

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Jonathan O'Toole et al.
U.S. Patent No.: 11,413,380 Attorney Docket No.: 58498-0003IP2
Issue Date: August 16, 2022
Appl. Serial No.: 17/203,327
Filing Date: March 16, 2021
Title: BREAST PUMP SYSTEM

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 11,413,380 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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1003	Declaration of Ryan Bauer in Support of Petition
1004	File History of Application 16/009,547
1005	File History of Application 17/181,057 as of August 12, 2024
1006	Curriculum Vitae of Ryan Bauer
1007	U.S. Patent Application Publication 2018/0333523 (“Chang”)
1008	CN Utility Model CN205913571U (“Fang CN”)
1009	Certified English Translation of CN Utility Model CN205913571U (“Fang”)
1010	U.S. Patent Application Publication 2013/0023821 (“Khalil”)
1011	PCT Patent Publication No. WO 2017/190678 (“Yuen”)
1012	AU Patent Application Publication No. 2010300058 (“Weber”)
1013	PCT Publication No. WO 2016/186452 (“Park KR”)
1014	Certified English Translation of PCT Publication No. WO 2016/186452 (“Park”)
1015	U.S. Patent Application Publication US2017/0080135 (“Chen”)
1016	Docket of <i>Shenzhen Root Technology Co., Ltd., v. Chiaro Technology, Ltd.</i> , Case No. 23-cv-631-KKE (W.D. Wash.), as of August 13, 2024
1017	U.S. Application Publication 2015/0217033 (“Pollen”)

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1018	U.S. Application Publication 2012/0116299 (“Tack”)
1019	U.S. Patent Application Publication 2016/0082166 (“Guthrie”)
1020	U.S. Application Publication 2015/0157775 (“Hu”)
1021-22	Reserved
1023	Elvie’s Disclosure of Asserted Claims and Supplemental Infringement Contentions Under Local Patent Rule 120, <i>Shenzhen Root Technology Co., Ltd., v. Chiaro Technology, Ltd.</i> , Case No. 23-cv-631 (W.D. Wash.), filed August 1, 2024
1024	PCT Publication WO 2002/102437 (“Myers ’437”)
1025	PCT Publication WO 2008/137678 (“Myers ’678”)
1026	Order on Motion to Continue Pretrial Deadlines and Strike Trial Date, <i>Shenzhen Root Technology Co., Ltd., v. Chiaro Technology, Ltd.</i> , Case No. 23-cv-631 (W.D. Wash.), issued June 28, 2024
1027	Momcozy’s Motion to Continue Pre-Trial Deadlines and Strike Trial Date, <i>Shenzhen Root Technology Co., Ltd., v. Chiaro Technology, Ltd.</i> , Case No. 23-cv-631 (W.D. Wash.), issued June 4, 2024

LISTING OF CHALLENGED CLAIMS

Element	Claim Limitations
Claim 1	
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.

Claim 2	
2	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.
Claim 3	
3	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.
Claim 4	
4	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.
Claim 5	
5	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.
Claim 6	
6	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.
Claim 7	
7	The breast pump device of claim 1, wherein the diaphragm is substantially circular and the diaphragm housing is substantially circular.

Claim 8	
8	The breast pump device of claim 1, wherein the milk container is substantially rigid.
Claim 9	
9	The breast pump device of claim 1, wherein the milk container is configured to attach to a lower part of the pump housing and to form a flat bottomed base for the breast pump device.
Claim 10	
10	The breast pump device of claim 1, wherein the milk container has a surface shaped to continue a curved shape of the pump housing so that the breast pump device can be held comfortably inside a bra.
Claim 11	
11	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.
Claim 12	
12	The breast pump device of claim 1, wherein the nipple tunnel includes on a lower surface of the nipple tunnel an opening through which expressed milk flows under gravity into the milk container.
Claim 13	
13	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.

Claim 14	
14	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.
Claim 15	
15	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.
Claim 16	
16	The breast pump device of claim 15, wherein the diaphragm is configured to be releasably secured around an edge of the second diaphragm housing.
Claim 17	
17	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.
Claim 18	
18	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.
Claim 19	
19	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.

Claim 20	
20	The breast pump device of claim 15, wherein the second diaphragm housing is an integral part of the breast shield.
Claim 21	
21	The breast pump device of claim 15, wherein the diaphragm is configured to be attached around an edge of the second diaphragm housing.
Claim 22	
22	The breast pump device of claim 15, wherein the diaphragm is configured to seal, self-seal, self energizing seal or interference fit seal against the first diaphragm housing.
Claim 23	
23	The breast pump device of claim 1, wherein the diaphragm is a flexible and generally circular diaphragm.
Claim 24	
24	The breast pump device of claim 1, wherein the diaphragm is a flexible and generally circular diaphragm that, in a relaxed state, includes an inner raised area and a concentric outer raised area.
Claim 25	
25	The breast pump device of claim 1, wherein the milk container is configured to be pressed or pushed into engagement with the pump housing.
Claim 26	
26	The breast pump device of claim 1, wherein the self-contained, in-bra wearable device is configured so that expressed milk flows under gravity through an opening in the nipple tunnel and into the milk container through a duck-bill valve that stays sealed when there is negative air pressure being applied by the pump to ensure that negative air pressure is not applied to the milk container.

Claim 27	
27	The breast pump device of claim 1, wherein the milk container comprises a curved surface that includes a flat area that serves as a base for the milk container.
Claim 28	
28	The breast pump device of claim 1, wherein the milk container has a curved surface configured to enable the breast pump device to be held comfortably in a bra.
Claim 29	
29[pre]	A breast pump device that is configured as a self-contained, in-bra wearable device, the breast pump device comprising:
29[a]	a self-contained, in-bra wearable device comprising:
29[b]	a housing that includes:
29[b][i]	a rechargeable battery,
29[b][ii]	a power charging circuit for controlling charging of the rechargeable battery,
29[b][iii]	control electronics powered by the rechargeable battery,
29[b][iv]	a pump powered by the rechargeable battery and configured to generate negative air pressure, and
29[b][v]	a Universal Serial Bus (USB) charging socket for transferring power to the power charging circuit and the rechargeable battery;
29[c]	a breast shield made up of a breast flange and a nipple tunnel;
29[d]	a milk container that is configured to be attached to and removed from the housing; and

29[e]	a membrane that is configured to define a pumping chamber at least in part with an external surface of the housing, the membrane configured to deform in response to changes in air pressure caused by the pump to create negative air pressure in the nipple tunnel.
Claim 30	
30	The breast pump device of claim 29, 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.
Claim 31	
31	The breast pump device of claim 29, wherein the breast shield is a one piece item that in use presents a single continuous surface to a nipple and a breast.
Claim 32	
32	The breast pump device of claim 29, 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.
Claim 33	
33	The breast pump device of claim 29, wherein the breast pump device includes only the breast shield and the milk container that are directly removable from the housing in normal use or normal dis-assembly.
Claim 34	
34	The breast pump device of claim 29, wherein the membrane is substantially circular.
Claim 35	
35	The breast pump device of claim 29, wherein the milk container is substantially rigid.

Claim 36	
36	The breast pump device of claim 29, wherein the milk container has a surface shaped to continue a curved shape of the housing so that the breast pump device can be held comfortably inside a bra.
Claim 37	
37	The breast pump device of claim 29, wherein the milk container is attachable to the housing with a mechanical or magnetic mechanism that releasably attaches or latches when the milk container is sufficiently pressed on to the housing with a single push action
Claim 38	
38	The breast pump device of claim 29, wherein the nipple tunnel includes on a lower surface of the nipple tunnel an opening through which expressed milk flows under gravity into the milk container.
Claim 39	
39	The breast pump device of claim 29, wherein the membrane defines a milk-flow side chamber on one side of the membrane and an air-side chamber on the other side of the membrane.
Claim 40	
40	The breast pump device of claim 29, wherein the membrane 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 housing.
Claim 41	
41	The breast pump device of claim 29, the membrane is a flexible membrane.
Claim 42	
42	The breast pump device of claim 29, wherein the membrane is a flexible and generally circular membrane that, in a relaxed state, includes an inner raised area and a concentric outer raised area.

Claim 43	
43	The breast pump device of claim 29, wherein the milk container is configured to be pressed or pushed into engagement with the housing.
Claim 44	
44	The breast pump device of claim 29, wherein the self-contained, in-bra wearable device is configured so that expressed milk flows under gravity through an opening in the nipple tunnel and into the milk container through a duck-bill valve that stays sealed when there is negative air pressure being applied by the pump to ensure that negative air pressure is not applied to the milk container.
Claim 45	
45	The breast pump device of claim 29, wherein the milk container comprises a curved surface that includes a flat area that serves as a base for the milk container.
Claim 46	
46	The breast pump device of claim 29, wherein the milk container has a curved surface configured to enable the breast pump device to be held comfortably in a bra.

Petitioner Shenzhen Root Technology Co., Ltd. (“Petitioner”) requests *inter partes* review (“IPR”) of claims 1-46 (“Challenged Claims”) of U.S. Patent 11,413,380 (“the ’380 patent”).

I. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies the ’380 patent is available for IPR and Petitioner is not barred or estopped. Patent Owner Chiaro Technology (“PO”) served its answer and counterclaims alleging that Petitioner infringes the ’380 patent on August 14, 2023. Petitioner files this Petition within one year of that event.

B. Challenge and Relief Requested—37 C.F.R. § 42.104(b)

Petitioner requests IPR on the following grounds. A declaration of Mr. Bauer (EX1003) supports this Petition. EX1003, ¶95.

Grounds	Claims	§103 Grounds
1A	1-8, 11, 13-23, 25, 29-35, 37, 39-41, 43	Chang-Fang-Yuen
1B	1-11, 13-23, 25-37, 39-41, 43-46	Chang-Fang-Yuen-Khalil
1C	12, 24, 38, 42	Chang-Fang-Yuen-Khalil-Park
1D	20	Chang-Fang-Yuen-Khalil-Chen

Each reference pre-dates the filing of the earliest claimed priority application filed on June 15, 2017. The applied references qualify as prior art under §102:

Reference	Date	Section
Chang	Feb. 9, 2017 (filed)	102(a)(2)
Fang	Feb. 1, 2017 (published)	102(a)(1)
Yuen	May 5, 2017 (filed)	102(a)(2)
Khalil	Jan. 24, 2013 (published)	102(a)(1)
Park	Nov. 24, 2016 (published)	102(a)(1)
Chen	Mar. 23, 2017 (published)	102(a)(1)

Fang (EX1009) is a certified English translation of Chinese Utility Model CN205913571U and is cited through the petition to identify relevant aspects of Fang (EX1008). Park (EX1014) is a certified English Translation of PCT Publication No. WO2016/186452 and is cited through the petition to identify relevant aspects of Park (EX1013).

None of Chang, Park, Fang, or Yuen were applied in any claim rejection in any office action during prosecution of the '380 patent. Chang was listed among the dozens of references on the face of the '380 patent. *See* EX1001, 3.

II. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (“POSITA”) as of the Critical Date (June 15, 2017) 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. More education could substitute for experience and vice versa. EX1003, ¶¶15-18.

III. CLAIM CONSTRUCTION

During prosecution of the '057 application, 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.” EX1005, 2290. PO did not dispute this construction, and Petitioner applies it herein.¹

Other 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.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); EX1003, ¶¶69-70.

IV. THE '380 PATENT

A. Specification

The '380 patent relates to a breast pump that is wearable inside a bra. EX1001, 3:57-62. The specification acknowledges that fully integrated in-bra breast pumps existed in the prior art, including as disclosed by US2016/0206794 (“Makower”) and US2013/0023821 (“Khalil”). *See* EX1001, 2:5-57; EX1003, ¶38. The '380 describes that Makower’s disadvantages includes a collapsible bag as the milk

¹ Petitioner does not concede that the Challenged Claims satisfy statutory requirements, such as §112, which cannot be raised in this proceeding.

container, a noisy and complex pump mechanism, and limited milk capacity, and that Khalil's disadvantages were an annular diaphragm resulting in a large, bulky device. *Id.*, ¶39.

The '380 patent purports to overcome these disadvantages with "a self-contained, in-bra wearable" breast pump device with a housing, a pump powered by a rechargeable battery, a breast shield, a milk container, a diaphragm (or membrane) that defines a pumping chamber with a diaphragm housing/external surface of the pump housing and deforms in response to changes in air pressure caused by the pump. EX1001, Cls. 1, 29; *see also* EX1003, ¶¶40-41.

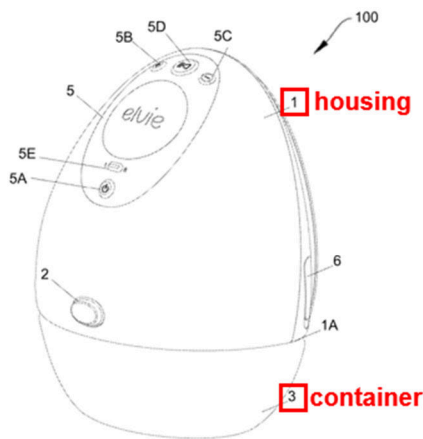


FIGURE 1

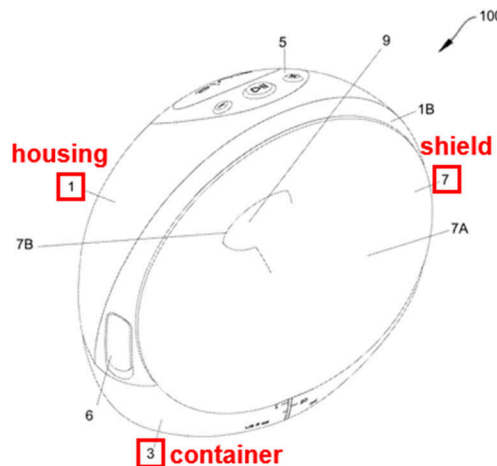


FIGURE 2

EX1003, ¶42 (annotating EX1001, Figs. 1, 2); *see* EX1001, 5:56-6:3, 6:14-21

Breast shield 7 has concave inner flange 7A which contacts the breast, and elongate nipple tunnel 9 aligned with an opening on breast shield 7 and extending from curved section 7B in breast shield 7. *Id.*, 8:62-64, 9:28-31. The nipple tunnel

defines a milk-flow path from the inner surface of breast shield 7A, through nipple tunnel 9, and into milk container 3. *Id.*, 9:39-42. EX1003, ¶43.

The breast pump system includes a “diaphragm” (or “membrane” or “barrier”) for transferring “negative air pressure” (or “suction” or “vacuum”) from the pump to the milk-collection side (i.e., breast side) of the system. EX1001, 10:25-29; 11:18. Figures 5 and 6 below show front and rear exploded views of the breast pump system, with housing 1, milk container 3, breast shield 7, and diaphragm 13:

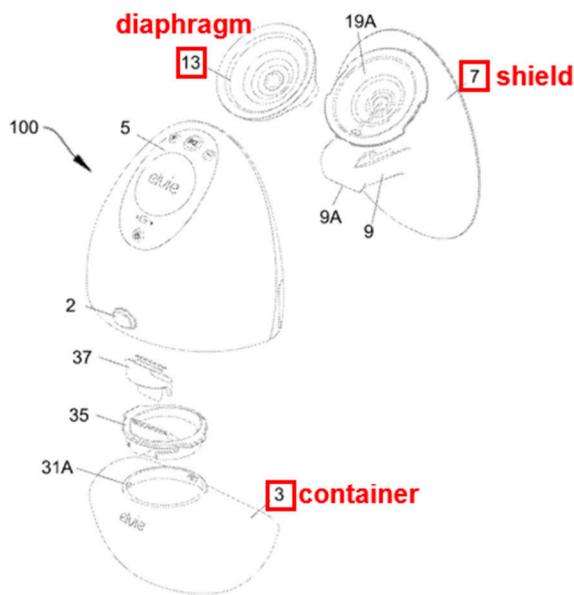


FIGURE 5

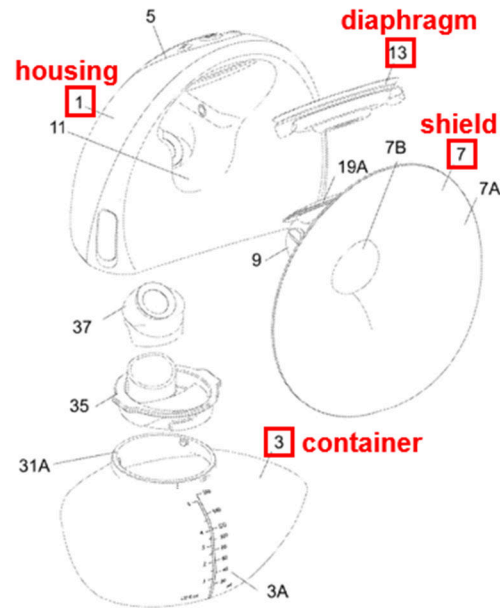


FIGURE 6

EX1003, ¶44 (annotating EX1001, Figs. 5, 6)

Diaphragm 13 is positioned in diaphragm housing and transfers negative pressure generated by the pump into nipple tunnel 9. EX1001, 10:25-35, 11:19-20.

