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Paper 18
Date: February 18, 2026

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN ROOT TECHNOLOGY CO., LTD.,
Petitioner,

v.

WILLOW BLOSSOM HOLDCO LIMITED,[1]
Patent Owner.

IPR2024-01296
Patent 11,413,380 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)

[1] Willow Blossom Holdco Limited acquired Patent No. 11,413,380 B2 from patent owner Chiaro Technology Ltd. subsequent to the filing of the petition and preliminary response in this proceeding. *See* Paper 11, 1 (citing the first numbered page; the cover page is not numbered). The caption is updated to reflect this change of ownership.

I. INTRODUCTION

Shenzhen Root Technology Co., Ltd. ("Shenzhen" or Petitioner") filed a Petition (Paper 3 ("Pet.")) for *inter partes* review of claims 1–46 ("the Challenged Claims") of U.S. Patent No. 11,413,380 B2 (Ex. 1001, "the '380 patent).

Chiaro Technology Ltd. ("Chiaro"), Patent Owner at the time, filed a Preliminary Response (Paper 6 ("Prelim. Resp.")).

Based on the Petition, Preliminary Response, and evidence file by both parties, we determined that the Petition established a reasonable likelihood that at least one of the challenged claims was not patentable. Accordingly, we granted the Petition and issued a Decision to Institute an *inter partes* review based on all asserted grounds against all Challenged Claims. Paper 9 ("Dec. Inst."); Paper 10 (Scheduling Order). *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (A decision to institute is "a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition.").

Subsequently, Willow Blossom Holdco Limited ("Willow") acquired the '380 patent from Chiaro. *See* Papers 11, 1; 12, 1; Ex. 3003 (recorded Assignment). Willow informed us that it would *not* be filing a Patent Owner Response. *See* Ex. 3001 (email from counsel for Willow sent to the Board on May 21, 2025, regarding "Patent Owner's Notice of Election Not to File a POR"). The Board informed Willow that a Response was not required, that Petitioner still had the burden of proof in this proceeding, and that "we do not draw any adverse inference from Patent Owner's election." *Id.* (*see* responsive email from the Board sent May 27, 2025). We reminded Patent Owner, however, as stated in the Scheduling Order, "Patent Owner is

cautioned that any arguments not raised in the response may be deemed waived." *Id.* (citing the Scheduling Order, Paper 10 at 9).

We were also informed that both sides waived oral argument. Ex. 3002 (*see* email sent June 7, 2025, stating "both Petitioner and Patent Owner conferred and jointly agreed to not request any oral argument in this proceeding").

Additionally, we note that Patent Owner *did not* cross-examine Mr. Ryan Bauer, who provided testimonial evidence in this proceeding on behalf of Petitioner. *See* Exhibit 1003.

Thus, the record before us is the same record we had when we issued the Decision to Institute.

Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 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.").

On the record before us, we determine Petitioner has met its burden of proof on all challenged claims and on all asserted grounds.

A. REAL PARTIES IN INTEREST

Petitioner identifies itself and the entities listed below as real parties-in-interest:

Petitioner Shenzhen Root Technology Co., Ltd. states it was also known as Shenzhen Lutejiacheng Network Technology Co., Ltd.,

which changed its name to Shenzhen Lute Innovation Technology Co., Ltd., in September 2023;

Hong Kong Lute Technology Co., Ltd.;

Shenzhen Conglin E-Commerce Co., Ltd.;

Shenzhen Jinruihang Technology Co, Ltd.;

Shenzhen Xitao Network Technology Co., Ltd.;

ROOT Technology Ltd.

Pet. 86–87.

In its updated Mandatory Notice filed on May 21, 2025, Patent Owner, Willow, identifies itself and Willow Innovations, Inc. as real parties-in-interest, stating that Willow is a wholly owned subsidiary of Willow Innovations, Inc. Paper 13, 2.[2] In its updated Mandatory Notice filed on April 22, 2025, however, under the heading of "REAL PARTIES-IN-INTEREST," Willow also informs us that "Chiaro Technology Limited (in Administration) has retained claims to ongoing U.S. litigation involving the '380 patent." Paper 11, 1. In the record before us, there is no disclosure or evidence of the scope of the "retained claims." Based on the "retained claims," in the '380 patent, it appears that Chiaro has an interest and some level of control over litigation involving the '380 patent. Thus, we consider Chiaro to be a real party-in-interest.

[2] To avoid confusion, again we note that we cite the first *numbered* page. In Paper 13 filed by Patent Owner, Willow, the first numbered page after the cover page is numbered as page "2" (*see* page number in upper right corner). In Paper 11, also filed by Willow, however, the first numbered page after the cover page is numbered as page "1" (*see* page number centered at bottom of page). Because of this inconsistency, we explain that we cite to the page number of the first "numbered" page.

B. RELATED MATTERS

The parties identify as a related matter IPR2024-00953 (petition denied; second ranked parallel petition); *see also* Paper 2 in the proceeding before us (ranking parallel petitions and citing Petitioner's request that IPR2024-00953 "be dismissed").

The parties also identify the following lawsuits in which the '380 patent is asserted: *Shenzhen Root Technology Co., Ltd. v. Chiaro Technology, Ltd.*, Case No. 2:23-cv-00631 (W.D. Wash.) ("the *Shenzhen Root* case"), and *Willow Innovations, Inc. v. Chiaro Technology, Ltd.*, Case no. 2:23-cv-00229 (E.D. Tex.) (to which Petitioner is not a party) ("the *Willow* litigation"). Pet. 87; Papers 7, 11.

We also note that patents challenged in IPR2025-00554 and 00560 involve similar subject matter and the same Petitioner. The patent challenged in the '560 IPR also has a common priority claim with the patent challenged in the '1296 IPR. The following chart summarizes these related IPR proceedings.

PROCEEDING	PATENT	PETITIONER	STATUS
IPR2024-01296	11,413,380	Shenzhen Root Technology	Proceeding before us
IPR2024-00953	11,413,380	Shenzhen Root Technology	Pet. denied; parallel, 2nd ranked petition to 01296
IPR2025-00554	11,806,454	Shenzhen Root Technology	Pending; DI issued 10/14/2025
IPR2025-00560	11,813,381; common parent application with 11,413,380	Shenzhen Root Technology	Pending; DI issued 8/11/2025

C. THE '380 PATENT

We make the following finding of facts concerning the '380 patent. The '380 patent is titled "BREAST PUMP SYSTEM" and issued August 16, 2022, from Application No. 17/203,327, filed on March 16, 2021 ("the '327 Application"). Ex. 1001, codes (21), (22), (45), (54). The '380 patent refers back to prior U.S. and foreign applications for its priority claim, the earliest of which was filed on June 15, 2017. *Id.* at codes (63), (30). Thus, based on this undisputed evidence, the effective filing date of the claimed invention in this proceeding is June 15, 2017.

The disclosed invention relates, in general to a wearable, electrically powered breast pump system for extracting milk from a mother. *Id.* 1:20–23. The system includes a housing, shaped at least in part to fit inside a bra, and a piezo air-pump. *Id.* at code (57). The piezo air-pump is fitted in the housing and forms part of a closed loop system that drives a separate, deformable diaphragm to generate negative air pressure. *Id.* Also inside the housing are a battery and control electronics. *Id.* at 5:47–49.

The '380 patent seeks to addresses prior art breast pump systems' disadvantages of a user being tethered to a wall, indiscreet use, noise, discomfort, difficulty in cleaning, collection bag issues regarding difficulty in extracting all the milk from the bag, the recurring cost, small bag size, and the large size and bulkiness of prior wearable breast pump systems. Ex. 1001, 1:65–67, 2:2–4, 2:19–30, 2:38, 53–55.

Figures 1 and 2, reproduced below, annotated by Petitioner, show front and rear views, respectively, of the assembled breast pump system. *Id.* at 4:3–6; Pet. 4.

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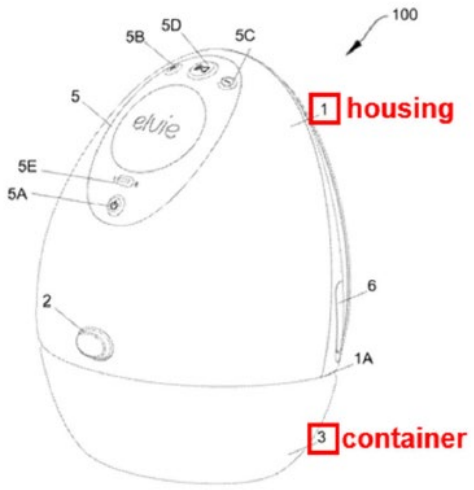


FIGURE 1

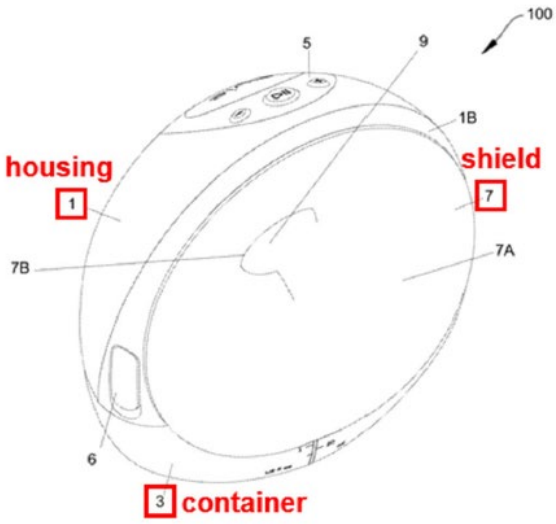


FIGURE 2

Breast pump system 100 comprises housing 1 and milk collection container 3. Ex. 1001, 5:40–47, 5:56–60. The word "elvie" shown in Figure 1 refers to the marketing name of the disclosed system. *Id.* at 5:36–40. As shown in Figure 2, breast shield 7 has a concave inner flange 7A which contacts the breast. An elongate nipple tunnel 9 aligned with an opening on breast shield 7 extends from curved section 7B in breast shield 7. *Id*. at 8:62–64, 9:28–31.

> According to the '380 patent disclosure,
>
> [u]nlike other wearable breast pumps, the only parts of the system that come into contact with milk in normal use are the breast shield and the milk container; milk only flows through the breast shield and then directly into the milk container. Milk does not flow through any parts of the housing at all, for maximum hygiene and ease of cleaning.

Id. at 5:50–55.

Figures 5 and 6, reproduced below, annotated by Petitioner, show front and rear views, respectively, of a partially disassembled breast pump system. *Id.* at 4:11–14; Pet. 5.

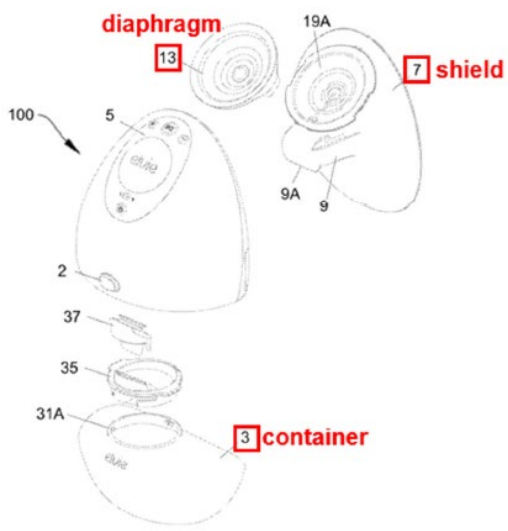


FIGURE 5

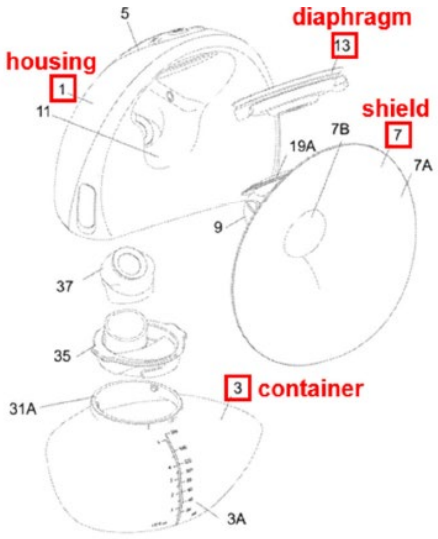
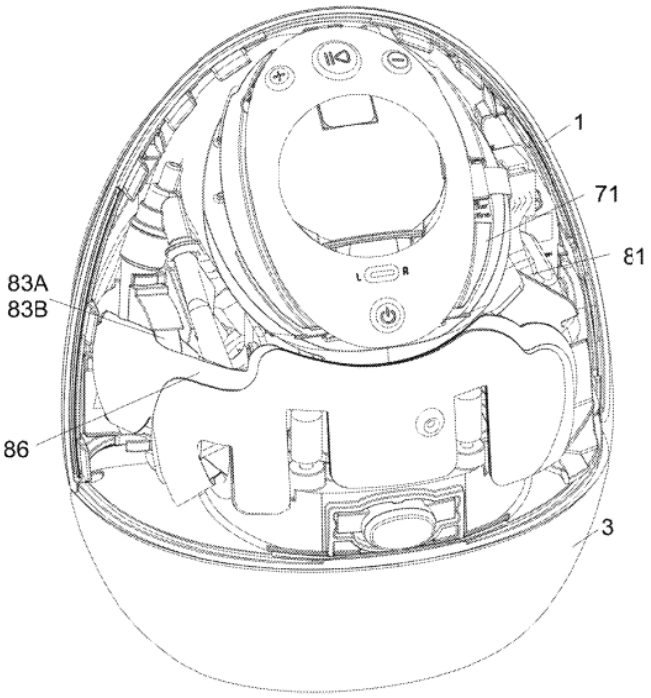


FIGURE 6

Breast shield 7 includes flexible diaphragm 13 (*see* Figure 5) "for transferring the pressure from the pump to the milk-collection side of the system." *Id.* at 10:25–29.

