relies on Weniger, rather than Furrer as in Grounds 1A, 1B, and 1C, for a diaphragm “configured to extend over and adjacent to the milk port in a relaxed state.” Pet. 50–51 (*see also id.* at 46–47, discussing why a person of ordinary skill would have made the proposed modification with a reasonable likelihood of success). Petitioner also relies on Mr. Bauer’s testimony to support this proposed new modification relying on Weniger. *Id.* at 44–51 (citing throughout Ground 1D to Ex. 1003 ¶¶ 173–185).

We are required to consider all asserted grounds and all challenged claims in this Final Written Decision even if they are repetitious and somewhat inconsistent. *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 367 (2018) (“claims still challenged ‘by the petitioner’ at the litigation’s end must be addressed in the Board’s final written decision”); *see Adidas AG v. Nike, Inc.*, 894 F.3d 1256, 1258 (Fed. Cir. 2018) (holding if the Board institutes an IPR, it must similarly address all grounds of unpatentability raised by the petitioner, and remanding noninstituted grounds for review).

We also are mindful that Ground 1D relies on four references. The criterion for determining whether a claim would have been obvious, however, is not determined by the number of references, but what they

would have meant to a person of ordinary skill in the field of the invention. *In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991) (summarizing cases). *See also, In re Gatabi*, No. 2022-1580, 2023 WL 3477285, at *3 (Fed. Cir. May 16, 2023) (“although the Board combined as many as three prior art references to reject some of the ’758 patent’s claims, ‘a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention.’”); *see also Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1149 (Fed. Cir. 1983) (where teachings relied upon to show obviousness were repeated in a number of references, the conclusion of obviousness was strengthened).

“When it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the applicant.” *In re Gorman*, 933 F.2d at 986 (citing *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, (Fed. Cir. 1985).

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claims 22 and 31 would have been obvious and thus are unpatentable based on Furrer, Alvarez, Pollen, and Weniger.

VI. GROUND 1E
CLAIM 25
(ADDING RIGERT)

Ground 1E challenges claim 25. Ground 1E also adds one additional new reference, Rigert, in addition to the Furrer, Alvarez, and Pollen references in Ground 1C and 1D. We summarize Rigert below.

A. *Rigert Ex. (1008)*

We make the following findings regarding Rigert.

Rigert is titled “Adapter with Media Separating Diaphragm Cap for a Breast Shield.” Ex. 1008, code (54). Rigert’s assembly is similar to the assemblies in the other applied references, as shown generally in Figure 13, which shows a perspective representation of a breast pump system, a vacuum pump, and the adapter according to Rigert’s disclosed invention. *Id.* ¶ 47.

According to Rigert’s disclosure, Rigert discloses an adapter with a media separating diaphragm which enables as small a pressure drop as possible over the media separating diaphragm while still being possible to reset the media separating diaphragm reliably into its original form. *Id.* ¶ 15.

1. Claim 25

Claim 25 depends on claim 24 and further states “the diaphragm cap is configured such that the air port can be located above the nipple tunnel.” Claim 24, depends on claim 17 and states “the diaphragm cap comprises an air port configured to receive an end of the air line.”

Claim 25 also was challenged in Grounds 1A, 1B, and 1C. In each of these Grounds we determined claim would have been obvious. Petitioner relied on Furrer for the disclosure of the limitations in claim 25 in each of Grounds 1A, 1B, and 1C. *See* for Ground 1A Pet. 25–26; for Ground 1B *id.* at 34 (stating in general for all claims not specifically addressed, which includes claim 25, “All other elements of the challenged claims are provided by the Furrer-Alvarez combination for the reasons discussed in Ground 1A, *supra*”); and for Ground 1C *id.* at 43 (stating for claim 25 “Furrer teaches this element as detailed above. *Supra*, Ground 1A.”).

In Ground 1E, Petitioner now argues a person of ordinary skill “would have been prompted to position this vacuum connector port above the nipple

tunnel 33 in the Furrer-Alvarez-Pollen-Rigert combination (based on Rigert’s teachings) for multiple reasons.” Pet. 53–54 (identifying three distinct reasons why the proposed modification would have been made, with a reasonable expectation of success). Petitioner also provides annotated Figures 1 and 7 from Rigert showing how the air port is located above the nipple tunnel. *Id.* at 54–55. Throughout Petitioner’s Ground 1E assertions, Petitioner cites Mr. Bauer’s testimony for evidentiary support, including cites to Ex.1003 ¶¶ 187–192.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claim 25 would have been obvious and thus is unpatentable based on Furrer, Alvarez, Pollen, and Rigert.