The diaphragm housing has a first half (19A) attached with breast shield 7 and a second half (19B) in a recessed portion of housing 1, as shown in Figure 4 below:

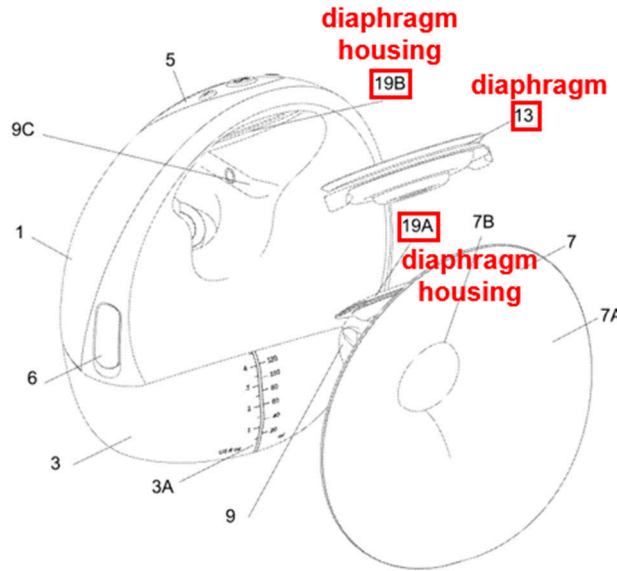


FIGURE 4

EX1003, ¶45 (annotating EX1001, Fig. 4); *see* EX1001, 11:23-27

As detailed below, wearable breast pumps that utilize a diaphragm pump have the features recited by the '380 patent's claims were known in the prior art, as demonstrated by Chang, Fang, Yuen, Khalil, and Park. EX1003, ¶¶46-47.

B. Prosecution History

The '380 patent issued from Application 17/203,327 ("327 application"; EX1002) filed on March 16, 2021, which is a continuation of Application 17/181,057 ("057 application"; EX1005), which is a continuation of Application 16/009,547 ("547 application"; EX1004). The earliest date to which the '380 patent

claims priority is June 15, 2017, which is the Critical Date for purposes of this proceeding.

The '380 patent has two independent claims, claims 1 and 29. These claims were allowed after the addition of structural features specifying how the diaphragm of the pump is held in the device. As explained below, claim 1 was allowed based on the diaphragm housing being fixed to a recessed surface of the pump housing, and claim 29 was allowed based on the diaphragm (membrane) defining a pumping chamber at least in part with an external surface of the housing of the device. EX1003, ¶¶48-49.

The examiner rejected originally-filed independent claim 1 as obvious over Khalil combined with other references. EX1002, 550-552. During an interview, after an initial round of amendments, the examiner indicated claim 1 would be allowable if amended to “indicat[e] that the diaphragm housing is fixed to a surface of the pump housing.” *Id.*, 499. According to the Examiner, “the configuration of the diaphragm housing 19B in [’380 Fig. 4] which is a recess in the rear surface of the housing was unique relative to the prior art.” *Id.* Similarly, the Examiner stated pending claim 47 would be allowable if PO amended it to “clarify that the surface [of the housing] is an exterior surface of the housing.” *Id.*; EX1003, ¶¶50-51.

After subsequent amendments, the Examiner allowed claim 1 based on the mistaken belief that the prior art failed to teach “a diaphragm housing fixed to a

recessed surface of the pump housing,” and allowed pending claim 47 based on the similarly mistaken belief that the prior art failed to teach “a membrane that forms an air pumping chamber at least in part with an external surface of the pump housing.” *Id.*, 24, 304. The Examiner cited to Khalil’s “membrane” (citing Khalil’s Fig. 11, element 3) in support of these reasons for allowance. *Id.*, 304. But this overlooked the actual state of the art—particularly Fang’s prior art teachings cited in this Petition. Simply put, Fang plainly suggested that which the Examiner believed to be missing from the prior art. *Infra* §VI; EX1003, ¶52.

As demonstrated by Fang and other publications, use of a diaphragm seated against a diaphragm housing that is fixed to a recessed surface of the pump housing, or that defines a pumping chamber at least in part with an external surface of the housing, were known options for implementing a diaphragm in a breast pump. *Id.* Critically, the prosecution history indicates the examiner did not consider the predictable combinations described in the Grounds below. If these references had been considered, especially in view of the testimony herein, the straightforward arrangement recited by the Challenged never would have issued in their current form. EX1003, ¶53.

V. TECHNOLOGY BACKGROUND

Breast pumps extract milk from users’ breasts. The breast pump industry has been significantly influenced by government policies and related market forces. For

example, the USA is by far the leading market for breast pumps in the world. In 2010, the enactment of the Affordable Care Act (“ACA”) revolutionized the industry by mandating health insurance plans to cover breastfeeding equipment. The ACA significantly increased demand for all types of breast pumps and accessories, which attracted new participants to the market and significantly expanded the commercial market for breast pumps. EX1003, ¶¶19-21.

After the ACA and before 2017, consumers demanded better products through media and feedback, which increased competition among manufacturers and caused them to develop improved products to address unmet needs. One significant industry event was the 2014 MIT Hackathon “Make The Breast Pump Not Suck.” Participants in the Hackathon sought to improve breast pumps by addressing features such as making them fashionable, discreet, hands-free and wearable, easily cleanable, “smart” to make use of data to communicate, facilitate connections to others in the community, etc. This topic touched a nerve in society and went viral, with related news and op-eds proliferating for many years. *Id.*, ¶¶22-25.

One example of the resulting products and competitors was the Willow Breast Pump, which was shown at the Consumer Electronics Show (CES) in January 2017. It garnered significant media attention, and it was an integrated, in-bra wearable, hands-free device. Technology publication Engadget recognized it as a winner of

their “Best Digital Health and Fitness Product” and “Best Wearable” awards. *Id.*, ¶¶26-27.

Breast pumps typically have a localized volume in which the nipple is inserted and a vacuum (or negative pressure or suction) is applied so that milk is ejected into the localized volume, the vacuum is released, and the milk is transferred to a collection container. This cycle is repeated at frequencies designed to emulate the sucking of a nursing baby. The milk accumulates in the collection container. *Id.*, ¶28.

Major components of the pump include a breast shield that engages the breast and presents the localized volume for the nipple, a pump to generate negative pressure (i.e., vacuum or suction), and a milk collection container. A one-way valve is often used with the localized volume to minimize its size and to allow extracted milk to escape between vacuum cycles and flow to the container. *Id.*, ¶29.

A common arrangement in the prior art was for the breast pump to use a membrane or diaphragm to define the localized volume on one side (milk side) and to be in mechanical or fluid communication with the pump on the other side. Such a diaphragm is commonly referred to as a media separation because it keeps milk away from the pump mechanism. Many different types of pumps have been used in breast pumps to generate suction to extract milk—for example, diaphragm pump, bellows pump, piston pump, reciprocating pump, peristaltic pump. *E.g.*, EX1017,

¶45. Breast pumps with diaphragm pumps were well known in the prior art. Examples include Weber (EX1012), Khalil (EX1010), Tack (EX1018) and Hu (EX1020). EX1003, ¶30.

Breast pumps are relatively simple electromechanical devices that were configured in a variety of ways before June 2017. The components of breast pumps can be combined and attached to each other or separated and connected by lines, hoses, or wires, as desired. In this crowded field, a POSITA knew that there is no single design or configuration that is ideal for all purposes. EX1003, ¶31. Rather, a POSITA knew the various combinations of components at their disposal and selected a configuration for a particular device based on desired commercial and clinical requirements—for example, weight distribution, cleanability, power consumption, anatomical variation. *Id.* All prior art breast pump designs cited in this Petition corroborate this flexibility by disclosing multiple configurations with various components alternatively combined and separate. EX1007, [0019]; EX1012, 8:5-7, 14:15-27, Figs. 1, 2, 6; EX1019, [0024], [0027], [0033]-[0035], Figs. 1, 2A-2C; EX1010, [0032], [0033], [0051], [0066], Figs. 1, 2, 9-11; *see also* EX1003, ¶¶31-46.

VI. DETAILED EXPLANATION OF GROUNDS

A. Ground 1A: Chang-Fang-Yuen Renders Claims 1-8, 11, 13-23, 25, 29-35, 37, 39-41, and 43 Obvious

1. Chang-Fang-Yuen Combination

a. Chang

Chang describes “portable breast pump systems...for collecting milk from a breast of a nursing mother.” EX1007, [0001]. Chang’s breast pump “is contemplated to fit comfortably and conveniently into a bra” (*id.*, ¶11) such that “the flange or skin contact member, the conduit, the driving mechanism, the external shell and the milk collection container are all contained within a cup of a brassiere” (*id.*, [0019]). EX1003, ¶¶71-72.

As shown in Figure 1A, Chang’s breast pump 10 includes “housing or outer shell 12” (blue) and “flange 14” (purple):

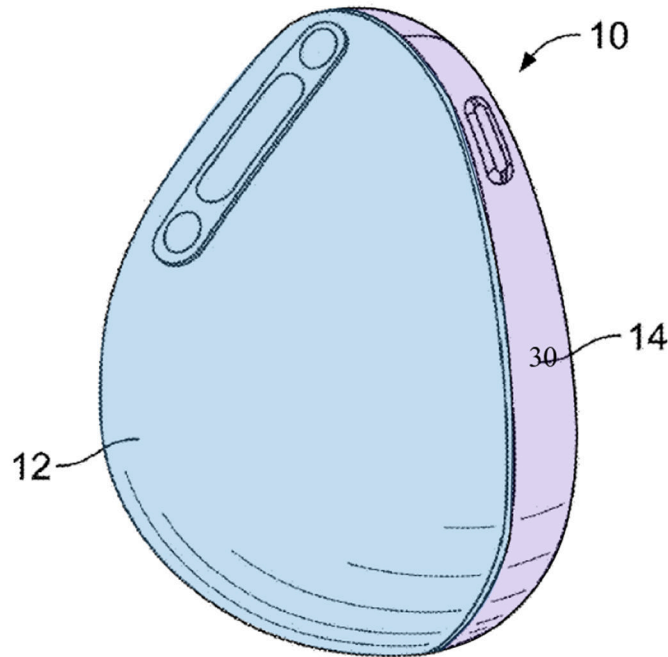
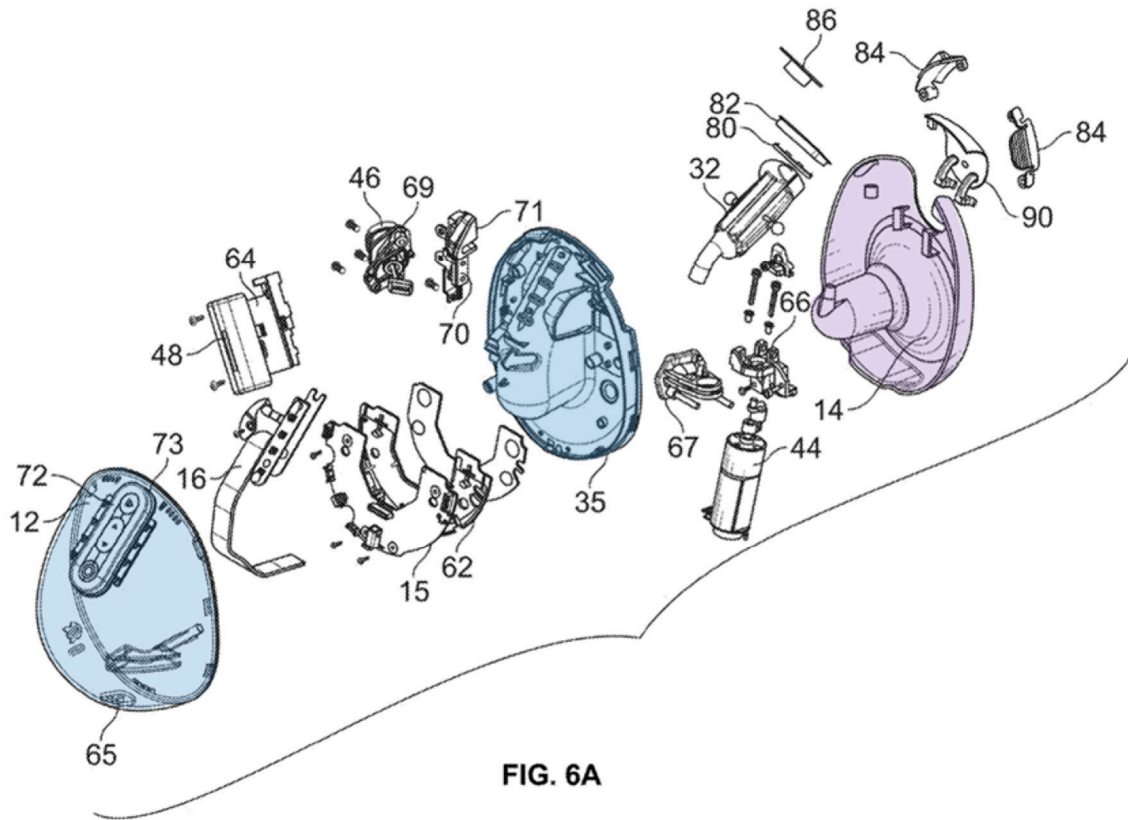


FIG. 1A

EX1003, ¶73(annotating EX1007, Fig. 1A)

The flange “is sized and shaped to engage a breast of a user...to provide structure for sealingly engaging with breast tissue.” EX1007, [0071]. It includes a “nipple receiving portion...contoured to more closely match the natural shape of the nipple.” *Id.*, [0090]; EX1003, ¶74.



EX1003, ¶74 (annotating EX1007, Fig. 6A); *see also* EX1007, Figs. 1, 2, 4, [0071]-[0072], [0080]

The “shell 12” and “pump chassis 35” provide a pump housing that accommodate pump components (e.g., “motor 46”), and the “pump chassis 35” includes a recessed surface (e.g., that accommodates portions of the “flex tube”). *Id.*; FIG. 6A.

In Chang, all system components are contained within the device, between outer shell 12 and the flange 14. EX1007, Fig. 6A, [0072], [0080]. The components include a “rechargeable battery” for powering the system, a “system controller” circuit board, and a pump (e.g., “motors 44, 46 are further provided and controlled electronically by the system to effect manipulation of actuators (described below)

operating on a conduit or flex-tube 32”). *Id.* Chang’s “pump” includes “one or more pumps and equivalents thereof known to those skilled in the art.” *Id.*, [0068]. EX1003, ¶74. The “shell 12” and “pump chassis 35” provide a pump housing that accommodate pump components (e.g., “motor 46”), and the “pump chassis 35” includes a recessed surface (e.g., that accommodates portions of the “flex tube”). *Id.*; FIG. 6A.

Chang’s system includes a “milk collection container.” EX1007, FIGS. 8, 11B.