Housing 1 is "for receiving at least a portion of the breast shield" and comprises a pump "for generating a negative pressure in the breast shield, as well as battery and control electronics." *Id.* at 5:40–49.

Figure 7, reproduced below, shows a front view of breast pump system 100 with the outer surface drawn as translucent to show the inside components. *Id.* at 4:15–16, 13:9–11.



Control circuitry 71 within housing 1 has a power charging means for charging battery 81. *Id.* at 13:29–30. Pumps 83A and 83B are mounted in series inside housing 1 with air filter 86 at the output of the pumps and are preferably piezoelectric air pumps "which operate nearly silently and with minimal vibrations." *Id.* at 13:37–44. However, the invention may have a single pump. *Id.* at 13:38–41.

D. ILLUSTRATIVE CLAIM

Petitioner challenges claims 1–46 of the '380 patent, which are all of the claims in the patent. Pet. 2. Claims 1 and 29 are independent claims. Claims 2–28 and 30–46 depend, directly or indirectly, from claims 1 and 29, respectively. Claim 1 is illustrative of the claimed subject matter and is reproduced below with bracketed labels as added by Petitioner:

1[pre]. A breast pump device comprising:

1[a] a self-contained, in-bra wearable device comprising:

1[b] a pump housing that includes:

> 1[b][i] a rechargeable battery,
>
> 1[b][ii] a power charging circuit for controlling charging of the rechargeable battery,
>
> 1[b][iii] control electronics powered by the rechargeable battery,
>
> 1[b][iv] a pump powered by the rechargeable battery and configured to generate negative air pressure,
>
> 1[b][v] a Universal Serial Bus (USB) charging socket for transferring power to the power charging circuit and the rechargeable battery, and
>
> 1[b][vi] a recess or cavity that defines a pumping chamber;
>
> 1[c] a breast shield made up of a breast flange and a nipple tunnel;
>
> 1[d] a milk container that is configured to be attached to and removed from the pump housing; and
>
> 1[e] a diaphragm that is configured to prevent milk from reaching the pump, the diaphragm being seated against a diaphragm housing that is fixed to a recessed surface of the pump housing, and the diaphragm being a membrane that deforms in response to changes in air pressure caused by the pump to create negative air pressure in the nipple tunnel.

Ex. 1001, 71:9–33; Pet. vi. Independent claim 29 is essentially identical to claim 1. The minor differences are without a substantive distinction.[3] *See* Ex. 1003 ("Claim 29 is very similar to claim 1."). We also note that

[3] *Compare* claim 1 in the "Listing of Challenged Claims" (Pet. vi) with claim 29 (*id.* at xi–xiii). This comparison shows, for example, the preamble of claim 29 states that the breast pump device "is configured as a self-contained, in-bra wearable device." This same phrase is stated in clause 1[a] of claim 1. It is also repeated in clause 29[a]. Clause 1[b] recites a "pump housing" that includes a "pump" [clause 1[b][iv]; whereas clause 29[b] recites a "housing," without the modifier of "pump," that includes a "pump" [clause 29[b][vi]. Clause 1[e] recites a "diaphragm being a membrane;" whereas claim 29[e] recites a only a "membrane."

dependent claims 30–46 each are essentially duplicates of one of dependent claims 2–28.[4]

E. ASSERTED GROUNDS OF UNPATENTABILITY

Petitioner asserts that claim 1–46 of the '380 patent are unpatentable based on the following grounds:

Claims Challenged	35 U.S.C. §[5]	References/Basis
1–8, 11, 13–23, 25, 29–35, 37, 39–41, 43	103(a)	Chang,[6] Fang,[7] Yuen[8]
1–11, 13–23, 25–37, 39–41, 43–46	103(a)	Chang, Fang, Yuen, Khalil[9]
12, 24, 38, 42	103(a)	Chang, Fang, Yuen, Khalil, Park[10]
20	103(a)	Chang, Fang, Yuen, Khalil, Chen[11]

[4] The following pairs of dependent claims are essentially duplicates: 2/30; 3/31; 4/32; 6/33; 12/38; 13/39; 14/40; 23/41; 24/42; 25/43; 26/44; 27/45; 28/46.

[5] 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 has an effective filing date after March 16, 2013, we refer to the AIA version of the statute.

[6] US Patent App. Pub. No. 2018/0333523 A1, filed July 31, 2018, published Nov. 22, 2018 (Ex. 1007 ("Chang")).

[7] CN Utility Model CN205913571U, published Feb 1, 2017 (Ex. 1008) and Certified English Translation (Ex. 1009) ("Fang").

[8] PCT Patent Publication No. WO 2017/190678, published Nov. 9, 2017 (Ex. 1011 ("Yuen")).

[9] US Patent App. Pub. No. 2013/0023821 A1, published Jan. 24, 2013 (Ex. 1010 ("Khalil")).

[10] PCT Publication No. WO 2016/186452, published Jan. 24, 2013 (Ex. 1013), and Certified English Translation (Ex. 1014) ("Park").

[11] U.S. Patent App. Pub. No. 2017/0080135 A1, filed Mar. 15, 2016, published Mar. 23, 2017 (Ex. 1015 ("Chen")).

Petitioner also relies on the Declaration testimony of Ryan Bauer. *See* Ex. 1003.[12]

II. ANALYSIS

A. LEGAL STANDARDS

1. Obviousness

Whether the challenged claims would have been obvious over the cited references is at issue in this proceeding.

Section 103 of the patent statute forbids issuance of a patent "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious [before the effective filing date of the claimed invention] to a person having ordinary skill in the art to which the claimed invention pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).[13] The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and

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[12] Mr. Bauer earned a Bachelor's degree in Mechanical Engineering and a Master's degree in Product Development. Ex. 1003 ¶ 4. In his career in industry, he designed breast pumps and breast pump-related equipment. *Id.* ¶ 6. Mr. Bauer led a team of engineers and other professionals to design and obtain FDA and global market approvals for equipment for expressing and handling human breast milk. *Id.* He also is an inventor or co-inventor of many patents and patent applications in the human breast milk field. *Id.* ¶ 7. Mr. Bauer 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 CV. *See id.* at 1–4. Mr. Bauer's experience includes: engineering analysis and project management of breast pumps and accessories (*id.* at 3); managing product development within the breastfeeding business to support new product initiatives (*id.* at 2); and responsibility for development of new strategic breast pump architecture and global product launch (*id.*).

[13] *KSR* cites to the *pre-AIA version* of the statute. As noted above, the *AIA version* of the statute applies to the '380 patent, which we have cited above.

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.[14] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls."). The Court in *Graham* explained that these factual inquiries promote "uniformity and definiteness," for "[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context." *Graham v. John Deere*, 383 U.S. at 18.

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 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 before the effective filing date of the claimed invention "would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention." *Id.*

[14] Patent Owner does not direct us to any persuasive objective evidence of non-obviousness.

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 also 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.

Applying these general principles, we consider the evidence and arguments of the parties.

2. Petitioner's Burden

"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).

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). "This reference point prevents . . . factfinders from using their own insight or, worse yet, hindsight, to gauge obviousness." *Id.*

"The *Graham* analysis includes a factual determination of the level of ordinary skill in the art. Without that information, a . . . court cannot properly assess obviousness because the critical question is whether a claimed invention would have been obvious" at the time it was filed to one with ordinary skill in the art. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986); *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. *Best Med. Int'l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022) (citing *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007) (quoting *Env't Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696 (Fed. Cir. 1983))). These

factors are not exhaustive but merely are a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo*, 501 F.3d at 1256. 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 before the effective filing date of the claimed invention a person of ordinary skill in the art ("POSITA") "would have had at least a bachelor's degree in mechanical engineering or a similar field and at least two years of experience designing human breast pump equipment" and that "[m]ore education could substitute for experience and vice versa." Pet. 2 (citing Ex. 1003 ¶¶ 15–18). Mr. Bauer's cited testimony supports Petitioner's assertion.

Patent Owner did *not* submit a Response in this proceeding. As stated in the Introduction (Section I), we advised Patent Owner that failure to file a Response may result in a waiver of all arguments opposing the Petition. Ex. 3001 (citing the Scheduling Order, Paper 10 at 9).

Here, we exercise our discretion and note that in in the Preliminary response, the only substantive filing by Patent Owner addressing the merits of the Petition, Patent Owner states that "[f]or the purposes of this Preliminary Response, Patent Owner does not dispute the Petition's definition of a POSITA." Prelim. Resp. 19.

Based on the cited prior art references, the disclosed invention, and Mr. Bauer's Declaration testimony, we determine that the appropriate level of skill at the time of the claimed priority date, June 15, 2017, is the level of skill proposed by Petitioner. Accordingly, based on the evidence, we determine that at the applicable priority date a person of ordinary skill would have had a bachelor's degree in mechanical engineering or a similar field and at least two years of experience designing human breast pump

equipment and that more education could substitute for experience and vice versa. Pet. 2 (citing Ex. 1003 ¶¶ 15–18).

C. CLAIM CONSTRUCTION

In this *inter partes* review, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b). In applying this standard, we generally give claim terms their ordinary and customary meaning as would be 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. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

Petitioner notes that "[d]uring prosecution of the '057 application [parent application to the application that matured into the '380 patent], the Examiner construed the term 'self-contained, in-bra wearable device' to mean 'complete, or having all that is needed, in itself' and is capable of being worn in a bra." Pet. 3 (citing Ex. 1005, 2290) (emphasis omitted). According to Petitioner, "PO did not dispute this construction, and Petitioner applies it herein." *Id.* Petitioner also states that "[o]ther terms of the Challenged Claims should receive their plain and ordinary meaning, and no formal claim constructions are necessary in this proceeding because 'claim terms need only be construed to the extent necessary to resolve the controversy.'" *Id.* (citing *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); Ex. 1003 ¶¶ 69–70).

Again, because Patent Owner did not file a Response, we exercise our discretion and look to Patent Owner's Preliminary Response. We note that in the Preliminary Response Patent Owner states that "[f]or purposes of this Preliminary Response, no claim terms require construction to resolve the prior art grounds raised in the Petition." Prelim. Resp. 19. According to

Patent Owner, "[t]o the extent the Board determines any claim terms require specific construction, any such terms should be accorded their plain and ordinary meaning in light of the specification." *Id.*

Construction is needed only for those terms "that are in controversy, and only to the extent necessary to resolve the controversy." *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). There are no claim terms in controversy. Accordingly, we need not construe any terms for our analysis.

D. OVERVIEW OF REFERENCES CITED IN ASSERTED GROUNDS

1. Chang – Exhibit 1007

We make the following findings of fact concerning Chang.