VII. GROUND 1F
CLAIMS 26 AND 33
(ADDING KASTING)

Ground 1F challenges claims 26 and 33. Ground 1F also adds one additional new reference, Rigert, in addition to the Furrer, Alvarez, and Pollen references in Ground 1C and 1D. We summarize Rigert below.

A. Kasting (Ex. 1012)

We make the following findings of fact concerning Kasting.

Kasting is titled “Sealing Mechanisms for Use in Liquid-Storage Containers.” Ex. 1012, code (54). Kasting’s disclosure “relates in general to the sealing of an interface between two (or more) members, such as between a container body and a container lid.” *Id.* at 1:19–21. More specifically, Kasting disclosure “relates to sealing mechanisms, structures, and techniques to be used in combination with liquid-storage containers which may be used to store (and dispense) various liquid substances such as

paint, household cleaners, laundry products, and beverages, to name a few.” *Id.* at 1:22–27. Kasting makes it clear, however, that the disclosed invention “focuses on various sealing mechanisms which offer a variety of design options for a variety of applications and interfaces. These various sealing mechanisms of the present invention have a general applicability for sealing between two (or more) members.” *Id.* at 1:53–57. It is *not* concerned specifically with a wearable breast pump system. The words “breast” and “pump” are *not* used in Kasting’s disclosure.

1. Claims 26 and 33

Claim 26 depends on independent claim 17 and further states “the diaphragm cap comprises a pair of recessed finger grip features.” Claim 33 depends on independent claim 28 and states this exact same limitation.

Claims 26 and 33 have *not* been challenged in Grounds 1A–1E.

Petitioner asserts that Kasting discloses a lid/cap structure that includes “two recessed pockets 100 and 101” that “enable the cap 32 to be grasped in an ergonomically-convenient manner so as to more easily remove the cap...and also to more easily reapply cap 32.” Pet. 55–56 (including a copy of Figure 8 from Kasting and citing Ex. 1012, 11:33–43).

Figure 8 from Kasting is reproduced below.

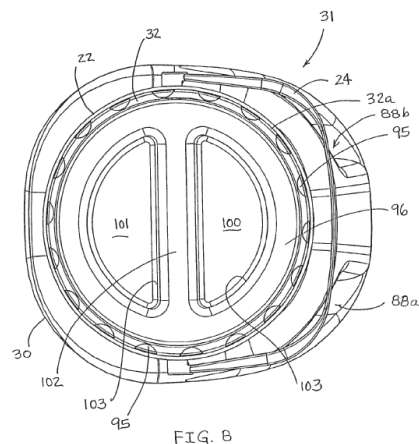


Figure 8 in Kasting is “a top plan view of the FIG. 6 paint container.” Ex. 1012, 3:38. Figure 6 in Kasting “is a right side elevational view of a paint container according to another embodiment of the present invention.” *Id.* at 3:34-35.

“Pockets 100 and 101,” on which Petitioner relies, are shown clearly in the center of Figure 8. Regarding pockets 100 and 101, Kasting discloses “The upper surface of the raised upper portion 96 is contoured with two recessed segment-shaped pockets 100 and 101 which are separated by dividing ridge 102.” *Id.* at 11:33–35. According to Kasting,

These two recessed pockets 100 and 101 in cooperation with the dividing ridge 102 enable the cap 32 to be grasped in an ergonomically-convenient manner so as to more easily remove the cap 32 from the spout 22 in order to open container 31 and also to more easily reapply cap 32 to spout 22 to close container 31.

Id. at 3:38–43.

Petitioner asserts it would have been obvious to add the ergonomically-convenient” pockets 100 and 101 to “Furrer’s housing 70” to provide “recessed finger grip features” as stated in claims 26 and 33. Pet. 56 (citing Ex. 1003 ¶¶ 194–198). Petitioner also asserts why it would have been obvious to add the recessed finger features from Kasting to the Furrer, Alvarez, Pollen structure and why a person of ordinary skill would have had a reasonable expectation of success in making the proposed modification. *Id.* at 56–57 (asserting four reasons for the proposed modification and citing Ex. 1003 (Mr. Bauer’s Declaration testimony) ¶¶ 195–198 for evidentiary support).