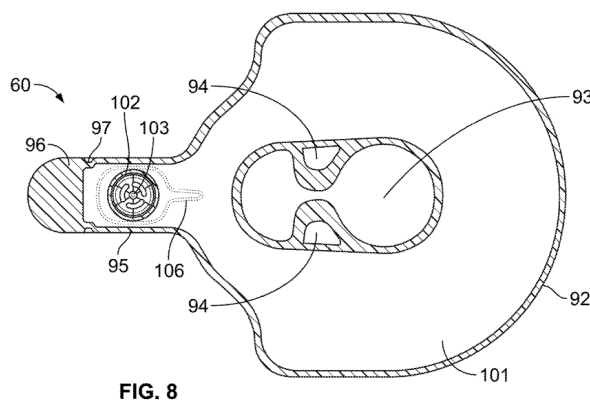


FIG. 8

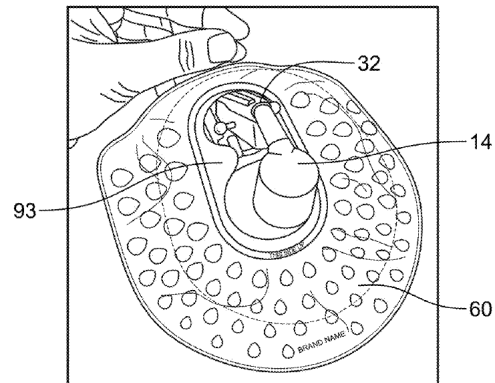


FIG. 11B

EX1007, FIGS. 8, 11B; *see id.*, [0081], [0086], [0099]-[0101], [0105], [0106];

EX1003, ¶75

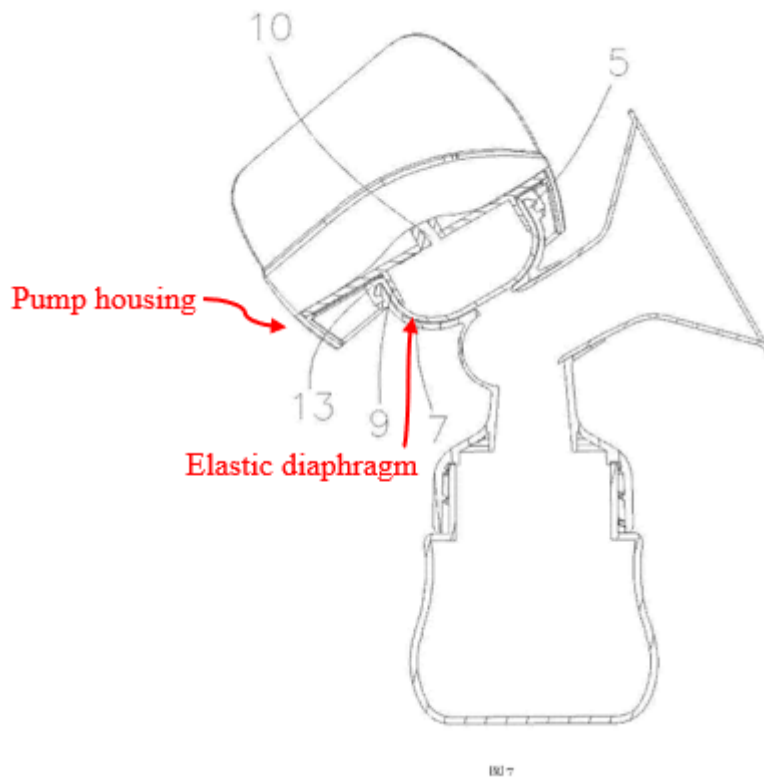
The system includes “a one-way valve that permits milk inflow into the milk collection container but prevents milk backflow from the milk collection container to the conduit.” EX1007, [0021]. The valve may “assume a myriad of shapes and kinds” and the container may be “flexible or rigid, or disposable or reusable” (*id.*)

and may be “inside or outside of the pump housing” (*id.*, [0101]). EX1003, ¶¶76-77.

b. Fang

Fang describes a “breast pump” having an “elastic diaphragm” that is “used to prevent the milk from flowing into the main body of the pump” and an “air pump main unit.” EX1009, Abstract. *Id.* The “elastic diaphragm” and the diaphragm housing it is seated in are connectable directly with features on an exterior surface of the pump housing. EX1009, FIG. 7; EX1003, ¶¶78-79.

In more detail, the “elastic diaphragm 7” is has “a circular wrapping 13” that is “sleeved on the annular edge 5.” EX1009, [0020]; EX1003, ¶80. A “flange 9” and adjacent features serve as a first diaphragm housing, such that the pump housing “presses the wrapping edge 12 of the elastic diaphragm 7 against the annular edge 5.” *Id.*



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

c. Combination of Chang and Fang

A POSITA 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, so as to achieve known benefits, as articulated below. EX1003, ¶¶97-107. Chang describes a pump that generates suction by cyclical compression and decompression of a conduit or flex-tube, and expressly notes that other configurations were known and suitable. *E.g.*, EX1007, [0022], [0025], [0028], [0068] (“one or more pumps and equivalents thereof known to those skilled in the art...”); [0079] (“Although both portions 32S and 32L [of the flex-tube] are shown

as tubular portions, the present disclosure is not limited to such, as one or both portions could be shaped otherwise.”); 84-86. Fang provides a straightforward suggestion of a diaphragm pump including a diaphragm housing component formed in a wall of the pump housing. EX1009, [0024]-[0025], FIG. 7; EX1003, ¶97.

In the predictable combination, the breast pump device would have used a diaphragm pump including first and second diaphragm housing components and an elastic diaphragm, in accordance with Fang’s suggestions. EX1009, [0019]-[0025] (“flaring 4,” “ring rim 5,” “elastic diaphragm 7,” “flange 9”), FIGS. 4-5, FIG. 7. Consistent with Fang’s express suggestion, a first diaphragm housing (e.g., as suggested by Fang’s “flange 9” and adjacent surfaces) would have been positioned in a recessed wall of the pump housing (e.g., recessed surface of “chassis 35”), and the elastic diaphragm and second diaphragm housing (e.g., as suggested by Fang’s “flaring 4” and “ring rim 5”) would have been predictably positioned at the opposing/mating location—attached with the breast shield. EX1003, ¶98; EX1009, FIG. 7. The overall form factor of the predictable combination generally would remain as taught by Chang, yet with an improved pump chamber defined between a recessed wall of the pump housing and the elastic diaphragm, in accordance with Fang’s suggestions. EX1003, ¶98. As a result, a perimeter of the first diaphragm housing surface would have been fixed with the remainder of the pump housing wall (e.g., “chassis 35”) such that the diaphragm housing surface defines part of the

external surface of the pump housing, and the elastic diaphragm sealingly engages when the device is assembled—again, in accordance with Fang’s suggestions. *Id.* This improved diaphragm pump arrangement would provide a milk flow path to the container, as described by Chang, along a milk-side of the diaphragm. EX1003, ¶98.

To be clear, a POSITA would have likewise included vacuum pump components to generate a vacuum and drive the diaphragm, in accordance with Fang’s suggestions. EX1003, ¶99. The use of a diaphragm pump in breast pump devices was widely known, including in “in-bra” devices, and a POSITA would have readily implemented such pump components withing the pump housing (e.g., similar to the predictable locations of Chang’s “motor” and “actuators,” and/or associated components). *Id.*, ¶100 (citing to corroborating examples of a traditional motor-driven vacuum pump integrated into a housing)). The selection and sizing of such pump components for “in-bra” devices was a common and predictable task for engineers in the field before June 2017. *Id.*, ¶101.

Multiple reasons would have prompted a POSITA to implement a diaphragm pump in Chang’s breast pump device in accordance with Fang’s suggestions.

First, a POSITA would have implemented Chang’s breast pump using diaphragm components, according to Fang’s suggestions, to facilitate convenient cleaning and maintenance. EX1003, ¶102. For example, a POSITA would have

recognized from Fang's description that the elastic diaphragm components are readily accessed for cleaning while isolating a milk side from the pump side, preventing flow of milk to the pump components. EX1009, [0019] ("elastic diaphragm 7 is used to prevent the milk from flowing into the air pump main unit 8."); Indeed, the cleaning and maintenance benefits of diaphragm pump components were known to a POSITA. *Id.*, ¶103; *see, e.g.*, EX1014, [0008] ("easily cleaned and maintained"), [0023] ("convenience in use due to easy cleaning and maintenance"), [0037] ("flow separation member 500"), [0040] ("inner space of the funnel connector 300 is sealed by the flow separation membrane 500, and thus, the breast milk is not allowed to flow backward"). To be clear, a POSITA would have been prompted to implement the first diaphragm housing on a surface of the pump housing, according to Fang's express suggestion, reducing the number of parts to be assembled/disassembled, and associated interfacing surfaces or small crevices. EX1003, ¶104. Relatedly, a POSITA would have been motivated to utilize such diaphragm components to reduce the length of tubing to be cleaned (e.g. Chang's "flex tube" and associated tubing), thereby reducing cleaning difficulty and reducing the likelihood of mold and mildew growth over time (from tubing that was difficult to dry). *Id.*

Second, a POSITA would have been prompted to implemented Chang using the improved diaphragm pump components (according to Fang's suggestions) to

facilitate more rapid assembly and disassembly (e.g., during use). EX1003, ¶105.

For example, a POSITA would have been motivated to avail Chang's device of assembly benefits imparted by the diaphragm components, which are readily slid into engagement during assembly. *Id.* A POSITA would have recognized from Chang and Fang that positioning the first diaphragm housing surface (e.g., as suggested by Fang's "flange 9" and adjacent surfaces) as part of the pump housing wall (e.g., "pump chassis 35"), in accordance with Fang's express teaching, would have facilitated reduced need for additional attachment features (e.g., to be manipulated and connected), and reduced interfaces between separate parts. *Id.*

Third, a POSITA would have been further motivated to implement Chang's breast pump using diaphragm pump components (as suggested by Fang) as a particularly effective and suitable option to generate negative pressure within a breast pump. EX1003, ¶106; *Intel Corporation v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1381 (Fed. Cir. March 13, 2023) (holding that Petitioner "just had to show that [secondary reference's feature] was a 'suitable option' to replace [primary reference's feature]," and not that it was an "'improvement' in the categorical sense"). Chang itself proposes the use of other pump components (e.g., instead of the "flex tube 32"), and Fang plainly suggests suitable diaphragm pump features for a breast pump. EX1003, ¶107.

Fourth, a POSITA would have been motivated to combine Chang and Fang because doing so was the application of a known technique (Fang’s diaphragm pump components for generating negative pressure in a breast pump, including a pump chamber defined in part between an external surface of a pump housing and elastic diaphragm) to a known device (the primary Chang breast pump device that generates negative pressure and has a recessed external pump housing) ready for improvement to yield predictable results (including several benefits articulated above). EX1003, ¶108; *see KSR Int’l Co., v. Teleflex, Inc.*, 550 U.S. 398, 416-17 550 U.S. at 417 (2007). Indeed, the modifications would have amounted to a simple substitution of one known pump configuration for another. EX1003, ¶108.

A POSITA would have had a reasonable expectation of success in making the modification based on the similarity of the breast pump device configurations, both including flexible pump components. EX1003, ¶108. Indeed, the use of such diaphragm pump components in similar breast pump devices was widely known, including implementing a first diaphragm housing on an external surface of the pump housing and a second diaphragm housing with the breast shield. *Id.* (citing to corroborating examples at EX1012, 12:3-5 (“The diaphragm 14 is arranged in a recess 112 of the housing 10, which forms part of a pump chamber.”) and 5:5-7 (“breast shield[]connected directly to the first port of the chamber.”); *see also* EX1010, EX1018, and EX1020. Moreover, such diaphragm pumps were used in

“wearable” in-bra devices. EX1003, ¶108 (citing to corroborating examples at EX1010 and EX1014, FIGS. 1-5).

d. Yuen

Yuen describes a battery-powered electronic device used in the collection/measurement of breast milk, and similar to Chang’s device, Yuen’s portable device also includes a rechargeable battery. *See* EX1011, 1, 8-11; EX1003, ¶81. Yuen teaches the conventional option in which the battery is recharged “by a power supply through a charging port 1110 e.g. a micro USB port located on the upper housing 112.” *Id.*, 14:14-20. The device includes “circuitry” to “monitor the charging current and the overall progress. For instance, the circuitry 900 may provide a signal associated with the charging status of the apparatus 100 to the indicator 500 for presenting a visual indication to the user.” *Id.*

e. Combination of Chang-Fang and Yuen

A POSITA would have been motivated to implement the Chang-Fang breast pump device to include a power charging circuit and a Universal Serial Bus socket on the device, as suggested by Yuen, for purposes of achieving known benefits. EX1003, ¶109-16. Chang describes its breast pump includes a rechargeable battery and “is configured to be plugged into a power source for charging” via a “power cord connector.” EX1007, [0072], [0080]. Yuen suggests the use of a suitable

power charging circuit for controlling charging of a battery, as well as a USB socket (e.g., a conveniently ubiquitous “micro USB port”) that receives a USB connector of a power charging cable. Thus, in the predictable combination, the Chang-Fang-Yuen breast pump device would have housed a conventional power charging circuit to safely and advantageously control charging of the rechargeable battery. EX1003, ¶110; EX1011, 14:14-20. And, the breast pump device would have beneficially included a micro USB socket (e.g., in addition or as an alternative to the existing “power cord connector” of “cover jack 65”) so as to provide the user with an opportunity to connect a highly common type of USB cable. EX1003, ¶111.

Multiple reasons would have prompted a POSITA to implement a power charging circuit and USB socket, in accordance with Yuen’s suggestions, in the Chang-Fang device.

First, a POSITA would have combined Chang-Fang and Yuen to avail the system of known charging technique that facilitated controlled charging and useful feedback regarding the charging status. EX1003, ¶112. Yuen provides further details of a power charging circuit that would have predictably enhanced control of charging of the rechargeable battery by “monitor[ing] the charging current and the overall progress,” and “provid[ing] a signal associated with the charging status.” EX1011, 14:17-20; *see also* EX1007, [0072], [0080], [0111]. Here, a POSITA would have found it obvious to implement the power charging circuit to facilitate

control of battery charging in a breast pump device. EX1003, ¶112. A POSITA would have recognized from Chang and Yuen that the breast pump device operates using electrical power having characteristics different than the raw supply of electricity from a typical outlet.

Second, a POSITA would have implemented the Chang-Fang combination to use Yuen's suggestion for a known USB port to facilitate charging, which would have provided a ubiquitous a common type of charging cable that was easily portable and replaceable by the user. EX1003, ¶113. By the timeframe of the '380 patent, USB ports were widely used on portable electronic devices. Implementing the Chang-Fang device with a micro-USB port, as suggested by Yuen, would have facilitated charging using a conventional connector type that was familiar to users and widely available (and, indeed, typically carried by others even if the user misplaced the original cable). EX1003, ¶¶114-15.

Third, a POSITA would have been motivated to combine Chang and Fang with Yuen because doing so was the application of a known technique (Yuen's battery charging circuit and USB port on a device) to a known device (the primary Chang-Fang breast pump device powered by a rechargeable battery and having a charging port) ready for improvement to yield predictable results (benefits articulated above). *KSR*, 550 U.S. at 416-17. Indeed, each of the references are directed to portable, battery-powered electronic devices often used during the

collection of breast milk, and would have been implemented as a matter of routine skill. For at least these reasons, the evidence here shows that a POSITA would have had a reasonable expectation of success in making these ordinary modifications for purposes of recharging Chang's battery. EX1003, ¶116.

2. Application to Challenged Claims

a. Claim 1

1[pre]:

If the preamble is limiting, the Chang-Fang-Yuen combination describes it. EX1003, ¶¶117, 118. Chang describes "portable breast pump systems and methods for collecting milk from a breast of a nursing mother." EX1007, [0001], Abstract, FIGS. 1-21.