Chang relates to "[s]ystems and methods for pumping milk from a breast, wherein the milk is expressed from the breast under suction and milk is expulsed from the pumping mechanism to a collection container under positive pressure." Ex. 1007, code (57). By way of background, Chang explains that "[a]lthough a variety of breast pumps are available, a number are awkward and cumbersome, requiring many parts and assemblies and being difficult to transport." *Id.* at ¶ 3. Chang explains that "[s]ome systems are battery driven, but draw down the battery power fairly rapidly as the motorized pump continuously operates to maintain suction during the milk extraction process." *Id.* Chang also discloses that "[t]o ensure that the nursing baby is receiving adequate nutrition, it is useful to monitor the baby's intake." *Id.* ¶ 5. Thus, Chang provides that it would be desirable to have a breast pump system that "easily and accurately monitors the volume of milk pumped by the system," "make[s] it convenient for the nursing

mother to know how much milk has been extracted by breast pumping," and "track[s] milk volume pumped per session, so that the volume of milk contained in any particular milk collection container can be readily known." *Id.*

To address these issues and desires, Chang discloses a breast pump system that "includes breast contacting structure and a collection or storage container or assembly, and structure that delivers milk from a breast to the collection assembly." *Id.* ¶ 7. Chang also discloses a method that "involves pumping milk from a breast and delivering the pumped milk into the collection assembly or storage container." *Id.* Chang also teaches that "[i]n one particular aspect, the breast pump system responds in real time to optimize pumping action for a particular user during a particular pumping session." *Id.*

Chang's breast pump system has a housing that "can be shaped and configured to be contoured to the breast of a user and to thus provide a more natural appearance when under the clothing of the user" and a flange "which is sized and shaped to engage a breast of a user." Ex. 1007 ¶ 71. The housing comprises a chassis, a circuit board, a rechargeable battery, pump components comprising motors, motor mountings, pumps, a conduit or flex tube, recesses, and compression and expansion members. *Id.* at ¶¶ 68, 71–73, 80. Petitioner provides an annotated version of Chang's Figure 1A, which is reproduced below. Pet. 13.

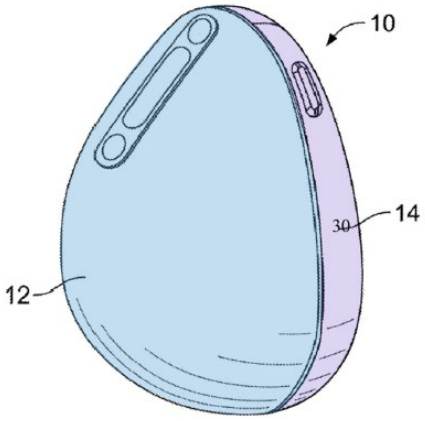


FIG. 1A

Chang's Figure 1A "shows a perspective view of a breast pump system." Ex. 1007 ¶ 30. Breast pump system 10 includes "housing or outer shell 12" that "can be shaped and configured to be contoured to the breast of a user and to thus provide a more natural appearance when under the clothing of the user" (blue in Petitioner's annotated version) and "flange 14 which is sized and shaped to engage a breast of a user" (purple in Petitioner's annotated version). *Id.* ¶ 71.

Petitioner also provides an annotated version of Chang's Figure 6A, which is reproduced below. Pet. 14.

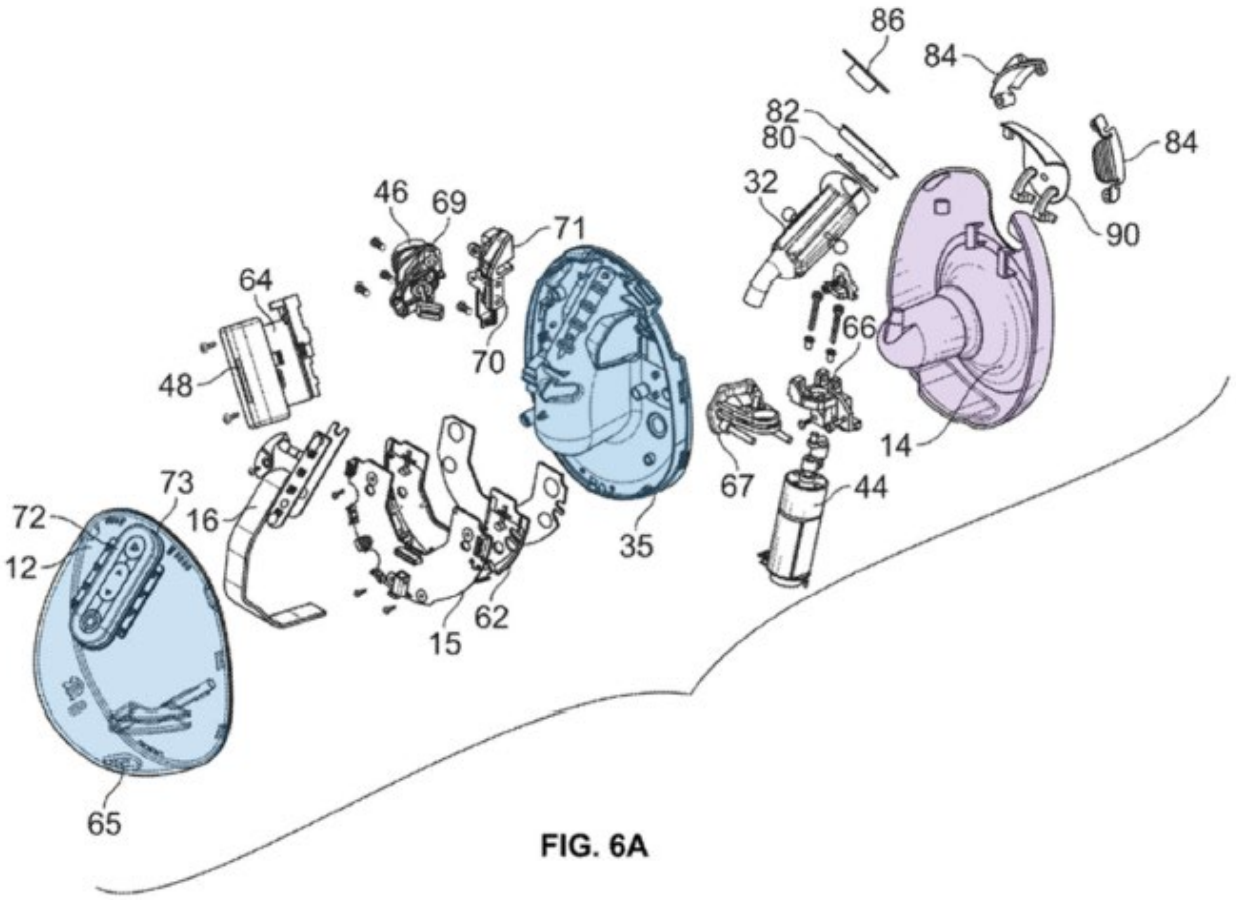


FIG. 6A

Chang's Figure 6A "is an exploded view of the system of [Figure] 1, depicting mechanical components of the system." Ex. 1007 ¶ 36. As shown in Figure 6A, chassis 35 (blue in Petitioner's annotated version) "can be configured to snap into engagement with the housing 12" (also blue in Petitioner's annotated version) and, in a preferred embodiment, "supports directly or indirectly all of the pump components." *Id.* ¶ 80. Chang teaches that "PCB controller mount 62 is supported by the chassis 35 and is configured to be connected to and support the circuit board 15" and "battery bracket 64 is also supported by the chassis 35 and is sized and shaped to receive a rechargeable battery 48 assembly that powers the system 10." *Id.*

Chang further discloses that "[m]otor mounting 66 and motor receiver structure 67 is also supported by the chassis 35 and are configured to receive and support the system motor which is powered by the battery and which functions to move actuators operating on the conduit or flex-tube 32." *Id.*

Chang also discloses a collection or container assembly for the pumped milk. *Id.* ¶ 7 (disclosing, in general, "a collection or storage container or assembly, and structure that delivers milk from a breast to the collection assembly"); *see also id.* at ¶ 99; Figs. 8–10 (disclosing and illustrating one embodiment of a milk container). The disclosed milk collection container "is positionable within the shell and the system is shaped and configured to be contoured to the breast of a user." *Id.* at ¶ 8; *see also id.* at ¶ 10 (summarizing "various embodiments" of the milk container). The milk collection container may use a one-way valve that permits milk inflow into the milk collection container but prevents milk backflow from the milk collection container to the conduit. *Id.* ¶ 21.

2. Fang – Exhibits 1008 and 1009 (English)

We make the following findings of fact concerning Fang.

Fang discloses an electric breast pump that includes a "suction head" or funnel 2 engaging the breast, milk container 3, and an elastic diaphragm 7, within cover 6, that defines an inner cavity and an outer cavity. Ex. 1009, code (57); *id.* ¶¶ 4, 19. The elastic diaphragm is used to prevent milk from flowing into the air pump main unit. *Id.* These three basic components – suction head 2, container 3, and diaphragm 7 are connected by means of three-way connector 1. *Id.* Air pump 8 provides the suction needed to transfer milk from a breast to the container. *Id.*

Figure 1 from Fang, reproduced below, is a schematic diagram of the disclosed electric breast pump. Ex. 1009 ¶¶ 11, 19. Figure 7 of Fang, also

reproduced below, is a schematic diagram of an alternate embodiment of the disclosed pump, annotated by Mr. Bauer (Ex. 1003 ¶ 80) and cited in the Petition (Pet. 17).

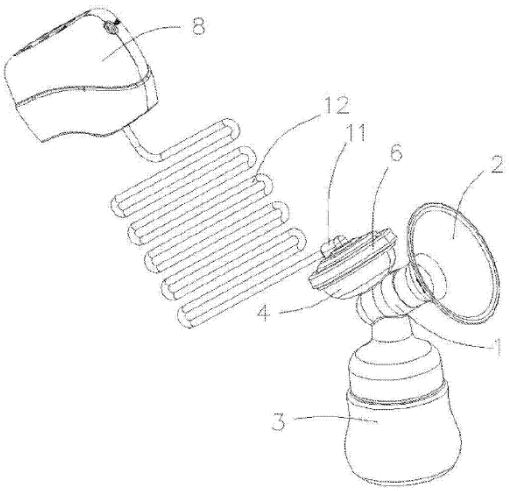
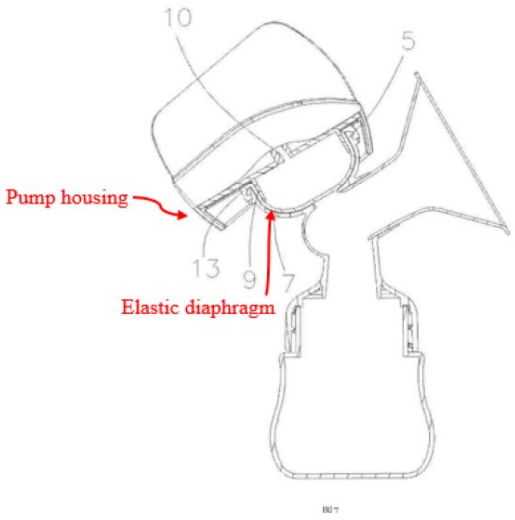


FIG. 1



EX1003, ¶80(annotating EX1008, FIG. 7)

As shown in Figure 1, Fang discloses an electric breast pump having "suction head," or funnel, 2, which engages the user's breast, and container 3, which receives milk pumped from breast by air pump 8. *Id.* ¶ 19. In Figure 1, air pump 8 is connected to air flow opening 11 of connection cover 6 by detachable air pipe 12. *See also* Fig. 5 showing an exploded view of these components.[15]

A different embodiment is shown in Figure 7 in which air pump 8 is connected directly to air flow opening 11 of connection cover 6, *without* the use of detachable air pipe 12.

[15] We note an error in Figure 5 in that suction head 2 and container 3 both are labeled with reference numeral "3." Based on the entirety of Fang's disclosure, it is clear that the suction head in Figure 5 should have been labeled with reference numeral 2.

In both embodiments, elastic diaphragm 7 "is used to prevent milk from flowing into the air pump main unit 8." Ex. 1009 ¶ 19; *see also* Ex. 1003 ¶ 79 (Mr. Bauer's testimony that diaphragm 7 prevents the pumped milk from flowing through the pump).

Thus, like the '380 patent, in Fang the milk only flows through the suction head or breast engaging element and then directly into the milk container.

As shown in annotated Figure 7, elastic diaphragm 7 has circular wrapping edge 13 sleeved on annular edge 5, and connection cover 6 (*see* Figs. 4, 5) pressing wrapping edge 13 against annular edge 5. *Id.* ¶ 20. Fang discloses that "[w]hen the air pump main unit 8 is installed on the three-way connector 1, the protruding edge 9 presses the wrapping edge 12 of the elastic diaphragm 7 against the annular edge 5." *Id.*

3. Yuen – Exhibit 1011

We make the following findings of fact concerning Yuen.