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence claims 26 and

33 would have been obvious and thus are unpatentable based on Furrer, Alvarez, Pollen, and Kasting.

VIII. GROUNDS 2A–2F

Grounds 2A–2F are substantially similar to Grounds 1A–1F. Rather than rely on Furrer and Alvarez, as in Ground 1, Ground 2 relies on Park and Silver in Ground 2. Petitioner continues its reliance on Weniger, Rigert, and Kasting for the dependent claims challenged in Grounds 2B–2F.

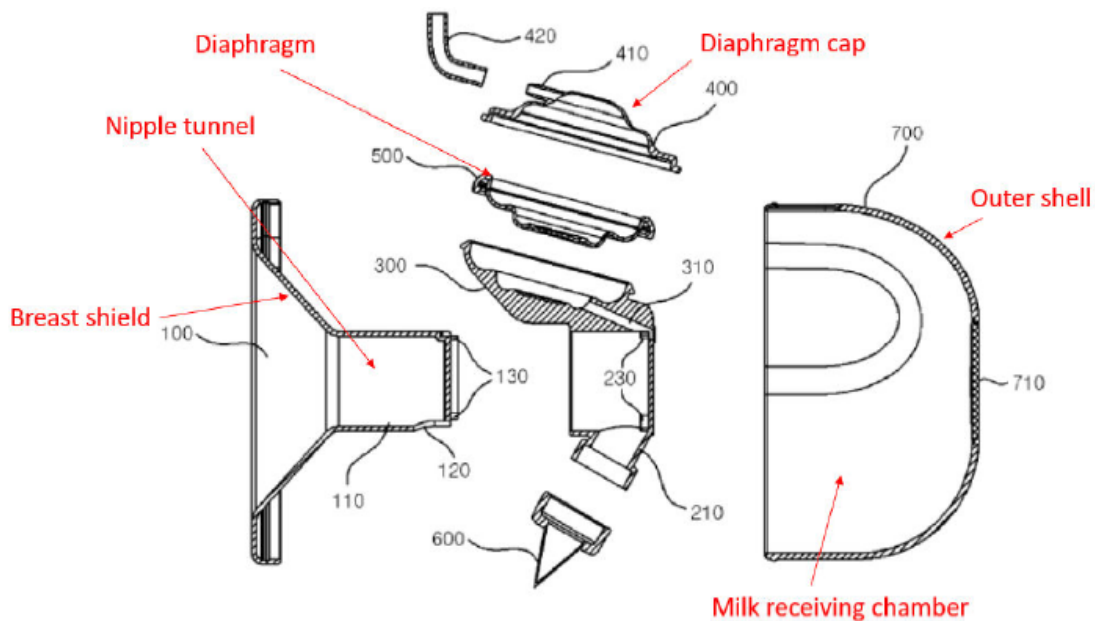
A. Park (Ex. 1009 (PCT Publ. App); Ex. 1010 (Eng. Trans.))

We make the following findings of fact concerning Park.

Park (Ex. 1009) is a published PCT⁸ patent application. Only the Abstract is published in English. The remaining text is in Korean. Exhibit 1010 is a certified English translation of the full text of the published Korean application. We will cite Exhibit 1010 in this Decision.

Petitioner provides the following annotated Figure 5 from Park.

⁸ “PCT” is the acronym for the Patent Cooperation Treaty. The PCT “makes it possible to seek patent protection for an invention simultaneously in each of a large number of countries by filing an ‘international’ patent application. Such an application may be filed by anyone who is a national or resident of a PCT Contracting State.” See [*Patent Cooperation Treaty \(PCT\)*](#) (searched Sept. 22, 2026). The PCT is administered by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.



EX1010, FIG. 5 (annotated).

Figure 5 from Park “is an exploded cross-sectional view of a breast pump according to the present invention.” Ex. 1010 ¶ 27.⁹ Petitioner’s annotations identify, in red text and arrows, the following components: “Diaphragm” 500, referred to in the translated text as “flow separation membrane 500” (*id.* at 4); “Nipple tunnel;” “Breast shield;” “Diaphragm cap;” “outer shell;” and “milk receiving chamber”. See Pet. 58 (citing Ex. 1010 ¶¶ 10, 37–39, and 44–46).

Park also discloses electric pump 800 for suctioning air through air tube 420. Pet. 60 (citing ¶¶ 37, 49).

B. Silver (Ex. 1011)

We make the following findings of fact concerning Silver.