1[a]:

The Chang-Fang-Yuen device provides a self-contained, in-bra wearable device. EX1003, ¶119. Chang describes "a small, portable, self-powered, energy efficient, wearable breast pump system" (EX1007, [0004]) that "is contemplated to fit comfortably and conveniently into a bra of a user" (*id.*, [0011]), with the components of the device "all contained within a cup of a brassiere." *Id.*, [0019]; EX1003, ¶119. The Chang-Fang-Yuen device is "complete, or having all that is needed, in itself" and is capable of being worn in a bra." EX1003, ¶119; *supra*, §VI.A.1 (Chang-Fang-Yuen); *infra*, Ground 1, 1[b]-1[e] Analysis. Implementing

the device using diaphragm pump components would have predictably maintained the compact, in-bra configuration of the breast pump device. *Id.*; EX1003, ¶119.

1[b]:

The Chang-Fang-Yuen device provides a pump housing. EX1003, ¶120. For example, Chang describes a “housing or outer shell 12 of” the breast pump device (annotated in blue below), and a recessed “pump chassis 35”. EX1007, [0071], [0073], FIGS. 1A, 6A; EX1003, ¶120. The “outer shell” and “pump chassis” together form a pump housing that accommodates pump components. *Id.*

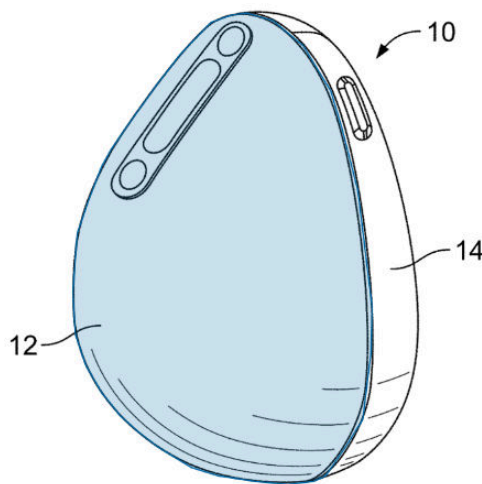
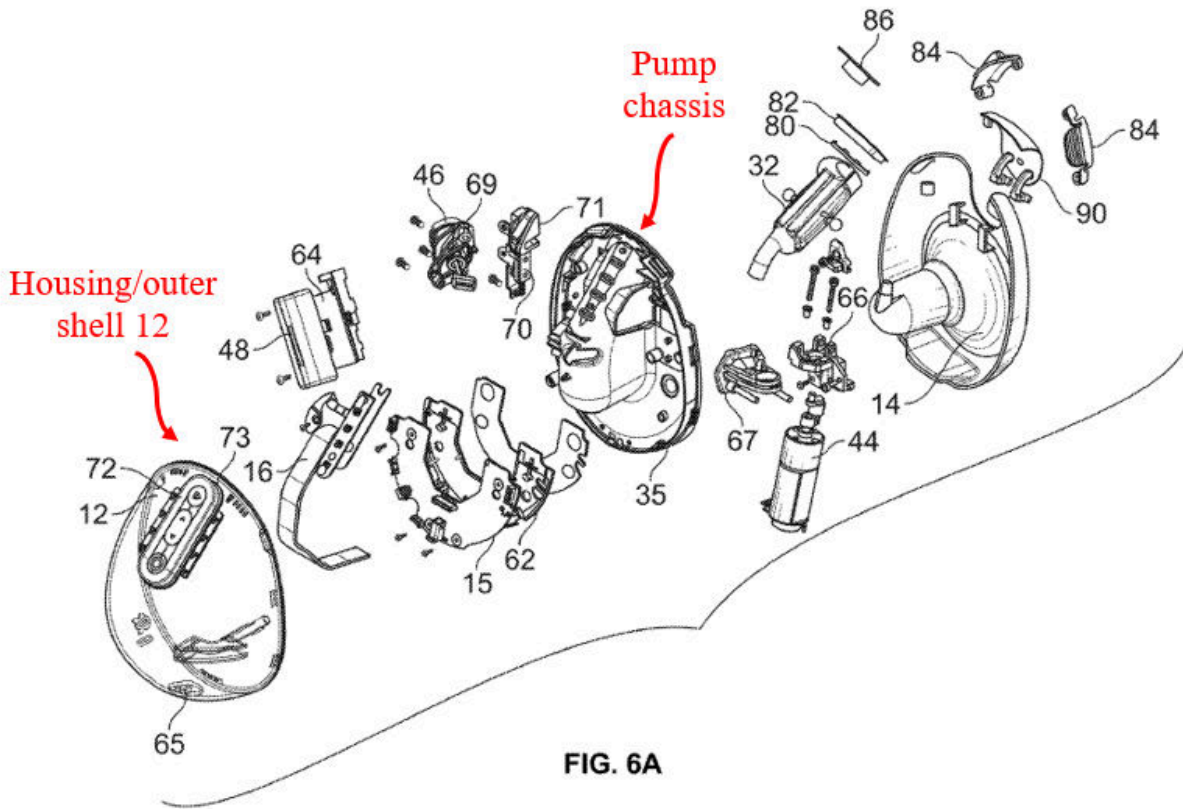


FIG. 1A



EX1003, ¶120 (annotating EX1007, FIGS. 1A, 6A)

1/b/i:

The Chang-Fang-Yuen device provides a rechargeable battery. EX1003, ¶¶121-23. For example, Chang describes a rechargeable battery used to power the pump device: “A **battery** 48 is included to provide a **rechargeable** power source and is configured to be plugged into a power source for charging.” EX1007, [0072]; *see also, id.*, [0020] (“battery powered” and battery is “received in the compartment of the external shell”); [0080] (“A battery bracket 64A” within the chassis inside housing 12 is “sized and shaped to receive a **rechargeable battery** 48 assembly that powers the system”); Fig. 6A; EX1003, ¶121.

1/b/ii/:

The Chang-Fang-Yuen device provides a power charging circuit for controlling charging of the rechargeable battery. EX1003, ¶¶122-24. For example, Chang describes a breast pump device with a rechargeable battery “configured to be plugged into a power source for charging.” EX1007, [0004], [0020], [0072]; EX1003 ¶122. A POSITA would have understood, and found it obvious, from Chang’s description, that the device include a power charging circuit for controlling charging of the battery in order to achieve Chang’s express objective of battery charging via an external power source. *Id.*, [0108]. For example, a power charging circuit was a conventional feature of rechargeable breast pumps and other portable electronic devices, 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. EX1007, [0080], [0111]; EX1003, ¶122.

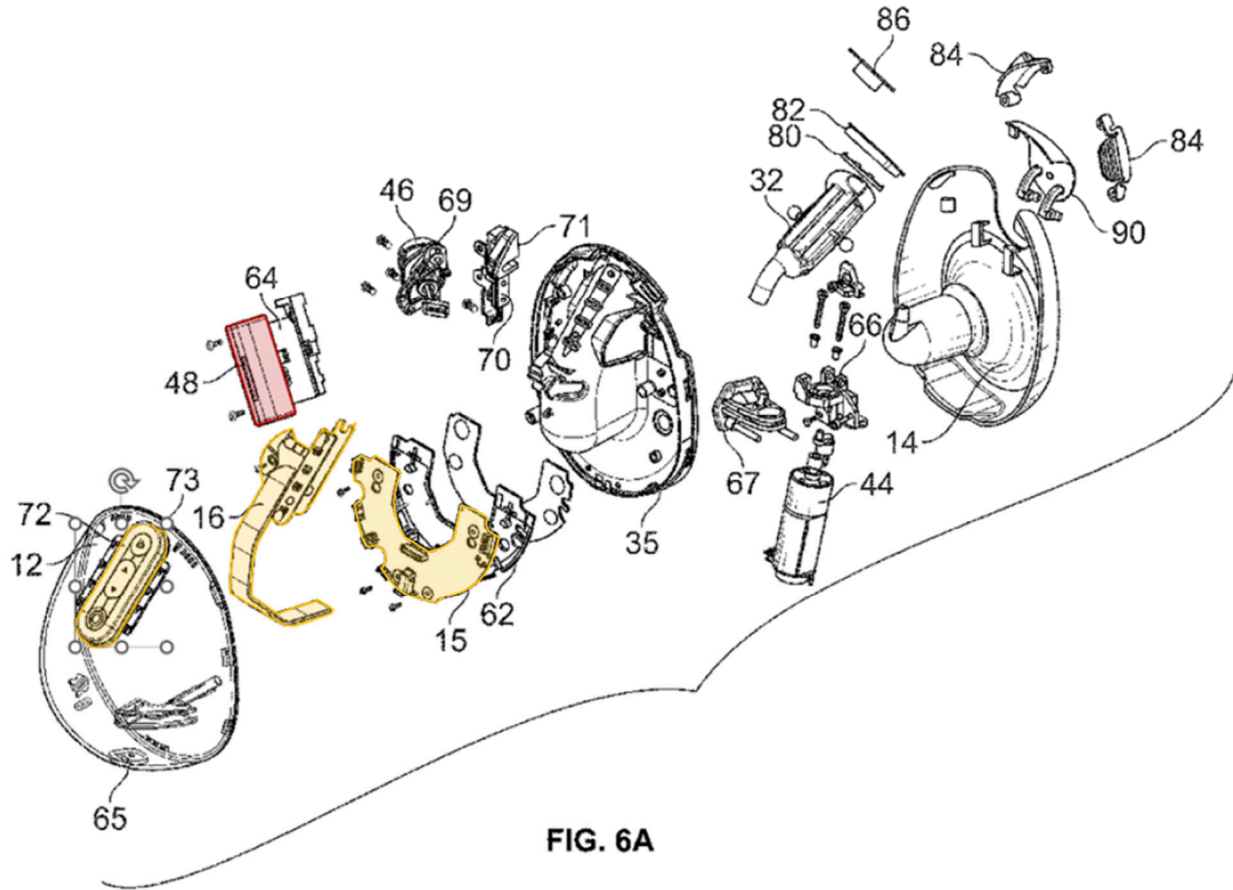
Even if Chang did not provide a power charging circuit for controlling charging of the rechargeable battery (which it does), this conventional feature is further provided in the combined device in accordance with Yuen’s suggestions. *Supra*, §VI.A.1.e (Chang-Fang-Yuen); EX1003, ¶123. For example, Yuen describes “circuitry” to “monitor the charging current and the overall progress.” EX1011, 14:14-20. A POSITA would have recognized and found obvious from Chang and

Yuen's description that the circuit is implemented in the combined system to monitor the incoming "charging current," thereby ensuring proper current for safe and effective charging. EX1003, ¶124. To be clear, a POSITA would have found obvious from Yuen's description to implement the power charging circuit within the device to account for electricity of varying characteristics being supplied to the device and provide appropriate "charging current" to the battery.² *Id.*, ¶124. Indeed, a POSITA 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. *Id.*

² The Chang-Fang-Yuen teachings actually provide more detail on this limitation than the '380 patent, which tersely mentions "a power charging means within the control circuitry 71 for charging the battery 81" (EX1001, 13:29-30) without any implementation details for the reader. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) ("[T]hat appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board's finding that one skilled in the art would have known how to implement the features of the references.").

1/[b]/[iii]:

The Chang-Fang-Yuen device provides control electronics powered by the rechargeable battery. EX1003, ¶125. Chang describes control electronics powered by rechargeable battery 48. For example, Chang expressly indicates the system is “battery powered,” and describes control electronics (e.g., “control panel 17,” “flex-circuit 16,” and/or “controller”/“circuit board 15”) such that a user can “power the system on and off as well as[] alter functioning.” EX1007, [0072]. “A battery 48 is included to provide a rechargeable power source and is configured to be plugged into a power source for charging.” *Id.* Chang states, “user interface panel can include a button membrane 72 and a button membrane housing 73 each supported on the housing 12 and placed in engagement with the flex-circuit 16 that provides the user with system control.” *Id.*, [0080]. EX1003, ¶125.



EX1003, ¶125 (annotating EX1007, FIG. 6A)

Even if Chang did not expressly describe that control electronics are powered by the rechargeable battery (which it does, as discussed above), a POSITA would have found it obvious, from Chang's description, that the control electronics are powered by the rechargeable battery. EX1007, [0020], [0072]; EX1003, ¶126. Chang expressly describes the "system is battery powered" via a battery "received in the compartment of the external shell." *Id.* A POSITA 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.

EX1003, ¶126.

1[b][iv]:

The Chang-Fang-Yuen device provides this limitation. EX1003, ¶¶127-28. In the combined system, the device includes a diaphragm pump that generates negative air pressure. Fang describes an “air pump” in pneumatic connection with the diaphragm that serves to generate negative air pressure. EX1009, [0019], [0024], FIG. 7. Consistent with Chang’s teachings of the location of pump components (e.g., “motor”), the “air pump” components of the combined device are positioned within the pump housing. EX1007, [0072] (motor 46), [0080], FIG. 6A.

To be clear, the air pump is powered by the rechargeable battery. EX1007, [0072], [0080] (“rechargeable battery 48 assembly that powers the system 10” and “the system motor which is powered by the battery”).

1[b][v]:

The Chang-Fang-Yuen device provides this limitation. EX1003, ¶129. Chang describes its breast pump includes a “cover jack...for accepting a power cord connector” for charging the rechargeable battery. EX1007, [0080]. In the combined system, the power cord connector is implemented as a “micro USB” charging socket, in accordance with Yuen’s suggestions. *Supra*, §VI.A.1.e (Chang-Fang-Yuen). The “micro USB” socket receives a complementary micro USB plug of a charging cable,

transferring power to the power charging circuit and the rechargeable battery to effectuate charging in accordance with Chang and Yuen's stated objectives. EX1003, ¶129.

1/[b]/[vi]:

The Chang-Fang-Yuen device provides a pumping chamber. EX1003, ¶130. In the combined device, a recess or cavity is defined between a pump housing wall (e.g., “pump chassis 35”) and the flexible diaphragm, in accordance with Chang and Fang's suggestions. EX1007, FIGS. 3 and 6A (illustrating recess of “pump chassis 35” that accommodates a “flex tube”); EX1009, FIG. 7 (illustrating recessed wall of pump housing that defines cavity with “elastic diaphragm”); *supra*, §VI.A.1.c (Chang-Fang). The recess or cavity between the pump housing wall and flexible diaphragm defines a pump chamber (e.g., an air-side of the diaphragm). EX1003, ¶130.

1/[c]:

The Chang-Fang-Yuen device provides a breast shield (e.g., Chang's nipple receiving portion and breast contact portion). EX1007, [0071], [0090]; EX1003, ¶131. Based on Chang, the breast shield is “sized and shaped to engage a breast of a user,” and “contoured to comfortably fit against a wide range of user's bodies and to provide structure for sealingly engaging with breast tissue.” EX1007, [0071]. The breast shield has two portions—a “nipple receiving portion...contoured to more

closely match the natural shape of the nipple” (*id.*, [0090]), and “surfaces that extend outwardly from a nipple receiving portion of the flange to engage breast tissue, thus providing extra surface area for comfortably contacting tissue” (*id.*, [0071], [0090]. Figure 4 of Chang illustrates a flange comprising the nipple receiving portion (green) and breast-contact portion (blue). EX1003, ¶131.