In the context of monitoring an infant's milk consumption and nutrition (Ex. 1011, 3),[16] Yuen discloses "[a]n apparatus for receiving a container, comprising: a weighing unit arranged to measure the mass of the container provided thereon during a predetermined interval." *Id.*, code (57). The apparatus also comprises "a processor arranged to [process] the measured mass during the predetermined interval to provide information relating to the consumption of the content stored in the container." *Id.*

[16] Starting with Exhibit page 3, the Yeun reference includes two different numbers on the bottom of each page. We refer to the Exhibit page number, which is beneath the original application page number.

Yeun's apparatus is powered by a rechargeable battery charged by a power supply through a charging port such as a micro-USB port. *Id.* at 16:14–16.

4. Khalil – Exhibit 1010

We make the following findings of fact concerning Khalil.

Khalil relates to "[a] breastshield unit for expressing human breastmilk." Ex. 1010, code (57). The breastshield unit has "a receiving part for receiving a human nipple, an underpressure chamber for applying an under-pressure [sic] to the nipple, wherein the receiving part opens into this underpressure chamber, and a membrane for generating an underpressure in the underpressure chamber." *Id.*

Figures 9 and 10 of Khalil, which are reproduced below, show a perspective view of a breast pump with breast shield unit with (Fig. 9) and without (Fig. 10) a cover, respectively. Ex. 1010 ¶¶ 44–45.

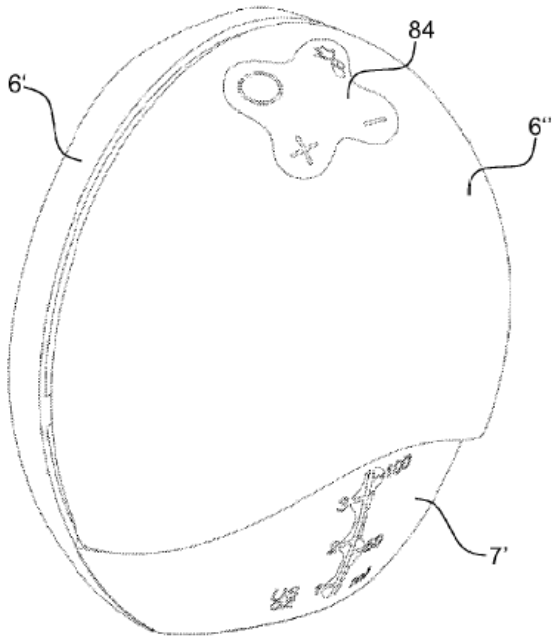


FIG. 9

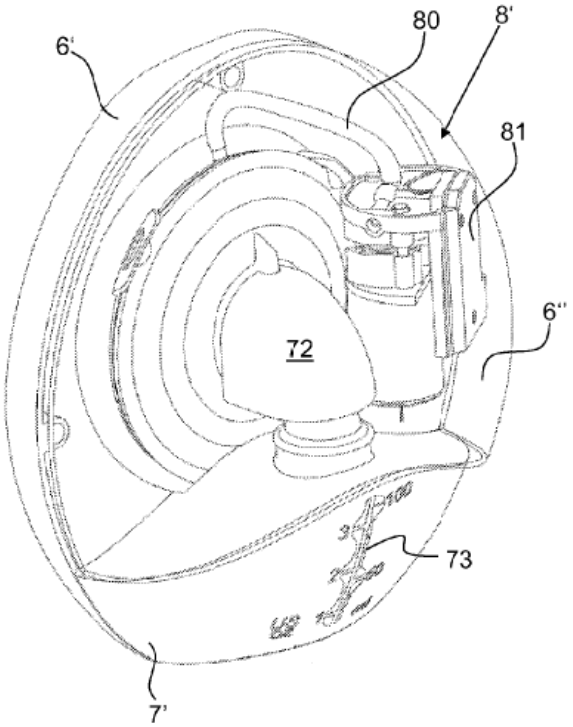


FIG. 10

Figures 9 and 10 depict an embodiment wherein "the breastshield unit is designed as a complete breastpump with an integrated suction pump unit [8']." Ex. 1010 ¶ 66. As shown in Figures 9 and 10, "shell ring 6' has an opening with a circumferential securing flange 62 for securing the breast interface 1." *Id.* ¶ 67. "A rear face, i.e., the face directed away from the breast, is partially closed by a cover [6"]," and "[a] pump seat 82, in which a vacuum pump 81 is held, is formed integrally in this cover [6"]." *Id.*

Khalil's Figure 11, reproduced below, shows an exploded view of the breast pump in Figure 9, with a breast shield interference 1, integrated milk collection container 7', and integrated vacuum pump 8' (Fig. 10). Ex. 1010 ¶ 46.

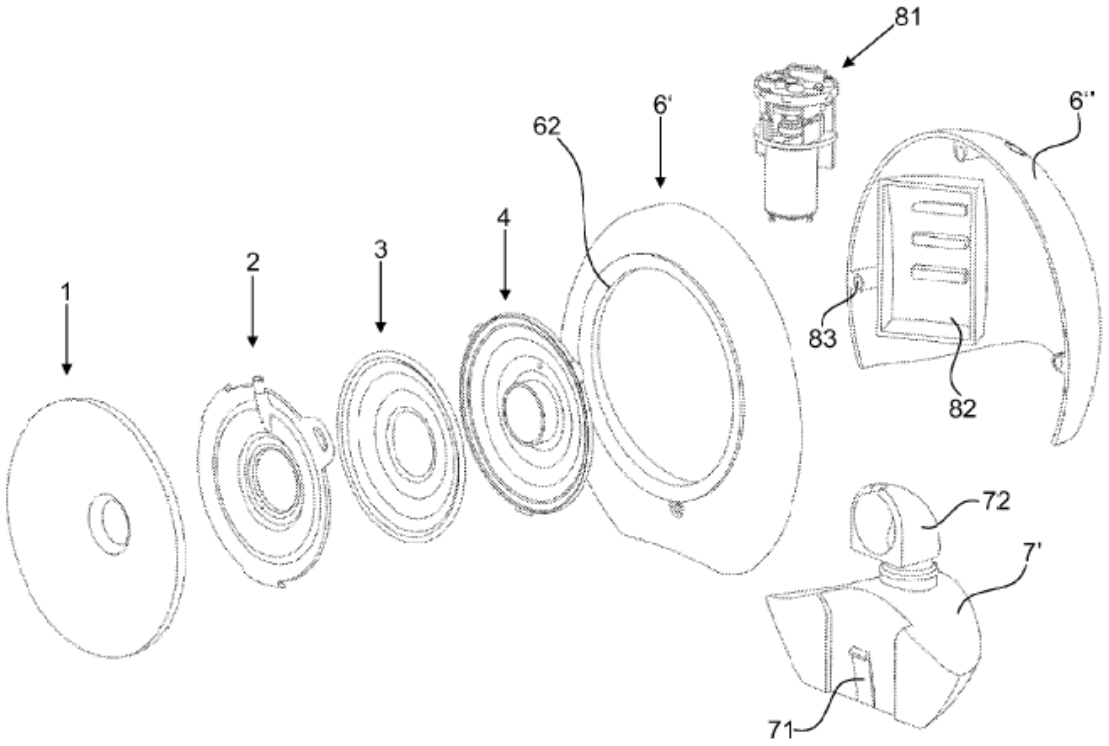


FIG. 11

Figure 11 of Khalil shows an embodiment "in which the breastshield unit is designed as a complete breastpump with an integrated suction pump

unit 8'." Ex. 1010 ¶ 66. Depicted in Figure 11 are breast interface 1, membrane housing parts 2 and 4, membrane 3, shell ring 6' with circumferential securing flange 62, a rear face partially closed by cover 6', pump seat 82 in which diaphragm vacuum pump 81 is held and formed integrally with cover 6''. *Id.* at ¶¶ 66–67. Milk collection container 7' is in the lower area adjoining cover 6''. *Id.* ¶ 69. "A locking lug 71 is integrally formed on this milk collection container 7' and can engage in a corresponding recess (not shown in the Figures) of the shell ring 6'," such that container 7' is releasably connected to shell ring 6'. *Id.* Container 7' has coupling part 72 to plug into the milk port of membrane housing part 4 facing away from the breast "such that the expressed milk can flow from the underpressure chamber 40 into the interior of milk collection container 7'." *Id.*

5. Park – Exhibits 1013 and 1014 (English)

We make the following findings of fact concerning Park.

Park "relates to a breast pump, and more particularly, to a breast pump configured to enable a lactating woman to freely use both hands during milking and to prevent breast milk from flowing backward." Ex. 1014 ¶ 1. Petitioner provides an annotated version of Park's Figure 5. Pet. 72. Figure 5 "is an exploded cross-sectional view of a breast pump" and is reproduced below as annotated by Petitioner. Ex. 1014 ¶ 27; Pet. 72.

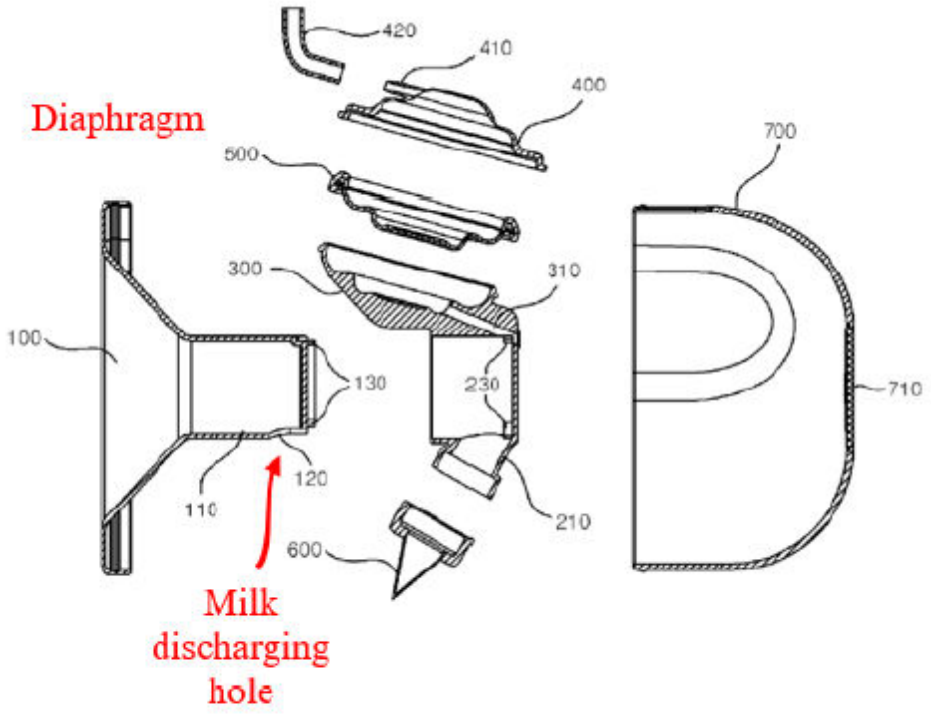


FIG. 5

Figure 5 of Park depicts "a close-contact housing 100 having a protruding part 110, which extends forward and is formed in the portion corresponding to a nipple of a lactating woman, and a breast milk discharging hole 120 formed on an end-side bottom surface of the protruding part 110." *Id.* ¶ 37. Also shown in Figure 5 is "a cover 400 coupled so as to cover the inner space of the funnel connector 300," "a flow separation membrane 500 for vertically separating the space between the funnel connector 300 and the cover 400," and "an air tube 420 for allowing air to flow into/out of the space between the cover 400 and the flow separation membrane 500." *Id.* Thus, the inner space of funnel connector 300 is sealed by flow separation membrane 500, and thus, the breast milk is not allowed to flow backward up to the air nozzle 410 to thereby be discharged to the outside or to contaminate, or be contaminated by, pump 800. *Id.* ¶ 40.

6. Chen – Exhibit 1015

We make the following findings of fact concerning Chen.

Chen "relates [to] the field of mother and baby products, in particular to a breast pump and components thereof." Ex. 1015, code (57). According to Chen, "[t]he tee joint component is different from others in that the tee joint component is only provided with one negative pressure input interface." *Id.*

Figure 2 of Chen, which is reproduced below, "is a sectional view of an electrical breast pump with the tee joint component of the [disclosed] invention." Ex. 1015 ¶ 17.