⁹ Petitioner cites to bracketed paragraph numbers along the left margin of Exhibit 1010, rather than the page numbers at the bottom of each page. See, e.g., Pet. 58, citing Ex. 1010 ¶¶ 10, 37–39, and 44–46. In order to avoid any confusion, we will cite to the paragraph numbers also.

Silver is titled “Highly Efficient Breastpump and System for Expressing Breastmilk.” Ex. 1011, code (54). In Silver, the breastshield “substantially limits the amount of air between the breast/nipple and the breastshield surrounding the breast/nipple, and most preferably virtually eliminates any air at least in the area of the breast and nipple.” *Id.*, code (57) (Abstract). According to Silver, “[w]ith the amount of air limited, the mechanism used for generating the pressure difference in the breastshield (e.g., vacuum or negative pressure), such as a diaphragm pump, does not need to do as much work.” *Id.*; *see also id.* ¶ 13 (asserting that another benefit of the disclosed structure is “the size of pump used can be decreased, thereby reducing the overall cost of the device”).

As confirmed by Silver, and consistent with the myriad breastpump references discussed in Ground 1, “[b]reastpumps are well known.” *Id.* ¶ 5. Silver also discloses that known breastpumps:

generally are comprised of breastshields (also referred to as hoods) that fit over the breast, a vacuum pump connected to the breastshield for generating an intermittent vacuum within the breastshield, and a receptacle for the milk that is pumped from the breast. Manually driven vacuum pumps are commonplace, as well as those that are driven by a motor (house current, battery, pneumatic, etc.).

Id.

C. Analysis

Petitioner asserts that an ordinarily skilled artisan would have recognized two ways that Park and Silver can be combined. One is to use Silver’s improved breastshield in the Park system. A second is to provide Park’s electric pump 800 with a battery power source, as suggested by Silver. Pet. 62–63. Petitioner also asserts why a person of ordinary skill

would have combined Park and Silver as proposed, with a reasonable expectation of success. *Id.* at 63–69. Throughout Petitioner’s assertions, Petitioner cites the Declaration testimony of Mr. Bauer for evidentiary support.

The other references applied in Ground 2 are the same as in Ground 1.

As in Ground 1, in Ground 2 Petitioner provides a claim-by-claim, clause-by-clause detailed mapping of each challenged claim to the applied references, supported by Mr. Bauer’s testimony.

We need not repeat the analysis. We adopt Petitioner’s assertions and conclusions in Ground 2 as our findings of fact and conclusions of law.

Based on the arguments and undisputed evidence, we determine Petitioner has established by a preponderance of the evidence that the claims challenged in Grounds 2A–2F would have been obvious and thus are unpatentable based on the references asserted in each of Grounds 2A–2F.

IX. CONCLUSION¹⁰

We have determined that all challenged claims are unpatentable under each asserted ground.

X. ORDER

In consideration of the foregoing, it is hereby:

¹⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this 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), (b)(2).

ORDERED that, Petitioner has shown by a preponderance of the evidence that claims 17–19 and 21–33 of U.S. Patent 11,806,454 are not patentable;

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

XI. SUMMARY

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
17, 18, 21, 22, 24, 25, 27, 28, 30–32	103	Furrer	17, 18, 21, 22, 24, 25, 27, 28, 30–32	
17, 18, 21, 22, 24, 25, 27, 28, 30–32	103	Furrer, Alvarez	17, 18, 21, 22, 24, 25, 27, 28, 30–32	
17–19, 21–25, 27–32	103	Furrer, Alvarez, Pollen	17–19, 21–25, 27–32	
22, 31	103	Furrer, Alvarez, Pollen, Weniger	22, 31	
25	103	Furrer, Alvarez, Pollen, Rigert	25	
26, 33	103	Furrer, Alvarez, Pollen, Kasting	26, 33	
17–19, 21, 23, 24, 27–30, 32	103	Park, Silver	17–19, 21, 23, 24, 27–30, 32	
22, 31	103	Park, Silver, Weniger	22, 31	
25, 27–30, 32	103	Park, Silver, Rigert	25, 27–30, 32	

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
31	103	Park, Silver, Rigert, Weniger	31	
26, 33	103	Park, Silver, Kasting	26, 33	
33	103	Park, Silver, Rigert, Kasting	33	
Overall Outcome			17–19, 21–33	

IPR2025-00554
Patent 11,806,454 B2

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