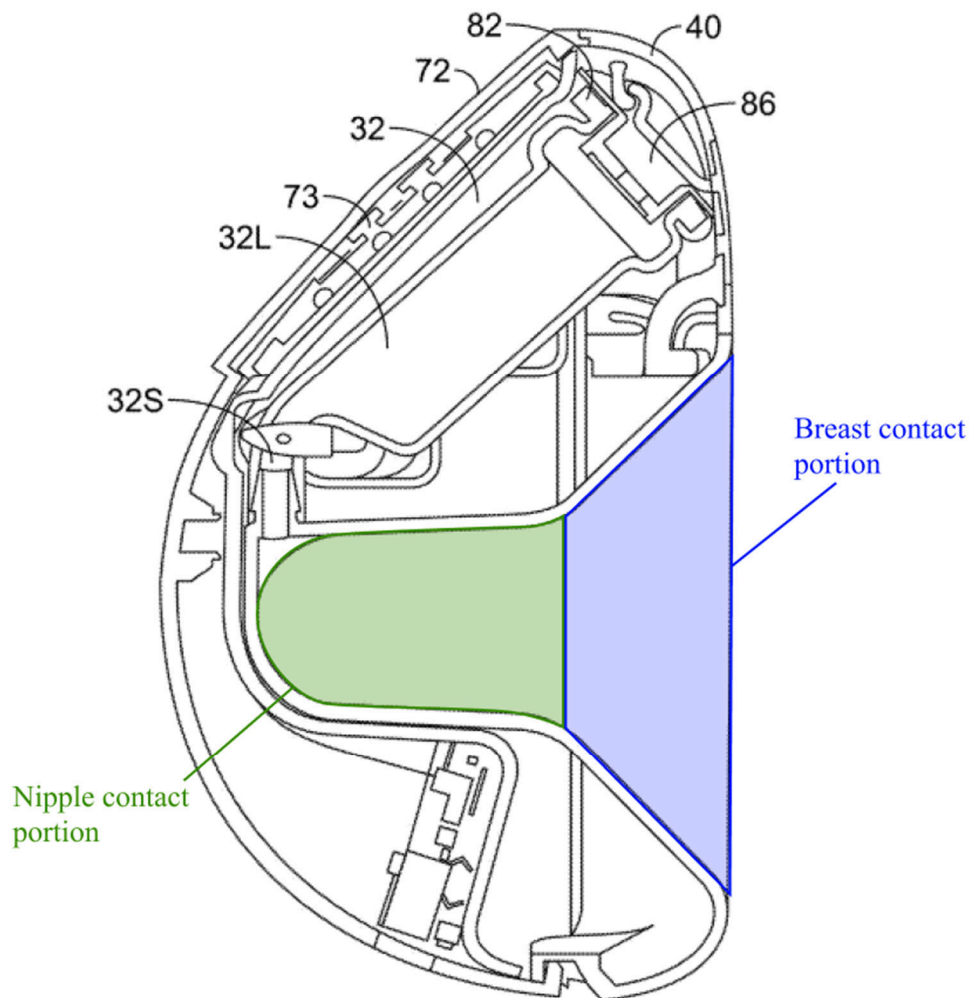
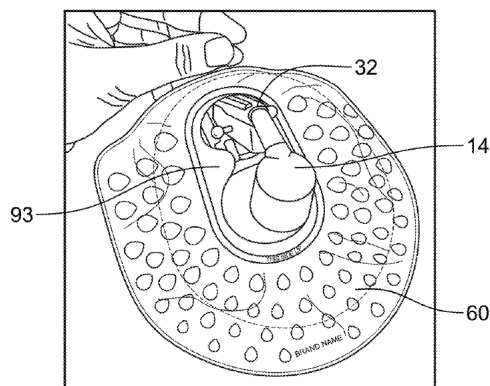


FIG. 4

EX1003, ¶131 (annotating EX1007, FIG. 4)

1/d/:

The Chang-Fang-Yuen device provides this limitation. EX1003, ¶132. For example, Chang describes a milk container that is located within the device and configured to be attached to and removed from the pump housing. EX1007, [0008], [0010], [0019] (“the milk collection container are all contained within a cup of a brassiere”), [0021], [0023], [0081], [0086], [0092], [0099], [0100] (“positioning of collection or container assembly 60 within a pump system 10.”), [0101] (“the system is configured to pump into a sealed collection or container assembly 60” and “inside or outside of the pump housing”). As Chang describes, the milk container is configured to be attached to and removed from the pump housing such that the container is within the device in a fixed position relative other components as part of the wearable, in-bra form factor. *Id.*, [0019] (“the milk collection container are all contained within a cup of a brassiere”); [0106]-[0107]; FIGS. 11A-11E.

**FIG. 11B**

EX1007, FIG. 11B

1/e:

The Chang-Fang-Yuen device provides a flexible diaphragm configured to prevent milk from reaching the pump, in accordance with Fang's suggestions. EX1009, [0019] ("The elastic diaphragm 7 is used to prevent the milk from flowing into the air pump main unit 8"); *supra*, §VI.A.1.c (Chang-Fang); EX1003, ¶¶133-35.

The diaphragm is seated against a diaphragm housing that is fixed to a recessed surface of the pump housing, in accordance with Fang's suggestions. EX1003, ¶134. Fang expressly provides a diaphragm housing that is fixed to a recessed surface of the pump housing. EX1009, FIG. 7. In the combined system, diaphragm housing features are fixed to a recessed surface of the pump housing wall (e.g., "chassis 35"). *Supra*, §VI.A.1.c (Chang-Fang); EX1003, ¶134(citing to corroborating example at EX1012, 12:3-5). Indeed, the prior art teachings here align with the preferred embodiment of the '380 patent itself. *See*, EX1001, FIG. 4.

The diaphragm is a membrane that deforms in response to changes in air pressure caused by the pump to create negative air pressure in the nipple tunnel. For example, Fang describes an "elastic" diaphragm that, when a vacuum is created on the pumping chamber, deforms away from the nipple tunnel, creating

negative air pressure in the nipple tunnel. EX1009, [0019], [0020]-[0025];

EX1003, ¶135.

b. Claim 29

29[pre]:

Supra, Ground 1A, 1[pre], 1[a] Analysis; EX1003, ¶¶118, 119, 136, 137.

29[a]-29[d]:

Supra, Ground 1A, 1[a]-1[d] Analysis; EX1003, ¶¶119-132, 138-146.

29[e]:

The Chang-Fang-Yuen combination provides this limitation. EX1003, ¶¶127-28, 133-35, 147-48; *supra*, Ground 1A, 1[e] Analysis. In the combined system, a membrane (e.g., “elastic diaphragm”) is configured to define a pumping chamber at least in part with an external surface of the pump housing (e.g., “chassis 35”), in accordance with Fang’s suggestions. *Id.*; *supra*, §VI.A.1.c (Chang-Fang). The recessed surface of “chassis 35” that defines the pumping chamber with the diaphragm is an external surface that is exposed (e.g., when the “flange 14”/breast shield is removed) and that houses pump components internally. EX1007, FIGS. 3, 6A; EX1003, ¶148.; *see also* EX1009, [0024], FIG. 7.

Claims 2, 30:

In the Chang-Fang-Yuen device, the breast shield includes, for example, Chang’s nipple receiving portion and breast contact portion. EX1007, [0071], [0090]; *supra*, 1[c] Analysis; EX1003, ¶¶131, 149. Based on Chang, the breast

shield is “symmetrical about the nipple receiving portion,” which is “cylindrical.” *Id.*, [0090]; *see* EX1003, ¶149. The combined device is configured to be “disabled when the flange [“breast shield”] is not placed in an operating position.” EX1007, [0017]. A POSITA would have understood, and found obvious from Chang’s description, the flange (“breast shield”) is symmetrical about the cylindrical nipple receiving portion and has an operating position, and thus, the flange is configured to rotate smoothly around a nipple inserted into the nipple receiving portion (“nipple tunnel”) so that the flange is positioned into a correct operating position onto a breast. *See* EX1003, ¶149.

Claims 3, 31:

In the Chang-Fang-Yuen device, the breast shield (e.g., including Chang’s nipple receiving portion and breast contact portion) is a “skin contact member” or “configured to form a seal with the breast.” EX1007, [0008], [0071]; EX1003, ¶¶150-51. The breast shield in the combined device is also a one piece item such that, in use, it presents a single continuous surface to a nipple and a breast, in accordance with Chang. *See* EX1003, ¶150.

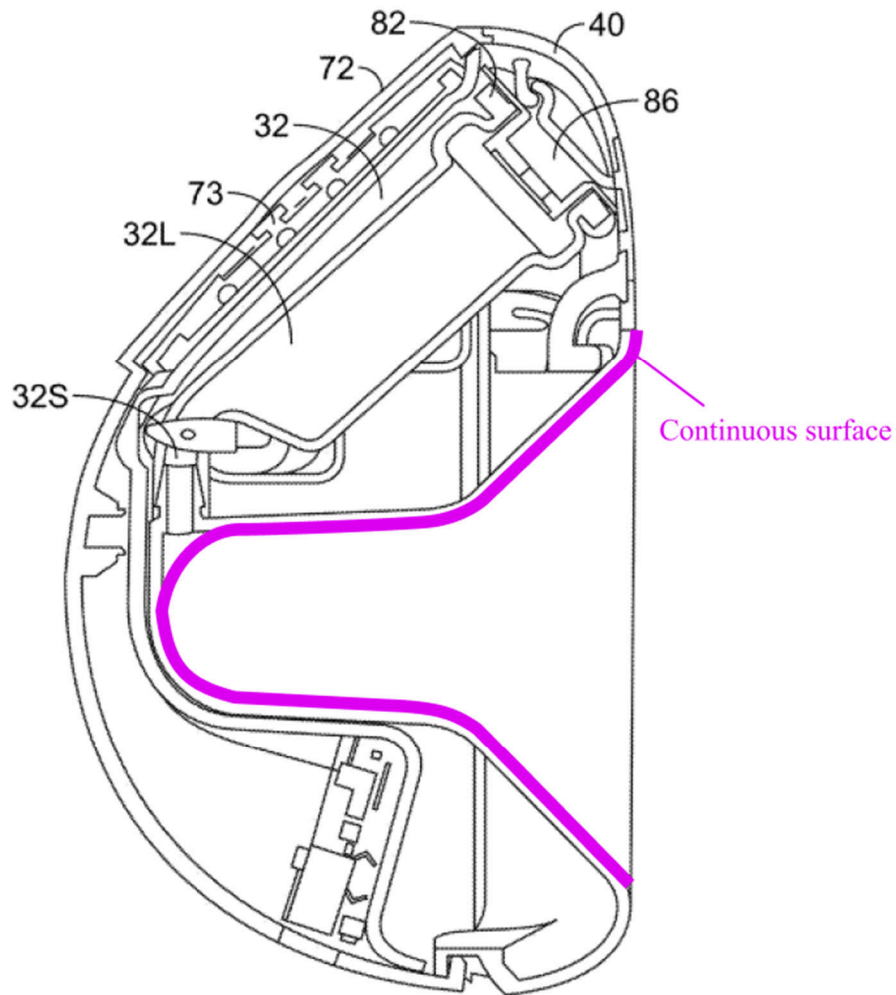


FIG. 4

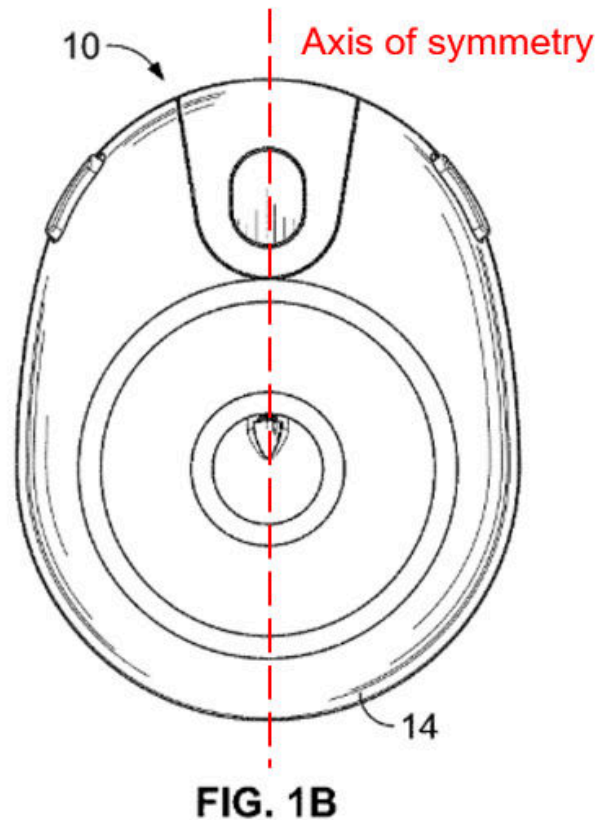
EX1003, ¶150(annotating EX1007, FIG. 4)

The breast shield has a “nipple receiving portion...contoured to more closely match the natural shape of the nipple” and “surfaces that extend outwardly from a nipple receiving portion of the flange to engage breast tissue.” EX1007, [0071], [0090]; FIGS. 4-6A. Based on these teachings, a POSITA would have also recognized and found obvious that the breast shield would have presented a single

continuous surface to a nipple and breast to “form a seal with the breast” (EX1007, [0022]) and avoid edges or interfaces that could create discomfort when sealingly engaged with the breast during use. EX1003, ¶151.

Claims 4, 32:

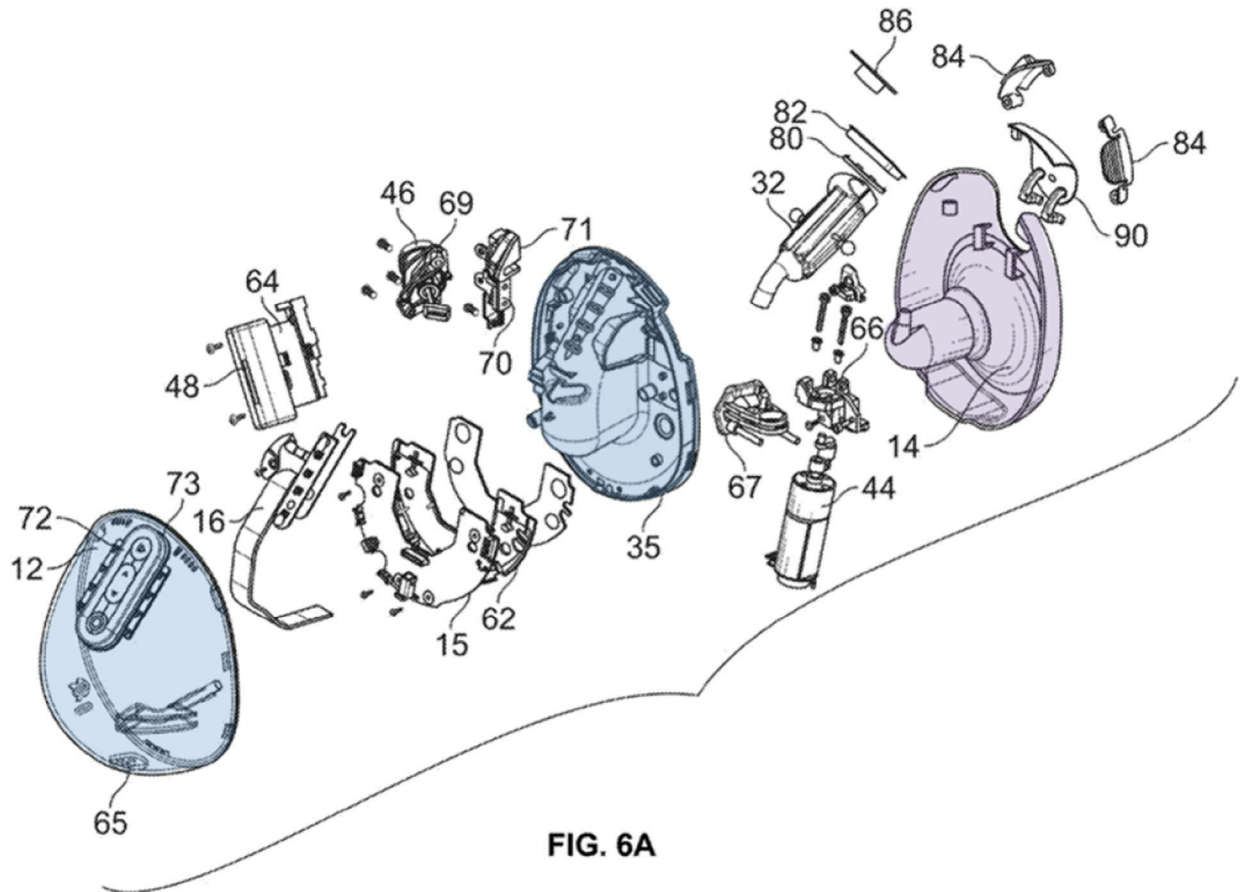
In the Chang-Fang-Yuen device, the breast shield (e.g., including Chang’s nipple receiving portion and breast contact portion) includes structures based on Chang’s teachings. *See* EX1003, ¶152. For example, Figure 1B shows a back view of Chang’s breast pump, the side facing the user’s breast and includes the breast shield. EX1007, [0071]. Annotated Figure 1B below shows the breast shield has a top and bottom and is symmetrical about a center-line running from the top to the bottom of the breast shield when positioned upright for normal use.