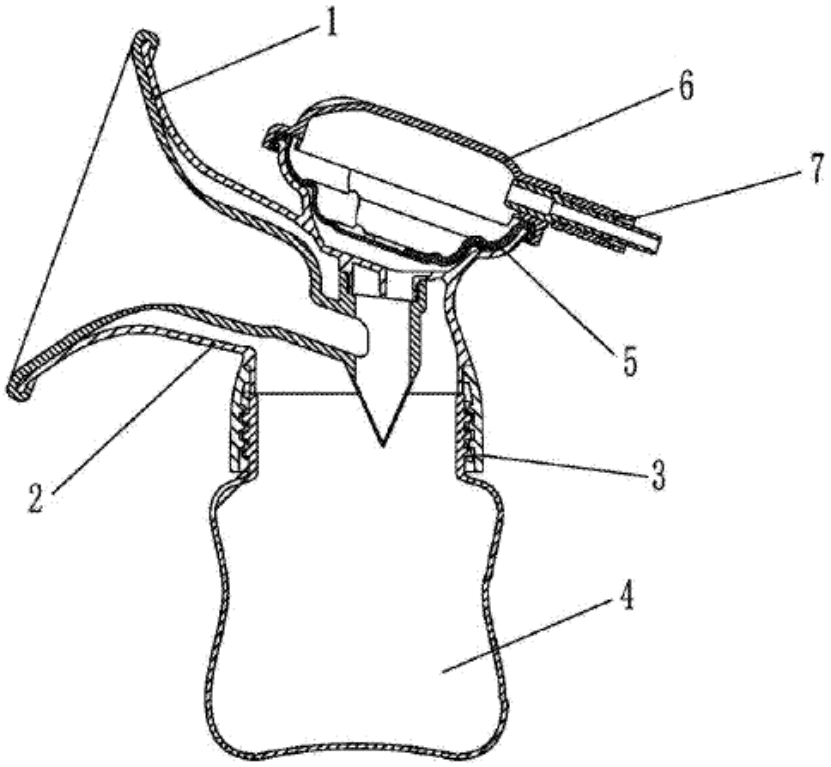


Figure 2 depicts: "1-tee joint component," "3-tee joint adapter, 4-bottle, 5-air bag, 6-air bag cover," and "7-straight through joint." *Id.* ¶ 20.

E. GROUND 1A – OBVIOUSNESS BASED ON CHANG, FANG, AND YUEN CLAIMS 1–8, 11, 13–23, 25, 29–35, 37, 39–41, AND 43

Petitioner challenges claims 1–8, 11, 13–23, 25, 29–35, 37, 39–41, and 43 as unpatentable under 35 U.S.C. § 103 over Chang in View of Fang and Yuen. Pet. 12–56. Petitioner provides a detailed explanation of its contentions in the Petition, including a clause-by-clause analysis specifying how the combination of Chang, Fang, and Yuen discloses each limitation of the challenged claims, and those contentions are supported by the testimony of Mr. Bauer. *Id.*; Ex. 1003 ¶¶ 119–179. As discussed above, claims 1 and 29 are substantively identical. Petitioner addresses independent claims 1 and 29 separately. Pet., e.g., 26, 38. We address them together, with claim 1 representative.

1. Independent Claims 1 and 29

Petitioner asserts that "the Chang-Fang-Yuen combination" teaches all the claim limitations. Petitioner provides specific citations of Chang teaching claim 1's limitations 1(pre), 1(a), 1(b), 1(b)(i), 1(b)(iii), 1(c), and 1(d), and rendering obvious limitations 1(b)(ii) and 1(b)(iii), as well as the corresponding limitations for claim 29. Pet. 26–29, 31–36, 38. Throughout its assertions Petitioner relies on the Declaration testimony of Mr. Bauer (Ex. 1003). We find Mr. Bauer's Declaration testimony to be helpful, relevant, and probative on the issues on which he testifies.

Petitioner also provides allegations of the combination of Chang and Yuen rendering obvious limitations 1(b)(ii) and 1(b)(v) (*id.* at 29, 33–34) and the combination of Chang and Fang rendering obvious limitations 1(b)(iv), 1(b)(vi), and 1(e) and the corresponding limitations of claim 29. *Id.* at 29, 33–34, 37–38.

We note here that there is no opposing evidence or argument for any of the asserted grounds or challenged claims.

(1) Limitation 1[pre]/29[pre] – A breast pump device comprising: "A breast pump device that is configured as a self-contained, in-bra wearable device, the breast pump device comprising:"

Petitioner contends, and we agree, that Chang's "portable breast pump systems" discloses a self-contained breast pump device, as stated in the preamble. Pet. 26, 38 (citing Ex. 1007, Abstr., ¶ 1, Figs. 1–21; Ex. 1003 ¶¶ 117–119, 136, 137).

(2) Limitation 1[a]/29[a] – "a self-contained, in-bra wearable device comprising:"

Petitioner contends, and we agree, that Chang's "small, portable, self-powered, energy efficient, wearable breast pump system" is self-contained and fits into a bra of the user. Pet. 26, 38 (citing Ex. 1007 ¶¶ 4, 11, 19; Ex. 1003 ¶¶ 119–132, 138–146).

(3) Limitation 1[b]29[b] – "a pump housing that includes:"; "a housing that includes:"

Petitioner contends, and we agree, that Chang discloses housing or outer shell 12 and recessed pump chassis 35 that together form a pump housing. Pet. 27–28, 38 (citing Ex. 1007 ¶¶ 71, 73, Figs. 1A, 6A; Ex. 1003 ¶ 119–132, 138–146).

(4) Limitation 1[b][i]/29[b][i] – "a rechargeable battery,"

It is beyond reasonable dispute that Chang's battery 48 provides a rechargeable power source and plugs into a power source for charging

discloses the claimed "rechargeable battery." Pet. 28, 38 (citing Ex. 1007 ¶¶ 20, 72 ("A battery 48 is included to provide a rechargeable power source and is configured to be plugged into a power source for charging"), 80, Fig, 6A; Ex. 1003 ¶¶ 119–132, 138–146).

(5) Limitation 1[b][ii]/29[b][ii] – "a power charging circuit for controlling charging of the rechargeable battery,"

As quoted above, and repeated here for emphasis, Chang discloses that "battery 48 is included to provide a rechargeable power source and is configured to be plugged into a power source for charging." Ex. 1007 ¶ 72. Petitioner first contends, and we agree, that a person of ordinary skill in the art, that is a person with a "a bachelor's degree in mechanical engineering or a similar field and at least two years of experience designing human breast pump equipment," "would have understood that Chang's disclosed device include the claimed power charging circuit "in order to achieve Chang's express objective of battery charging via an external power source." Pet. 29 (citing and quoting Ex. 1007 ¶¶ 4, 20, 72; citing Ex. 1003 ¶¶ 122–124). Petitioner asserts that such a circuit was conventional for rechargeable devices such as breast pumps and "would have been predictably implemented to include power charging circuitry electrically between the "power connector" and the "rechargeable battery" to provide for charging of the battery via power from the external power source." *Id.* (citing Ex. 1007 ¶¶ 80, 111; Ex. 1003 ¶ 122).

Alternatively, Petitioner asserts that it would have been obvious to a person of ordinary skill to combine Yuen's circuitry that "monitor[s] the charging current and overall progress" with Chang's circuit to "monitor the incoming 'charging current,' thereby ensuring proper current for safe and

effective charging" and would have done so "to facilitate safe and consistent control of charging the battery, and/or to facilitate use of power supplies of varying characteristics while allowing for effective charging." Pet. 28–30 (citing Ex. 1011, 14:14–20; Ex, 1003 ¶¶ 123–124); *see also id.* at 38 (citing Ex. 1003 ¶¶ 119–132, 138–146). We agree with Petitioner's assertion and analysis.

(6) Limitation 1[b][iii]/29[b][iii] – "control electronics powered by the rechargeable battery,"

Petitioner asserts that this limitation is met by Chang's battery 48 and a user interface panel that can include a button membrane 72 and a button membrane housing 73 supported on the housing 12, placed in engagement with the flex-circuit 16, and providing the user with system control. Pet. 31, 38 (citing Ex. 1007 ¶¶ 72, 80; Ex. 1003 ¶¶ 125). We agree. It is beyond reasonable dispute that these electronic control components in Chang are powered by Chang's rechargeable battery.

Petitioner alternatively asserts that a person of ordinary skill in the art "would have found it obvious, from Chang's description, that the control electronics are powered by the rechargeable battery" as Chang's system is battery-powered. Pet. 32 (citing Ex. 1007 ¶¶ 20, 72; Ex. 1003 ¶ 126). Petitioner asserts that one of ordinary skill in the art would "have powered the control electronics via the 'battery' to utilize an existing battery (e.g., rather than an additional power source distinct from the battery), and to achieve the express functionality of the control electronics that Chang describes." *Id.* at 32–33 (citing Ex. 1003 ¶ 126); *see also id.* at 38. Again, based on the evidence, we agree with Petitioner's assertion and analysis.

(7) Limitation 1[b][iv]/29[b][iv] – "a pump powered by the rechargeable battery and configured to generate negative air pressure,"

Petitioner contends that the combination of Chang and Fang discloses a breast pump device having "a diaphragm pump that generates negative air pressure." Pet. 33; *see also id.* at 38. Petitioner explains Chang's pump "generates suction by cyclical compression and decompression of a conduit or flex-tube, and expressly notes that other configurations were known and suitable." *Id.* at 17 (citing Ex. 1007 ¶¶ 22, 25, 28, 68, 79, 84–86). Chang, however, does not mention, specifically, that Chang's pump is a "diaphragm" pump. We note, however, that this claim clause does not state or require any specific type of pump. It merely requires a "pump." Clause 1[e]/29[e], discussed below, however, does require a "diaphragm" pump.

Petitioner here merely lays the foundation for this later clause by asserting that "Fang provides a straightforward suggestion of a diaphragm pump including a diaphragm housing component formed in a wall of the pump housing." *Id.* at 18 (citing Ex. 1009 ¶¶ 24–25, Fig. 7; Ex. 1003 ¶ 97).

Thus, Petitioner asserts, Fang teaches "an 'air pump' in pneumatic connection with the diaphragm that serves to generate negative air pressure," and Chang teaches "the location of pump components (e.g., 'motor' [46])." Pet. 33 (citing Ex. 1007 ¶¶ 72, 80, Fig, 6A; Ex. 1009 ¶¶ 19, 24). Petitioner then asserts that "the 'air pump' components of the combined device are positioned within the pump housing," and the air pump is powered by Chang's rechargeable battery. *Id.* (citing Ex. 1007 ¶¶ 72, 80).

Petitioner contends (Pet. 17) that a person of ordinary skill in the art "would have been motivated to implement Chang's breast pump device

using a pump system that utilizes a diaphragm to transmit negative pressure, as suggested by Fang" to achieve four benefits:

(1) "to facilitate convenient cleaning and maintenance" (Pet. 19 (citing Ex, 1003 ¶ 102));

(2) "to facilitate more rapid assembly and disassembly (e.g., during use)" (*id.* at 20–21 (citing Ex. 1003 ¶ 105));

(3) "as a particularly effective and suitable option to generate negative pressure within a breast pump" (*id.* at 21 (citing Ex. 1003 ¶¶ 106, 107; *Intel Corporation v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1381 (Fed. Cir. 2023))); and

(4) "because doing so was the application of a known technique (Fang's diaphragm pump components for generating negative pressure in a breast pump. . .) to a known device (. . . Chang['s] breast pump device that generates negative pressure . . .) ready for improvement to yield predictable results (including several benefits articulated above)" (*id.* at 22 (citing Ex. 1003 ¶ 108; *KSR*, 550 U.S. at 416–417)).

(8) Limitation 1[b][v]/29[b][v] – "a Universal Serial Bus (USB) charging socket for transferring power to the power charging circuit and the rechargeable battery,"

Petitioner contends that this limitation is met by the combination of Chang and Yuen. Pet. 33–34; *see also id.* at 38. Petitioner asserts "Chang describes its breast pump includes a 'cover jack…for accepting a power cord connector' for charging the rechargeable battery," and when combined with Yuen, the power cord connector in implemented as a micro-USB charging socket that receives a micro-USB plug. *Id.* at 33 (citing Ex. 1007 ¶ 80; Ex. 1003 ¶ 129). The micro-USB socket thus, according to Petitioner,

transfers power to the power charging circuit of the rechargeable battery. *Id.* at 34 (citing Ex. 1003 ¶ 129). We agree.

Mr. Bauer testifies:

> In the combined Chang-Fang-Yuen device, the power cord connector is implemented as a "micro USB" charging socket, according to Yuen's suggestions. Consistent with Chang and Fang's description, the "micro USB" socket receives a complementary micro USB plug of a charging cable. When plugged into a power source, the socket serves to transfer power to the power charging circuit and the rechargeable battery. In doing so, charging of the rechargeable battery within the device is carried out in accordance with the express objectives of Chang and Yuen.

Ex. 1003 ¶ 129.