EX1003, ¶152(annotating EX1007, FIG. 1B)

Claim 5:

In the Chang-Fang-Yuen device, the breast shield (e.g., including Chang’s nipple receiving portion and breast contact portion) and pump housing (e.g., Chang’s “outer shell 12” and/or “chassis 35”) are arranged based on Chang’s teachings. *See* EX1003, ¶¶153-54; EX1007, [0071], [0073], FIGS. 1A, 6A. As shown in the annotated figure below, in the combined device, the breast shield and the pump housing would have been arranged like Chang’s outer shell 12 and chassis 35 (blue) and the breast shield (magenta), with the breast shield configured to slide in and out when assembled/disassembled:



EX1003, ¶153(annotating EX1007, FIG. 6A)

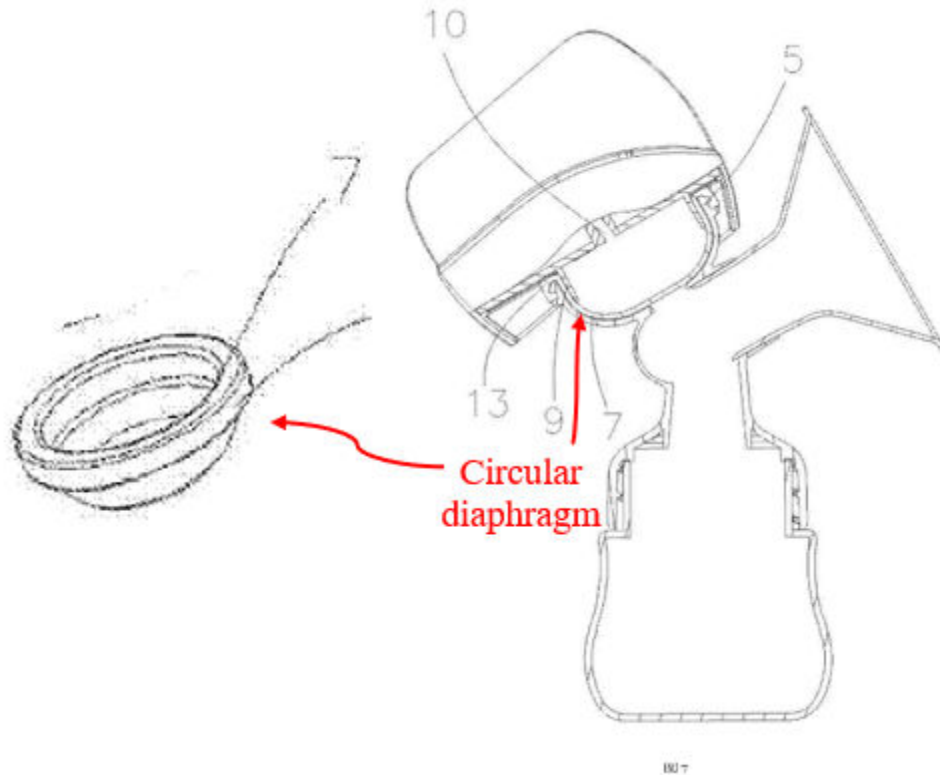
In the combined system, the flexible diaphragm (e.g. “elastic diaphragm 7”) and second diaphragm housing (e.g., that the “elastic diaphragm 7” is seated in) are attached with the breast shield. *Supra*, §VI.A.1.c (Chang-Fang); EX1009, [0019], FIG. 7; EX1003, ¶154. The flexible diaphragm therefore moves together with the breast shield such that both are configured to slide in and out from the pump housing. EX1003, ¶154.

Claims 6, 33:

The Chang-Fang-Yuen combination provides claims 6 and 33. For example, Chang describes the breast shield can be “removed from engagement with the remainder of the” breast pump device. EX1007, [0105]; EX1003, ¶132, 155. The milk container is likewise removable from the pump housing. *Id.*, [0021], [0023], [0081], [0086], [0092], [0099]-[0100]; *supra*, Ground 1A, 1[d] Analysis. In normal use or disassembly (e.g., to empty the milk container or clean the milk flowpath), only the breast shield and milk container are directly removable from the pump housing. EX1003, ¶155; *see also*, EX1001, 6:61-67. Doing so provides access to empty the milk container and clean the diaphragm components, for example, without requiring further disassembly. *Id.*

Claims 7, 34:

In the Chang-Fang-Yuen device, the diaphragm/membrane is substantially circular. *See* EX1003, ¶¶156-57. For example, Fang shows elastic diaphragm 7 to have a substantially circular shape:



EX1003, ¶156 (annotating EX1009, Fig. 5 (partial), FIG. 7); *see also* EX1009, [0020]

The diaphragm housing is likewise substantially circular, engaging with the circular elastic diaphragm 7. EX1003, ¶157; EX1009, [0020]-[0025]; FIG. 7.

Claims 8, 35:

As discussed for 1[d], the Chang-Fang-Yuen device includes a milk container (e.g., Chang’s milk container). *See* EX1007, [0008], [0010], [0019], [0021], [0023], [0081], [0086], [0092], [0099], [0100], [0101]. Chang describes that its milk container may be “flexible or ***rigid***, or disposable or reusable.” EX1007, [0021]; EX1003, ¶158.

Claims 11, 37:

The Chang-Fang-Yuen device includes a milk container (e.g., Chang's milk container) attachable to the pump housing. *See* EX1007, [0008], [0010], [0019], [0021], [0023], [0081], [0086], [0092], [0099], [0100], [0101]; *supra*, Ground 1A, 1[d] Analysis. For example, Chang describes that its milk container includes “a rigid or flexible sealing component, such as a ring or gasket into which [a] pump or container valve is **pushed** or twisted and sealed.” *Id.*, [0101]. The “sealing component” thus provides a mechanical mechanism that attaches to the pump housing (e.g., at the pump valve) via a single push action (e.g., a single push to secure the sealing component to the container valve). *Id.* The attachment secures the milk container with the pump housing, and allows the milk container to be released (e.g., after a pump session). EX1003, ¶¶132, 159.

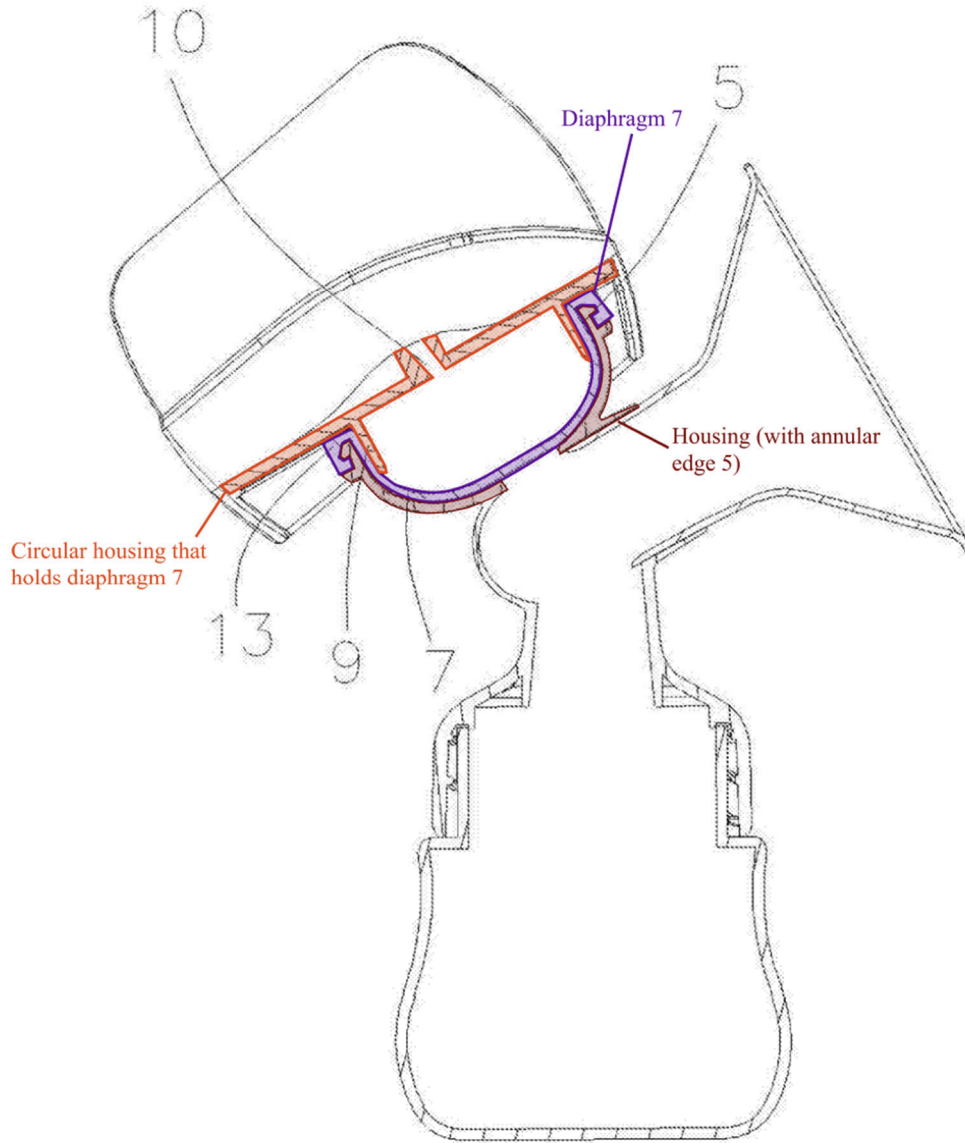
Claims 13, 39:

Supra, Ground 1A, 1[e] Analysis, §VI.A.1.c (Chang-Fang); EX1003, ¶¶133-35, 160. An air-side chamber is defined between the first diaphragm housing (e.g., on “chassis 35”) and the diaphragm, and a milk-flow side chamber is defined between a second diaphragm housing (e.g., attached with the breast shield) and the diaphragm. EX1003, ¶160.

Claims 14, 40:

In the Chang-Fang-Yuen device, the flexible diaphragm (e.g., Fang's elastic diaphragm 7) is configured to self-seal under negative pressure around its outer edge

(e.g., without adhesive or moisture). *See* EX1009, [0019]-[0025], FIG. 7; *see also* Ground 1A, 1[e] Analysis; EX1001, 6:25-28; EX1003, ¶¶133-35, 161-62. A POSITA would have understood, and found obvious, to configure the flexible diaphragm of the Chang-Fang-Yuen device to self-seal under negative pressure to form a watertight and airtight seal around the recess or cavity in the pump housing (e.g., flange 9) , thereby preventing passage of milk and providing for generating of negative pressure. EX1003, ¶162. *Id.*, [0020]; *see id.*, [0025] (“secure installation”); *see also id.*, [0010]; FIG. 7.

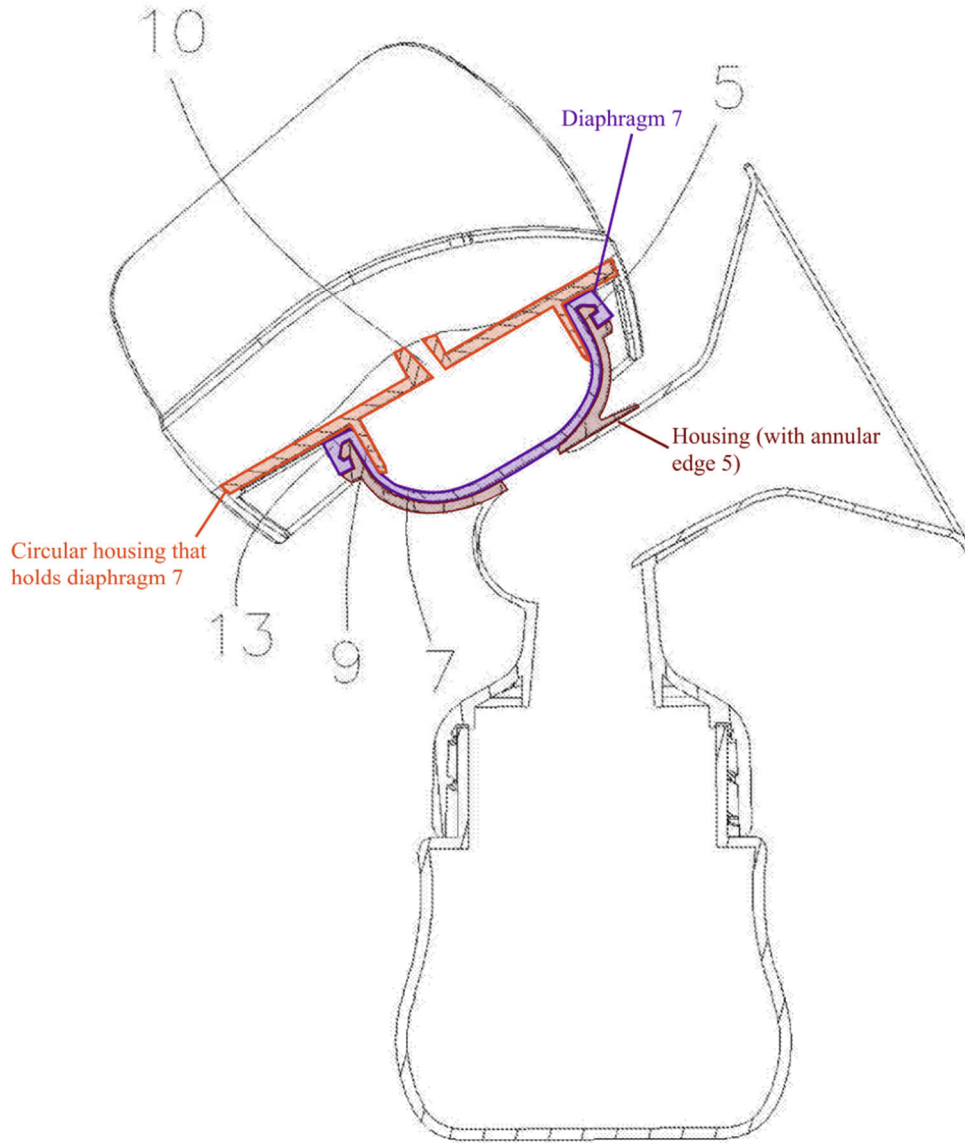


EX1003, ¶162(annotating EX1009, Fig. 7); *see* EX1009, [0020]

Claim 15:

In the Chang-Fang-Yuen device, a flexible diaphragm (e.g., Fang's elastic diaphragm 7) is seated against a diaphragm housing (e.g., protruding flange 9 and related features) that is fixed to a recessed surface of the pump housing, in accordance with Fang's suggestions. EX1009, Fig. 7, [0019]-[0025]; *supra*, Ground

1A, 1[e] Analysis. For example, Fang describes an elastic diaphragm 7 positioned between the first diaphragm housing on the pump housing (e.g., protruding flange 9 and related features, highlighted in orange) and the second diaphragm housing (e.g. flaring 4, alone or together with annular edge 5, highlighted in maroon). EX1003, ¶163. In the resulting combination, the second diaphragm housing is attached to the nipple tunnel such that the diaphragm components are in an upper, central location, consistent with Chang and Fang’s suggestions (e.g., near the original locations of Chang’s “flex tube” and Fang’s elastic diaphragm and housing). *Id.*



EX1003, ¶163(annotating EX1009, Fig. 7)

The diaphragm is positioned between the first and second diaphragm housings, and the second diaphragm housing (e.g., flaring 4, alone or together with annular edge 5) is configured to define a milk-flow side chamber with the diaphragm. EX1003, ¶164.