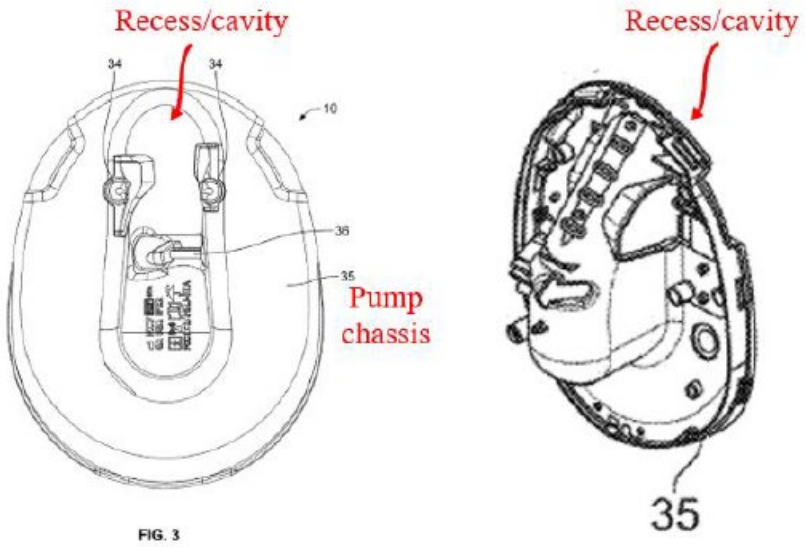
Based on the evidence before us, we determine that it is well-within the skills of a person of ordinary skill – a person with a "bachelor's degree in mechanical engineering or a similar field and at least two years of experience designing human breast pump equipment" – to add a USB charging socket, as suggested by Yuen to the self-contained, rechargeable, breast pump device disclosed in Chang.

(9) Limitation 1[b][vi] – "a recess or cavity that defines a pumping chamber;"

Petitioner contends that this limitation is met by the combination of Chang and Fang. Pet. 34; *see also id.* at 37–38. Petitioner asserts that in the proposed combination of Chang and Fang, "a recess or cavity is defined between a pump housing wall (e.g., [Chang's] "pump chassis 35") and the flexible diaphragm" of Fang that defines a pump chamber. *Id.* at 34 (citing Ex. 1007, Figs. 3, 6A; Ex. 1009, Fig, 7; Ex. 1003 ¶ 130). We agree.

Mr. Bauer's cited Declaration testimony provides the following testimony and annotated figures from Chang to illustrate the claimed recess or cavity that defines a pumping chamber.

"Chang illustrates an example recess/cavity in the pump housing wall in FIGS. 3 and 6A." Ex.1003 ¶ 130.



EX1007, FIGS. 3, 6A (annotated).

As further explained by Mr. Bauer, "Chang already describes a recess/cavity in the pump housing wall." *Id.* Additionally, Mr. Bauer testifies "[i]n the combined system [of Chang and Fang], the recess or cavity is configured in accordance with Fang's suggestions, and such that the recess or cavity between the pump housing wall and flexible diaphragm defines a pump chamber on the air-side of the diaphragm." *Id.*

As discussed above, elastic diaphragm 7 from Fang "is used to prevent milk from flowing into the air pump main unit 8." Ex. 1009 ¶ 19; *see also* Ex. 1003 ¶ 79 (Mr. Bauer's testimony that diaphragm 7 prevents the pumped milk from flowing through the pump). Thus, in the proposed combination of Chang and Fang the milk only flows through the suction

head or breast engaging element and then directly into the milk container to provide a more sanitary system that keeps milk away from the pump mechanism. Ex. 1003 ¶ 28.

(10) Limitation 1[c]/29[c] – "a breast shield made up of a breast flange and a nipple tunnel;"

Petitioner contends that Chang's breast contact portion and nipple receiving portion teach this limitation. Pet. 34–36 (citing Ex. 1007 ¶¶ 71, 90, Fig. 4; Ex. 1003 ¶ 131) *see also id.* at 38. Petitioner provides an annotated version of Chang's Figure 4 to depict the breast contact portion (breast flange) and nipple contact portion (nipple tunnel), reproduced below.

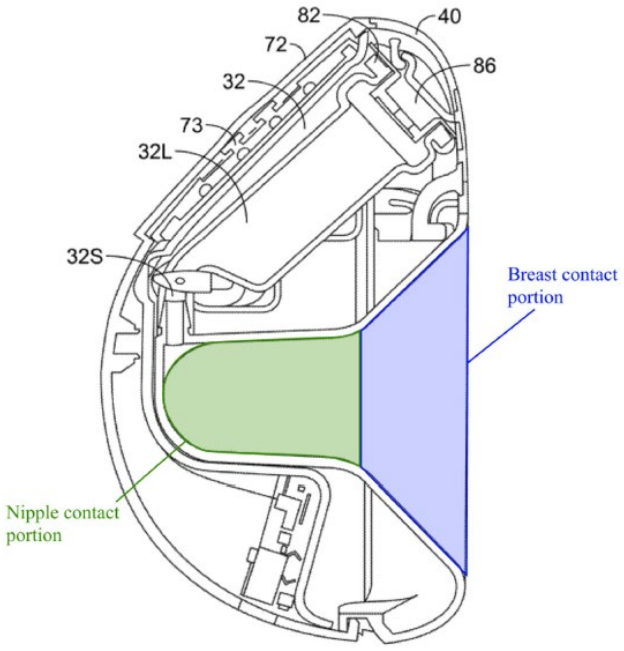


FIG. 4

Pet. 35. Petitioner's annotated Figure 4 of Chang depicts a breast contact portion in blue and a nipple contact portion in green. It is beyond reasonable dispute that Chang discloses a breast shield with a breast flange and nipple tunnel as claimed.

(11) Limitation 1[d]/29[d] – "a milk container that is configured to be attached to and removed from the pump housing;"

Petitioner contends that Chang's "milk container that is located within the device and configured to be attached to and removed from the pump housing" meets this limitation. Pet. 36 (citing Ex. 1007 ¶¶ 8, 10, 19, 21, 23, 81, 86, 92, 99, 100, 101, 106, 107, Figs. 11A–11E and reproducing Chang's Fig. 11B); *see also id.* at 38.

We agree that Chang clearly discloses a milk container as claimed. Chang discloses a collection or container assembly for the pumped milk. *Id.* ¶ 7 (disclosing, in general, "a collection or storage container or assembly, and structure that delivers milk from a breast to the collection assembly"); *see also id.* at ¶ 99; Figs. 8–10 (disclosing and illustrating one embodiment of a milk container). The disclosed milk collection container "is positionable within the shell and the system is shaped and configured to be contoured to the breast of a user." *Id.* at ¶ 8; *see also id.* at ¶ 10 (summarizing "various embodiments" of the milk container).

(12) Limitation 1[e]/29[e] – "a diaphragm that is configured to prevent milk from reaching the pump, the diaphragm being seated against a diaphragm housing that is fixed to a recessed surface of the pump housing, and the diaphragm being a membrane that deforms in response to changes in air pressure caused by the pump to create negative air pressure in the nipple tunnel."[17]

Petitioner contends this limitation of claims 1 and 29 is met by the combination of Chang and Fang. Pet. 37. Petitioner assert that Fang's flexible diaphragm 7 is seated against a diaphragm housing that is fixed to a recessed surface of the pump housing. *Id.* (citing Ex. 1009, Fig. 7; Ex. 1003, ¶ 134). Petitioner asserts that in the combined system of Chang and Fang, the "diaphragm housing features are fixed to a recessed surface of the pump housing wall (e.g., 'chassis 35')." *Id.* (citing Pet. 17–23; Ex. 1003 ¶ 134; Ex. 1012, 12:3–5). Petitioner also argues "the prior art teachings here align with the preferred embodiment of the '380 patent itself." *Id.* (citing Ex. 1001, Fig. 4). Petitioner further contends that Fang's elastic diaphragm deforms away from the nipple tunnel and creates negative air pressure when a vacuum is created on the pumping chamber. Pet. 37–38 (citing Ex. 1009 ¶¶ 16, 20–25; Ex. 1003 ¶ 135). We agree.

For the limitation in claim 29, Petitioner similarly relies on the combination of Chang and Fang. Pet. 38. Petitioner asserts that Fang teaches an elastic diaphragm configured to define a pumping chamber at in

[17] Clause 1(e) is shown. Clause 29(e) is substantively identical.

least in part with an exposed external surface of Chang's chassis 35 that houses pump components internally. *Id.* (citing Ex. 1007, Figs, 3, 6A; Ex, 1009 ¶ 24, Fig, 7).

b) Conclusion for claims 1 and 29

Having considered the arguments and evidence before us, we determine that Petitioner has established by a preponderance of the evidence that independent claims 1 and 29 would have been obvious over Chang, Fang, and Yuen.

2. Dependent claims 2–8, 11, 13–23, 25, 30–35, 37, 39–41, and 43

Petitioner contends that dependent claims 2–8, 11, 13–23, 25, 30–35, 37, 39–41, and 43, each depending, directly or indirectly, from one of claims 1 and 29, would have been obvious over Chang, Fang, and Yeun. Pet. 38–56.

As we have noted above in footnote 4, similar to the substantive identity of claims 1 and 29, the dependent claims dependent from claim 29, are essentially duplicates of the dependent claims dependent from claim 1. We will address only the claims dependent from claim 1, and state that our findings and conclusions regarding the claims dependent from claim 1 apply equally to the corresponding dependent claims dependent from claim 29.

a) Claims 2 and 30

Claim 2, which is exemplary, states: "The breast pump device of claim 1, wherein the breast shield is configured to rotate smoothly around a nipple inserted into the nipple tunnel to provide a correct positioning of the breast shield onto a breast."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 38–

39. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id.*

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 2 and 30 would have been obvious in view of the cited references.

b) Claims 3 and 31

Claim 3, which is exemplary, states: "The breast pump device of claim 1, wherein the breast shield is a one piece item that in use presents a single continuous surface to a nipple and a breast."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 39–41. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id.*

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 3 and 31 would have been obvious in view of the cited references.

c) Claims 4 and 32

Claim 4, which is exemplary, states: "The breast pump device of claim 1, wherein the breast shield has a top and bottom when positioned upright for normal use, and wherein the breast shield is generally symmetrical about a center-line running from the top to the bottom of the breast shield when positioned upright for normal use."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 41–

42. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 4 and 32 would have been obvious in view of the cited references.

d) Claim 5

Claim 5 states: "The breast pump device of claim 1, wherein the breast shield is configured to slide in and out from the pump housing, together with the diaphragm that prevents milk from reaching the pump."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 42–43. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 5 would have been obvious in view of the cited references.

e) Claims 6 and 33

Claim 6, which is exemplary, states: "The breast pump device of claim 1, wherein the breast pump device includes only the breast shield and the milk container that are directly removable from the pump housing in normal use or normal dis-assembly."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 44. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 6 and 33 would have been obvious in view of the cited references.

f) Claims 7 and 34

Claim 7, which is exemplary, states: "The breast pump device of claim 1, wherein the diaphragm is substantially circular and the diaphragm housing is substantially circular."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 44–45. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 7 and 34 would have been obvious in view of the cited references.

g) Claims 8 and 35

Claim 8, which is exemplary, states: "The breast pump device of claim 1, wherein the milk container is substantially rigid."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 45. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 8 and 35 would have been obvious in view of the cited references.

h) Claims 11 and 37

Claim 11, which is exemplary, states: "The breast pump device of claim 1, wherein the milk container is attachable to the pump housing with a mechanical or magnetic mechanism that releasably attaches or latches when the milk container is sufficiently pressed on to the pump housing with a single push action."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 46. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 11 and 37 would have been obvious in view of the cited references.

i) Claims 13 and 39

Claim 13, which is exemplary, states: "The breast pump device of claim 1, wherein the diaphragm defines a milk-flow side chamber on one side of the diaphragm and an air-side chamber on the other side of the diaphragm."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 46. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 13 and 39 would have been obvious in view of the cited references.

j) Claims 14 and 40

Claim 14, which is exemplary, states: "The breast pump device of claim 1, wherein the diaphragm is configured to self-seal under negative pressure around its outer edge, to form a watertight and airtight seal around the recess or cavity in the pump housing."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 46–48. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

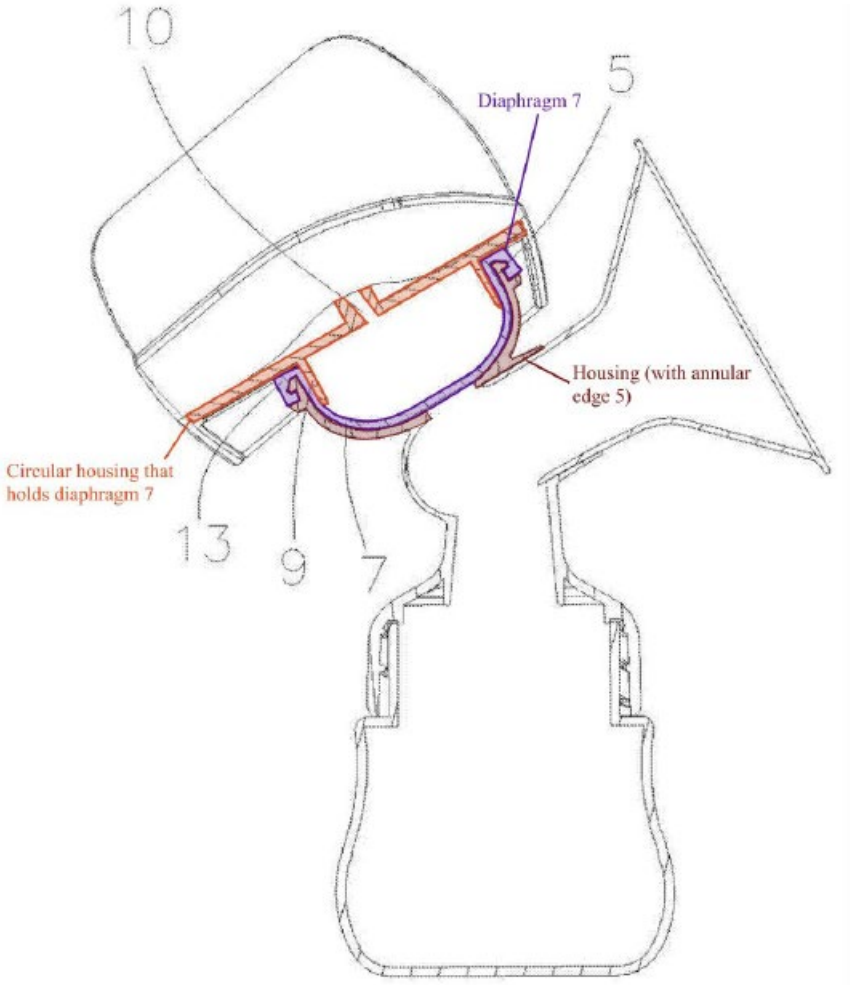
Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 14 and 40 would have been obvious in view of the cited references.

k) Claim 15

Claim 15 states:

> The breast pump device of claim 1, wherein the diaphragm housing is a first diaphragm housing, and wherein the breast pump device further comprises a second diaphragm housing attached to the nipple tunnel and configured to define a milk-flow side chamber, the diaphragm being configured to be positioned between the first diaphragm housing and the second diaphragm housing.

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 48–50. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*. Petitioner also provides the following Figure 7 from Fang, annotated by Mr. Bauer, and cited in the Petition (Pet. 50).



EX1009, Fig. 7 (annotated); *see id.*, [0020]

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 15 would have been obvious in view of the cited references.

l) Claim 16

Claim 16 states: "The breast pump device of claim 15, wherein the diaphragm is configured to be releasably secured around an edge of the second diaphragm housing."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 51. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

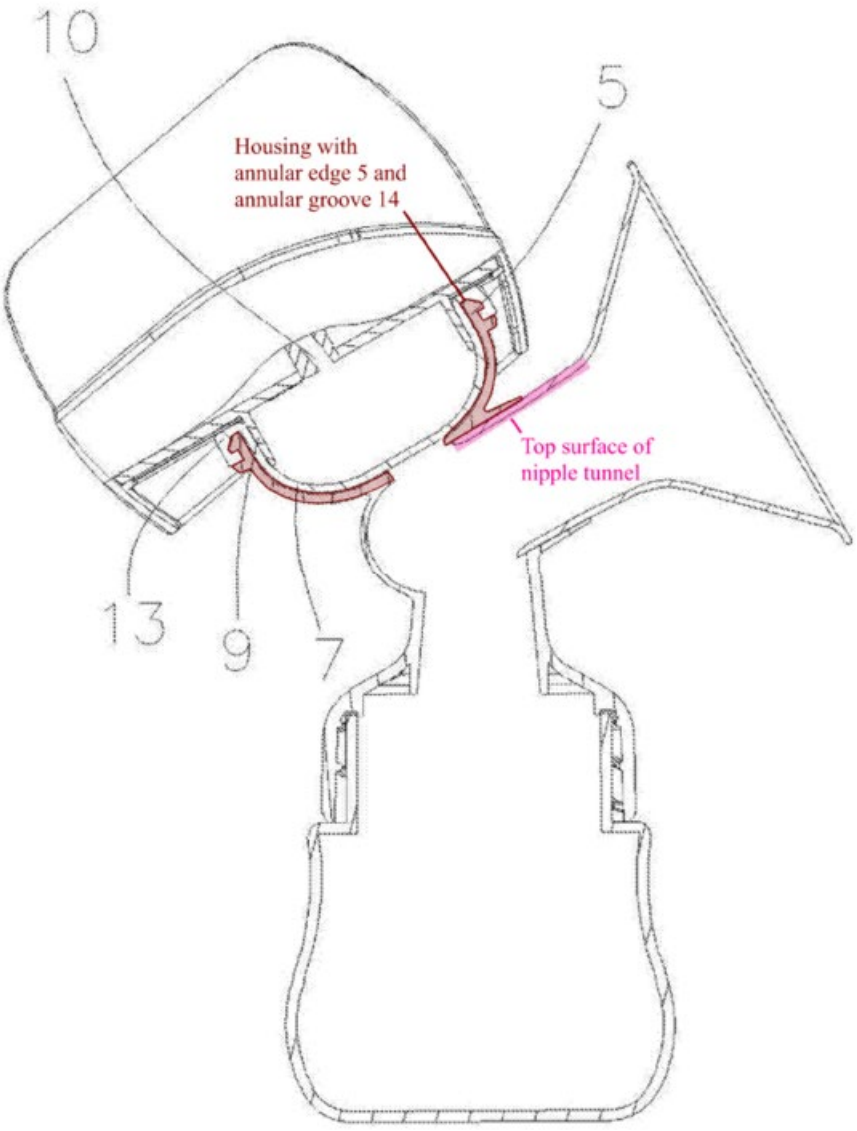
There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 16 would have been obvious in view of the cited references.

m) Claim 17

Claim 17 states: "The breast pump device of claim 15, wherein the second diaphragm housing is positioned, when the breast pump device is upright, over a top surface of the nipple tunnel."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 51–53. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*. Petitioner also relies on the following Figure 7 from Fang, annotated by Mr. Bauer.



EX1003, ¶168(annotating EX1009, Fig. 7)

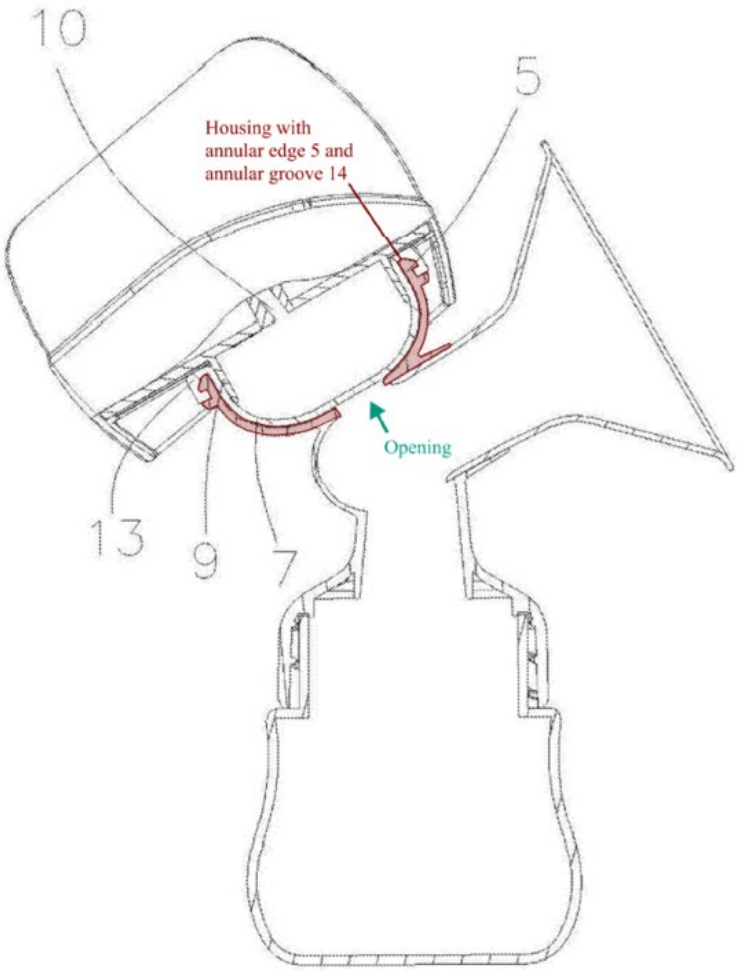
There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 17 would have been obvious in view of the cited references.

n) Claim 18

Claim 18 states: "The breast pump device of claim 15, wherein the second diaphragm housing includes an air hole to transfer negative air pressure to the nipple tunnel."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 53–54. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*. Petitioner also relies on the following Figure 7 from Fang, annotated by Mr. Bauer.



EX1003, ¶170(annotating EX1009, Fig. 7)

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 18 would have been obvious in view of the cited references.

o) Claim 19

Claim 19 states: "The breast pump device of claim 15, wherein the diaphragm is a flexible and generally circular diaphragm and the second diaphragm housing has a corresponding generally circular shape."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 55. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 19 would have been obvious in view of the cited references.

p) Claim 20

Claim 20 states: "The breast pump device of claim 15, wherein the second diaphragm housing is an integral part of the breast shield."

Petitioner addresses this claim in the Petition explaining why the claim would have been obvious based on Chang, Fang, and Yuen. Pet. 55–56. Throughout this analysis, Petitioner cites to the applicable passages of the references and to the applicable Declaration testimony of Mr. Bauer. *Id*.

There is no contrary evidence.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 20 would have been obvious in view of the cited references.

q) Claims 21–23, 25, 41, 43

Petitioner addresses claims 21–23, 25, 41, and 43 by referencing its analysis of prior claims that have similar, nearly identical, elements and limitations. *See* Pet. 56. For example, for claim 21, Petitioner refers to its analysis of claim 16. Mr. Bauer follows this same "incorporation by reference" style in his Declaration testimony. *See, e.g.* Ex. 1003 ¶ 175 ("The Chang-Fang-Yuen device provides the elements of Claim 21. *See* Analysis of Claim 16.").

We have referred above to the substantial similarity between independent claims 1 and 29, and the substantial similarity between many of the dependent claims. This duplication and substantial repetition of claims justifies Petitioner's analysis by "incorporation by reference" to similar claims. We find it sufficient under these circumstances to satisfy Petitioner's burden under 37 C.F.R. §§ 42.104(b)(4), (5).

There is no contrary evidence regarding this group of claims.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 21–23, 25, 41, and 43 would have been obvious in view of the cited references.

F. GROUND 1B – OBVIOUSNESS BASED ON CHANG, FANG, YUEN, AND KHALIL CLAIMS 1–11, 13–23, 25–37, 39–41, AND 43–46

Petitioner challenges claims 1–11, 13–23, 25–37, 39–41, and 43–46 as unpatentable under 35 U.S.C. § 103 over Chang in view of Fang, Yuen, and Khalil. Pet. 56–71.

For independent claims' limitations 1[pre] through 1[c] and 1[e], and 29[pre] though 29[e], Petitioner relies on the combination of Chang, Fang,

and Yuen as explained in Ground 1A. *Id.* at 62 –63. For the dependent claims, Petitioner also relies on its Ground 1A assertions. *Id.* at 63–71. Mr. Bauer's Declaration testimony, cited throughout Petitioner's assertions regarding Ground 1B, provides an ordered analysis for each claim in Ground 1B and a discussion of why the claim is not patentable. Ex. 1003 ¶¶ 187–223.