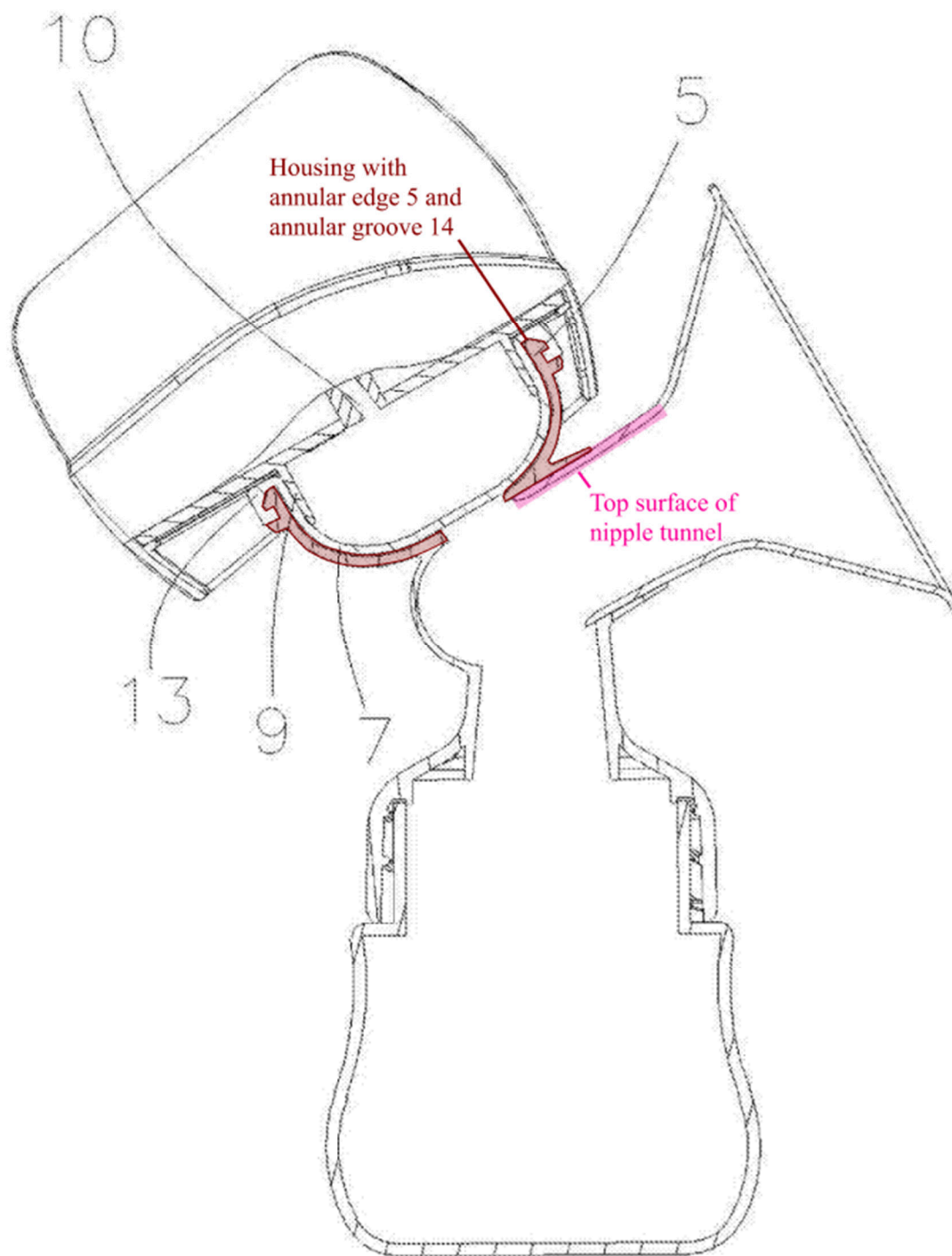
Claim 16:

In the Chang-Fang-Yuen device, a flexible diaphragm (e.g., Fang's elastic diaphragm 7) is releasably secured around an edge of the second diaphragm housing, which is attached to the nipple tunnel. EX1009, Fig. 7, [0019]-[0025]; EX1003, ¶¶165-67. For example, Fang illustrates the elastic diaphragm releasably secured around an edge (e.g., annular edge 5) of the second diaphragm housing. *Id.*; *supra*, Ground 1A, Claim 15 Analysis. EX1003, ¶165. To be clear, even if Fang did not expressly provide this feature (which it does), a POSITA would have understood, and found it obvious based on Fang's description, that the flexible diaphragm be releasably secured around an edge of the second diaphragm housing to facilitate disassembly for cleaning/sterilization. EX1009, [0004]; EX1003, ¶¶166-67(citing as corroborating example EX1012, 15:1-5; *see id.*, [0097], [0099], Fig. 12).

Claim 17:

In the Chang-Fang-Yuen device, the second diaphragm housing (e.g., that the "elastic diaphragm" is attached to) is positioned, when the breast pump device is upright, over a top surface of the nipple tunnel. *Supra*, Ground 1A, Claim 15 Analysis; EX1003, ¶¶168-69. Fang's elastic diaphragm 7 is positioned according to the teachings of Fang, e.g., between a first diaphragm housing (e.g., including protruding flange 9 and adjacent surfaces and the second diaphragm housing (e.g., including flaring 4). EX1009, Figs 5, 7; *see id.*, [0019]-[0025]. As shown in the

annotated figure below, in this arrangement, the second diaphragm housing is over a top surface of a nipple tunnel (pink).

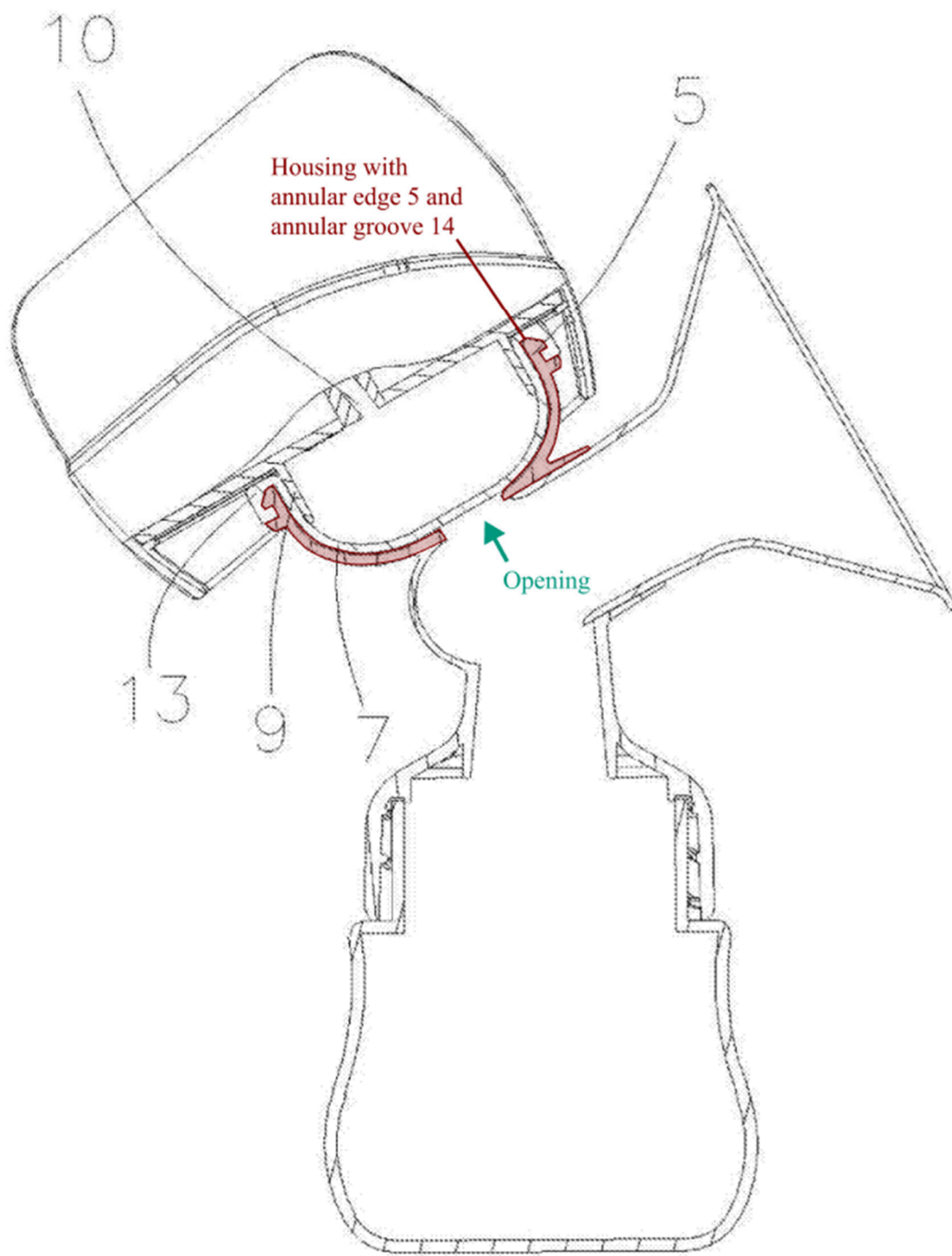


EX1003, ¶168(annotating EX1009, Fig. 7)

In the Chang-Fang-Yuen device, the flexible diaphragm is positioned in a similar manner according to Fang's suggestions (and consistent with the upper, central location of Chang's "flex tube") such that the structure securing the flexible diaphragm (e.g., "second diaphragm housing") is over a top surface of the nipple tunnel of the breast shield (Chang's nipple receiving portion) (e.g., "a top surface of the nipple tunnel") when the combined device is upright. EX1003, ¶169.

Claim 18:

In the Chang-Fang-Yuen device, the second diaphragm housing includes an air hole to transfer negative air pressure to the nipple tunnel, in accordance with Fang's suggestions. EX1003, ¶¶170-71. Indeed, Fang illustrates the air hole of the second diaphragm housing (e.g., including "flaring 4"). EX1009, Figs 5, 7; *see id.*, [0019]-[0025]. As shown in the annotated figure below, the second diaphragm housing includes an air hole to transfer negative pressure to the nipple tunnel:



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

Claim 19:

Supra, Ground 1A, 1[e] Analysis, and Claims 7, 34 above; EX1003, ¶¶133-35, 156-57, 172. The second diaphragm housing (e.g., including “flaring 4”) has a corresponding generally circular shape to accommodate the circular diaphragm. EX1009, FIGS. 5, 7; *see also Abstract* (“circular”), [0004], [0005], [0019]-[0025].

Claim 20:

In the Chang-Fang-Yuen device, the second diaphragm housing is connected with the breast shield forming an integral structure when assembled. EX1003, ¶¶173-74. A POSITA would have found it obvious, in view of Chang and Fang’s description, to form the second diaphragm housing as an integral part of the breast shield. *Id.* Fang expressly provides the second diaphragm housing as an integral part of an adjacent structure below the second diaphragm housing and connected to the nipple tunnel/breast flange. EX1009, FIG. 7.

In the combined device, a POSITA would have been prompted to likewise integrally form the second diaphragm housing with the adjacent structure below the second diaphragm housing—Chang’s nipple tunnel/breast shield. Indeed, doing so would have reduced the number of separate parts, facilitating assembly/disassembly by the user, and reducing associated interfaces to be cleaned—a known benefit desired in breast pump devices. EX1003, ¶174. Moreover, a POSITA would have found such modification obvious to try, especially given the known market demand

for easy to assemble and clean devices, and the finite number of solutions for attachment of the second diaphragm housing and the breast shield (e.g., integrally or non-integrally). *KSR*, 550 U.S. 398, 421.

Claim 21:

Supra, Claim 16 Analysis; EX1003, ¶¶165-67, 175.

Claim 22:

Supra, Claims 14, 40 Analysis; EX1003, ¶¶165-67, 176. Additionally, a POSITA would have recognized from Fang that the diaphragm engages with protruding flange 9 via an interference fit. EX1009, FIG. 7.

Claim 23:

Supra, Claims 1[e], 7, 34 Analysis; EX1003, ¶¶156-57, 177.

Claims 25, 43:

Supra, Claims 11, 37 Analysis; EX1003, ¶¶159, 178.

Claim 41:

Supra, Claims 1[e], 7, 34 Analysis; EX1003, ¶¶133-35, 156-57, 179.

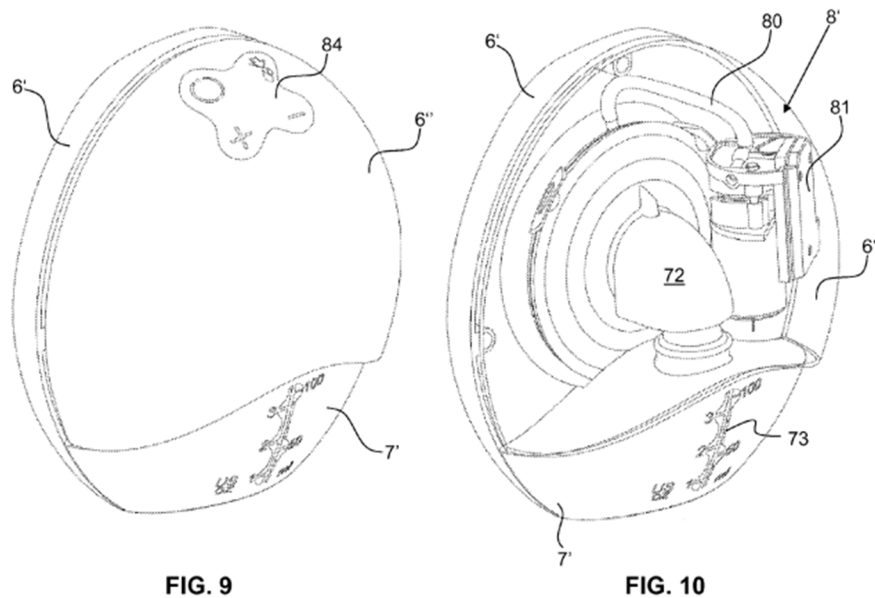
B. Ground 1B: Chang-Fang-Yuen-Khalil Renders Claims 1-11, 13-23, 25-37, 39-41, and 43-46 Obvious

Khalil provides a wearable, in-bra breast pump device having a rigid milk container, further informing Elements 1[d] and 29[d], and particular dependent claims. EX1003, ¶¶82-90.

1. Chang-Fang-Yuen-Khalil Combination

a. Khalil

Khalil describes an integrated breast pump, referred to as a “breastshield unit.” EX1010, Abstract. The breastshield unit is “designed as a hands-free unit” that can be worn “under” or “in” a bra (*id.*, [0032], [0070]):



EX1010, FIGS. 9, 10, Abstract, [0066]

The unit includes a shell (cover 6'' and shell ring 6'), milk container 7' and integrated pump unit 8', including vacuum pump 81. *Id.*, [0066]-[0067]. The pump “is preferably a diaphragm vacuum pump of a known type, which is operated by means of an electric motor.” *Id.*, [0067]. The pump may be powered by an integrated “power source.” *Id.* Milk collection container 7' is “arranged in the lower area adjoining the cover (6'')” and uses locking lug 71, “integrally formed” on it, to

“engage in a corresponding recess...of the shell ring (6’)” as shown below. *Id.*, [0069]. EX1003, ¶¶82-88.