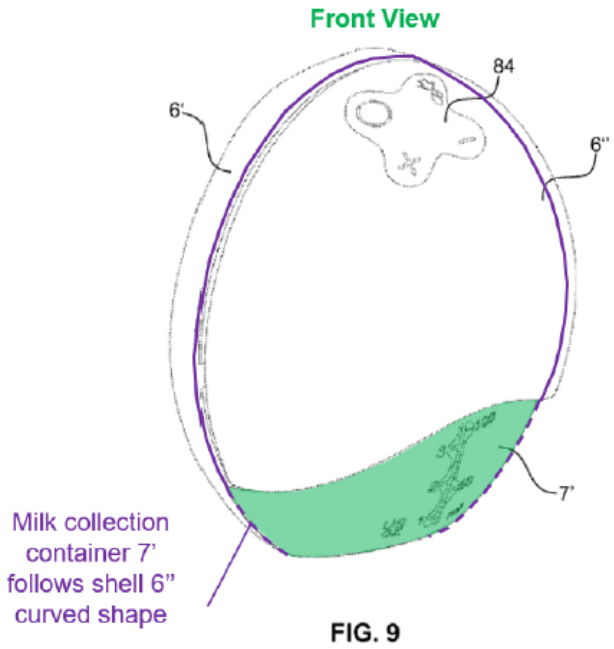
Petitioner relies on Khalil, in substantial part, for its specific disclosure of a milk container. As asserted by Petitioner, Khalil suggests using a rigid container at a lower portion of the device, and downward flow of milk to the container, so as to achieve known benefits. Pet. 58–59 (citing Ex. 1003 ¶¶ 181–86). Petitioner also asserts that Chang expressly describes that its device can be implemented to have a "rigid" milk container that can be provided in "alternative locations." *Id.* at 59 (citing Ex. 1007 ¶¶ 21, 105). Petitioner asserts that "Khalil provides a straightforward suggestion for implementing a rigid container in a wearable, in-bra device." *Id.* (citing Ex. 1010 ¶ 32 ("the invention can be designed as a hands-free unit and worn under a bra")).

Petitioner asserts that a person of ordinary skill would implement Khalil into the combination of Chang, Fang, and Yuen to achieve the known benefits of "further enhanc[ing] cleanability and assembly/disassembly in a wearable device having a diaphragm" and "enhanc[ing] the user experience during pump removal from the breast at the conclusion of a pumping session," by avoiding spillage." *Id.* at 60–61 (citing Ex. 1003 ¶¶ 183, 184). Petitioner further asserts that a skilled artisan "would have been motivated to avail the Chang-Fang-Yuen device of Khalil's rigid milk container as a suitable option for collecting expressed milk within the device" and "because doing so was the application of a known technique (Khalil's milk

container as part of an integrated wearable diaphragm breast pump) to a known device (the primary Chang-Fang-Yuen wearable breast pump) ready for improvement to yield predictable results (benefits articulated above)." *Id.*at 61 (citing Ex. 1003 ¶¶ 185, 186. A person of ordinary skill would recognize the stability provided by Khalil's flat bottom on the milk container, as well as the curved shape of Khalil's container. *Id.* at 65–67 (citing Ex. 1003 ¶¶ 204, 205).

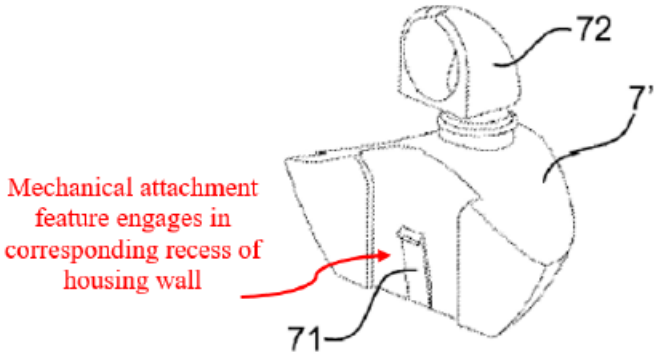
Mr. Bauer's cited Declaration testimony also includes several annotated figures, two of which are reproduced below, illustrating how Khalil discloses the suggested features in the claims for the milk container. Ex. 1003 ¶¶ 204, 207.

Mr. Bauer's annotated Figure 9 (Ex. 1003 ¶ 204), shown below, from Khalil shows a milk container below a shell housing, wherein the container follows the contour of the curved housing.



EX1010, FIG. 9 (annotated).

Mr. Bauer also provides annotated Fig. 11 (*Id.*¶ 207), reproduced below, showing how the curved, flat-bottomed container in Khalil is attached to the housing.



EX1010, FIG. 11 (partial, annotated)

Patent Owner does not provide any argument or evidence regarding Ground 1B.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that the claims at issue in Ground 1B would have been obvious in view of the cited references.

G. GROUND 1C – OBVIOUSNESS BASED ON CHANG, FANG, YUEN, KHALIL, AND PARK CLAIMS 12, 24, 38, AND 42

Petitioner challenges claims dependent claims 12, 24, 38, and 42 as unpatentable under 35 U.S.C. § 103 over Chang in view of Fang, Yuen, Khalil, and Park. Pet. 71–76.

Claims 12 and 38 further defines the nipple tunnel of the breast pump devices of claims 1 and 29, respectively, as including an opening on a lower surface of the nipple tunnel "through which expressed milk flows under gravity into the milk container." Ex. 1001, 72:6–9, 74:13–16; *see also*

Ex. 1003 ¶ 229 (illustrating an opening on the lower surface of the nipple tunnel in Park).

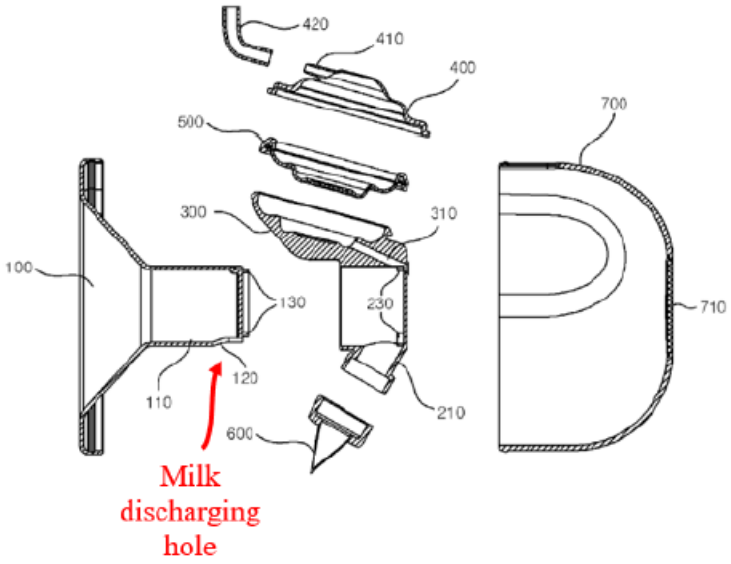


FIG. 5

EX1014, FIG. 5 (annotated)

Claims 24 and 42 further define that the diaphragm/membrane is "flexible and generally circular. . . [and] that, in a relaxed state, includes an inner raised area and a concentric outer raised area." *Id.* at 72:54–57, 74:27–31; *see also* Ex. 1003 ¶ 230 (illustrating a contoured membrane in Park).

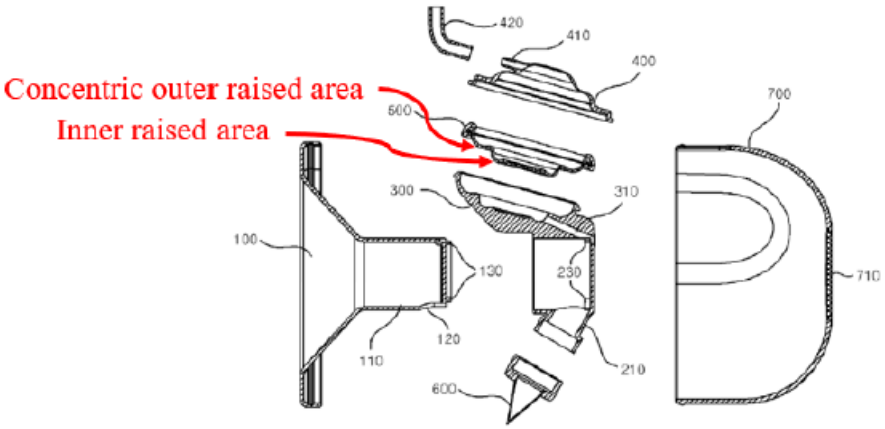


FIG. 5

EX1014, FIG. 5 (annotated)

Petitioner contends that the Park teaches a flow separation membrane provides that "has a contoured shape that includes a central raised portion and a concentric raised portion." Pet. 71 (citing Ex. 1014 ¶¶ 37–39, 54–56, Figs. 5, 7, 8; Ex. 1003 ¶ 91). Petitioner asserts that "[m]ultiple reasons would have prompted a POSITA to implement the Chang-Fang-Yuen-Khalil combination (from Ground 1B) in accordance with Park's suggestions" for claims 12, 24, 38, and 42: (1) to "enhance[] system operation, driving out milk and air during each cycle;" (2) to "promotes assembly/disassembly and cleaning;" and (3) "because doing so was the application of a known technique (Park's diaphragm shape and lower nipple tunnel opening) to known systems having downward milkflow to a lower container, to yield predictable results (benefits articulated above)." Pet. 73–74 (citing Ex. 1003 ¶¶ 225–228).

Patent Owner does not provide argument or evidence regarding Ground 1C.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claims 12, 24, 38, and 42 at issue in Ground 1C would have been obvious in view of the cited references.

H. GROUND 1D –OBVIOUSNESS BASED ON CHANG, FANG, YUEN, KHALIL, AND CHEN CLAIM 20

Petitioner challenges dependent claim 20 as unpatentable under 35 U.S.C. §103 over Chang in view of Fang, Yuen, Khalil, and Chen. Pet. 76–78. Claim 20 further defines the second diaphragm housing of claims 1 and 15 to be "an integral part of the breast shield." Ex. 1001, 72:45–47; *see also id.* at 72:19–26.

Petitioner contends that "Chen expressly describes that the breast shield and diaphragm housing are 'integrally molded,' [and] provides an express benefit of doing so to 'make disassembly and assembly more convenient.'" Pet. 76 (quoting Ex. 1015 ¶ 115 and citing Ex. 1015 ¶ 3; Ex. 1003 ¶ 93, 94). Petitioner asserts that a person of ordinary skill in the art "would have been prompted to combine Chen with Chang-Fang-Yuen-Khalil" for the following reasons: (1) to make disassembly and assembly more convenient," as stated in Chen; (2) "to facilitate cleaning" due to having fewer interfaces between parts; and (3) "because doing so was the application of known techniques (Chen's suggestion for an integral diaphragm housing and breast shield) to a known system (the Chang-Fang-Yuen-Khalil combination having a diaphragm housing attached with a breast shield) ready for improvement to yield predictable results." Pet. 77–78 (citing Ex. 1003 ¶¶ 232, 233). Moreover, as Mr. Bauer testifies:

> the Chang-Fang-Yuen-Khalil device already includes a second diaphragm housing attached with the breast shield (e.g., above the nipple tunnel). See Analysis of Claim 15 in Ground 1B;

> EX1009, Fig. 7, [0019]-[0025]. When the Chang-Fang-Yuen-Khalil device is implemented based on the suggestions in Chen, the second diaphragm housing and breast shield would have their existing configuration/location according to Chang-Fang-Yuen-Khalil, and would be integrally formed.

Ex. 1003 ¶ 231,

Patent Owner does not provide any argument or evidence regarding Ground 1D.

Based on Petitioner's arguments and evidence, we agree with its analysis and conclusion that claim 20, at issue in Ground 1D, would have been obvious in view of the cited references.

III. CONCLUSION[18]

Based on the evidence and analysis above, we determine that Petitioner has established that claims 1-46 are not patentable based on the asserted grounds.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, that Petitioner has shown by a preponderance of the evidence that claims 1–46 are not patentable;

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[18] 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).

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.

V. SUMMARY TABLE

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–8, 11, 13–23, 25, 29–35, 37, 39–41, 43 1–11, 13–23, 25–37, 39–41, 43–46 12, 24, 38, 42 20	103(a)	Chang, Fang, Yuen	1–8, 11, 13–23, 25, 29–35, 37, 39–41, 43 1–11, 13–23, 25–37, 39–41, 43–46 12, 24, 38, 42 20	
1–11, 13–23, 25–37, 39–41, 43–46	103(a)	Chang, Fang, Yuen, Khalil	1–11, 13–23, 25–37, 39–41, 43–46	
12, 24, 38, 42	103(a)	Chang, Fang, Yuen, Khalil, Park	12, 24, 38, 42	
20	103(a)	Chang, Fang, Yuen, Khalil, Chen	20	
Overall Outcome			1–46	

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