The breastshield unit includes “breast interface 1 for placing on a human mother’s breast.” EX1010, [0048], [0066]]. Khalil’s breastshield may include “membrane 3” located between “membrane housing parts 2, 4,” which are attached to the shell via cover ring 6’:

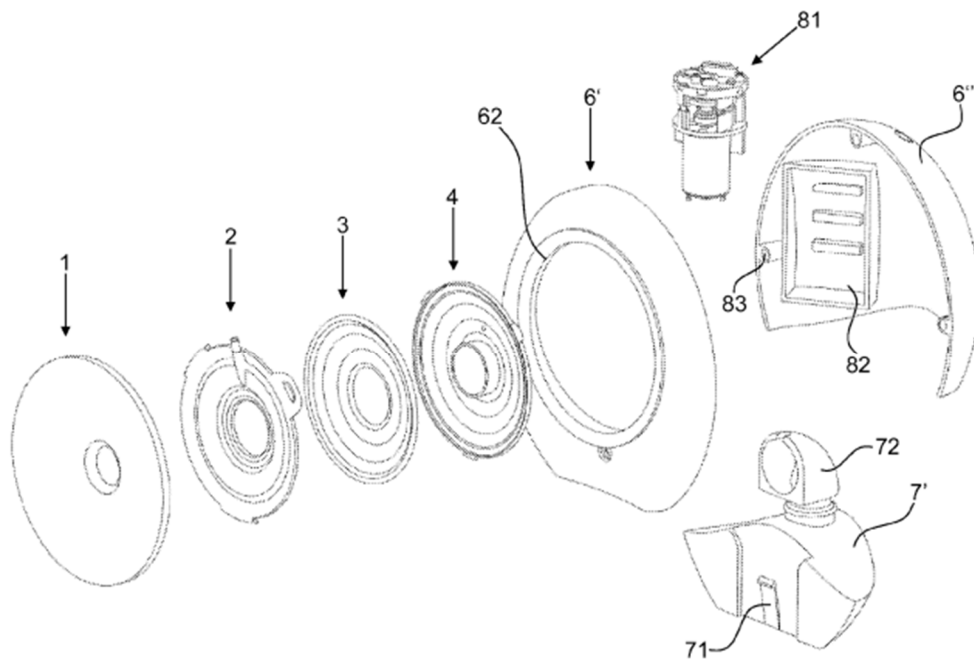


FIG. 11

EX1010, FIG. 11; *see id.*, [0066]-[0067], [0053]-[0058]; EX1003, ¶90

b. Combination of Chang-Fang-Yuen and Khalil

A POSITA would have been motivated to implement the aforementioned Chang-Fang-Yuen combination (from Ground 1A) with Khalil’s suggestion to utilize a rigid container at a lower portion of the device, and downward flow of milk

to the container, so as to achieve known benefits (articulated below). EX1003, ¶¶181-86. Chang expressly describes that its device can be implemented to have a “rigid” milk container that can be provided in “alternative locations.” EX1007, [0021], [0105]. Khalil provides a straightforward suggestion for implementing a rigid container in a wearable, in-bra device. EX1010, [0032] (“the invention can be designed as a hands-free unit and worn under a bra”). Khalil discloses the use of a rigid “milk collection container...integrated in the housing of the unit or coupled directly thereto.” *Id.*; *see also*, [0069] (“[The milk collection container] is preferably made of plastic like the cover 6.”), [0050] (“The shell 6 is preferably in one piece and rigid, and usually made of a plastic”), [0067].

In the resulting combination, the breast pump device would have included an integrated milk container at a lower location of the device, in accordance with Khalil’s suggestion. EX1003, ¶182. The milk container would have a contoured shape to complement the shape of other portions of the device (e.g., “outer shell 12”), and contributes to its wearable, in-bra configuration. *Id.* Milk flows through the nipple tunnel and then downward through a one-way valve into the container. EX1010, [0053] (“non-return valve 5”/“duckbill valve”), [0069]; EX1003, ¶182. The container would have included a removable attachment with the pump housing (e.g., “chassis 35” and/or “outer shell 12”), and fluidic connection with the nipple tunnel. EX1010, [0069] (“locking lug” and “corresponding recess” and “expressed

milk can flow from the underpressure chamber 40 into the interior of the milk collection container”); EX1003, ¶182.

Multiple reasons would have prompted a POSITA to implement the Chang-Fang-Yuen device to have a rigid container at a lower portion of the device, as suggested by Khalil. EX1003, ¶183.

First, a POSITA would have been motivated to combine Khalil with Chang, Fang, and Yuen to further enhance cleanability and assembly/disassembly in a wearable device having a diaphragm. Khalil specifically describes advantages of its configuration in providing a device that is “small and easy to clean” and “that can be worn in the bra.” EX1010, [0070]. A POSITA would have been motivated to further enhance these benefits in the Chang-Fang-Yuen device by positioning the milk container at a lower portion that can be readily assembled and disassembled with the remainder of the device, as suggested by Khalil. EX1003, ¶183; EX1010, [0069]. Moreover, in doing so, a POSITA would have recognized the benefits of a downward flow of milk in which the milk flow path remains below the diaphragm components, consistent with Fang and Khalil’s suggestions, further enhancing the isolation of pump components from milk flow. *Id.*

Second, a POSITA would have been motivated to combine Khalil with Chang-Fang-Yuen to enhance the user experience during pump removal from the breast at the conclusion of a pumping session. EX1003, ¶184. The diaphragm

arrangement and downward flow of milk to a lower container (e.g., in which the milk is evacuated into the container during each pump stroke) facilitates removal without requiring the user to lean forward or otherwise adjust the orientation of their body to avoid spilling milk captured within the device. *Id.*

Third, a POSITA 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. EX1003, ¶185. Chang expressly describes that its container can be "rigid" and positioned in various locations. EX1007, [0021], [0101]. Khalil provides a suitable example to implement a rigid container at a lower portion of the device in an integrated manner. *Intel Corp.*, 61 F.4th at 1381 ("was a 'suitable option' to replace [primary reference's feature]").

Fourth, the evidence confirms a POSITA would have been motivated to combine Khalil with Chang, Fang, and Yuen 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). *KSR*, 550 U.S. at 416-17; EX1003, ¶186. To be clear, a POSITA would have had a reasonable expectation of success given the similarity to the breast pump configurations.

2. Application to Challenged Claims

a. Claim 1

1[pre]:

Supra, Ground 1A, 1[pre] Analysis; EX1003, ¶¶118, 180, 187.

1[a]:

Supra, Ground 1A, 1[a] Analysis; EX1003, ¶¶119, 188.

1[b]-1[c]:

Supra, Ground 1A, 1[b]-1[c] Analysis; EX1003, ¶¶120-131, 189.

1[d]:

The Chang-Fang-Yuen-Khalil combination provides this limitation. EX1003, ¶190. For example, Khalil describes a rigid “milk collection container...integrated in the housing of the unit or coupled directly thereto.” *Id.*; *see also*, [0069] (“[The milk collection container] is preferably made of plastic like the cover 6.”), [0050] (“The shell 6 is preferably in one piece and rigid, and usually made of a plastic”), [0067]. In the resulting combination, the breast pump device would have included an integrated milk container at a lower location of the device, in accordance with Khalil’s suggestion. EX1003, ¶132; *supra*, §VI.b.1 (Chang-Fang-Yuen-Khalil). The container is configured to be attached to and removed from the pump housing. EX1010, [0069] (“locking lug” and “corresponding recess” and “expressed milk can flow from the underpressure chamber 40 into the interior of the milk collection container”); EX1003, ¶¶190, 202-03; *see also, infra*, Ground 1B, Claim 9 Analysis.

1[e]:

Supra, Ground 1A, 1[e] Analysis; EX1003, ¶191.

b. Claim 29

29[pre]:

Supra, Ground 1A, 1[pre], 1[a] Analysis; EX1003, ¶¶118-19, 192.

29[a]-29[c]:

Supra, Ground 1A, 1[a]-1[c] Analysis; EX1003, ¶119-31, 193.

29[d]:

Supra, Ground 1B, 1[d] Analysis; EX1003, ¶¶194.

29[e]:

Supra, Ground 1B, 1[e] Analysis; EX1003, ¶132, 195.

Claims 2, 30:

Supra, Ground 1A, Claims 2, 30 Analysis; EX1003, ¶¶149, 196.

Claims 3, 31:

Supra, Ground 1A, Claims 3, 31 Analysis; EX1003, ¶¶150-51, 197.

Claims 4, 32:

Supra, Ground 1A, Claims 4, 32 Analysis; EX1003, ¶¶152, 198.

Claim 5:

Supra, Ground 1A, Claim 5 Analysis; EX1003, ¶¶153-54, 199.

Claims 6, 33:

In the Chang-Fang-Yuen-Khalil combination, only the breast shield and the milk container are directly removable from the pump housing/housing in normal use

or normal disassembly. For example, Chang describes the breast shield can be “removed from engagement with the remainder of the” breast pump device. EX1007, [0105]; *supra*, Ground 1A, Claims 6, 33 Analysis; EX1003, ¶200. The milk container is likewise removable via complementary engagement with the pump housing and/or fluid connection with the nipple tunnel, consistent with Khalil’s suggestions. EX1010, [0069]; *supra*, §VI.b.1(Chang-Fang-Yuen-Khalil). In normal use or disassembly (e.g., to empty the milk container or clean the milk flowpath), only the breast shield and milk container are directly removable from the pump housing. EX1003, ¶200. Doing so provides access to empty the milk container and clean the diaphragm components, for example, without requiring further disassembly. *Id.*

Claims 7 and 34:

Supra, Ground 1A, Claims 7, 34 Analysis; EX1003, ¶201.

Claims 8, 35:

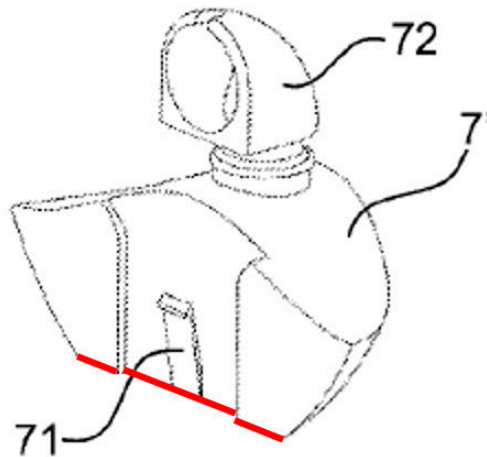
The Chang-Fang-Yuen-Khalil provides a milk container that is substantially rigid. EX1003, ¶202; *supra*, §VI.b.1(Chang-Fang-Yuen-Khalil). For example, Khalil describes a milk container “made of plastic.” EX1010, [0069] (“like the cover 6”); [0050] (“the shell 6 is . . . rigid, and usually made of plastic”). Indeed, a POSITA would have recognized, and found it obvious, from Khalil’s description, to implement the milk container as a rigid material in order to provide a structurally

stable outer contour of the breast pump device, and prevent compression of the volume of the milk container that could otherwise affect filling. EX1003, ¶202; *see also* EX1007, [0021].

Claim 9:

In the Chang-Fang-Yuen-Khalil combination, the milk container is configured to attach to a lower part of the pump housing (e.g., “chassis 35”), in accordance with Khalil’s suggestions. *Supra*, §VI.b.1(Chang-Fang-Yuen-Khalil). For example, Khalil describes complementary mating features between the milk container and the pump housing such that the milk container is releasably attachable with a lower part of the pump housing. *See*, EX1010, [0069]; EX1003, ¶203.

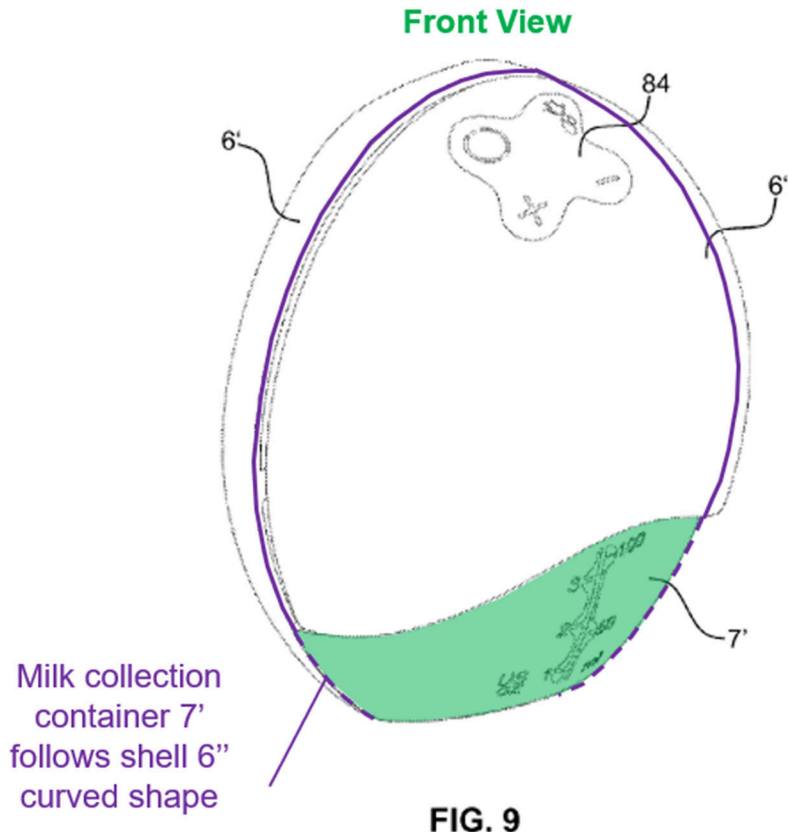
The container forms a flat-bottomed base for the device, consistent with Khalil’s suggestion. EX1010, FIGS. 10-11; EX1003, ¶204. Indeed, a POSITA would have recognized from Khalil’s description, that when the milk container forms a base of the device, a flat bottom promotes stability and beneficially facilitates an upright orientation of the container (e.g., preventing spillage when disassembled).



EX1003, ¶204 (EX1010, FIG. 11 (partial, annotated))

Claims 10, 36:

The resulting system provides the features of claims 10 and 36, as suggested by Chang and Khalil. *See* EX1003, ¶205. For example, the outer surface of the milk container is shaped to continue a curved shape of the pump housing (e.g., “shell 12”) so that the breast pump device can be held comfortably inside a bra. Khalil describes a breast shield unit (or breast pump) “designed as a hands-free unit and worn under a bra” and including a “milk collection container...integrated in the housing of the unit or...coupled directly thereto.” EX1010, [0032], [0070]; EX1007, [0004], [0011], [0019], [0071]. Furthering these express design objectives of Chang and Khalil, Khalil describes a milk container (green) in a curved shape that continues the curved shape of the pump housing.

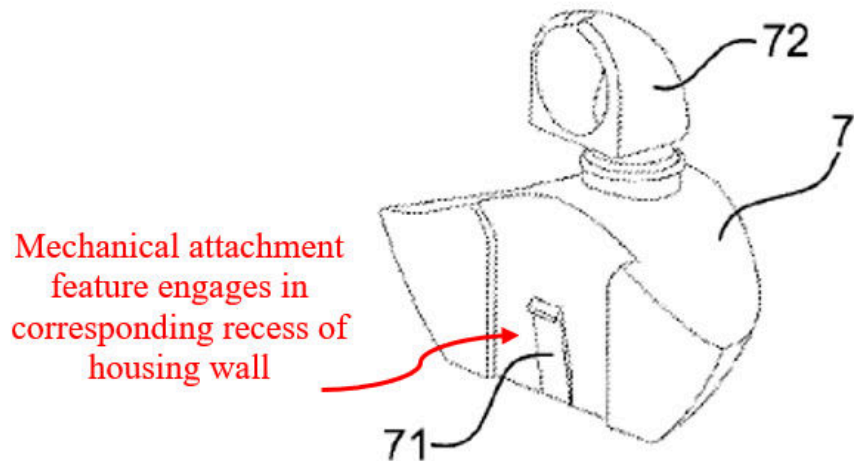


EX1003, ¶205 (annotating EX1010, FIG. 9)

Claims 11, 37:

In the Chang-Fang-Yuen-Khalil combination, the milk container is attachable to the pump housing/housing (e.g., “chassis 35”) with a mechanical or magnetic mechanism that releasably attaches or latches. *See* EX1003, ¶¶203-04, 206-07; *supra*, Ground 1B, Claim 9 Analysis. For example, Khalil describes a locking lug of the milk container that engages in a corresponding recess of the pump housing. *See*, EX1010, [0069]; EX1003, ¶206. A POSITA would have recognized, and found obvious from Khalil, that the milk container releasably attaches with a single push

action into engagement with the housing (e.g., “chassis 35”), predictably facilitating assembly by the user. *Id.*



EX1003, ¶207 (annotating EX1010, FIG. 11 (partial))

Claims 13, 39:

Supra, Ground 1A, Claims 13, 39 Analysis; EX1003, ¶¶160, 208. Furthermore, in the Chang-Fang-Yuen-Khalil device, the diaphragm prevents passage of milk into the pump, and thus defines a milk-flow side chamber on one side of the diaphragm (e.g., below the diaphragm) and an air-side chamber on the other side of the diaphragm (e.g., above the diaphragm). EX1003, ¶208; EX1009, [0004]; *supra*, §VI.b.1(Chang-Fang-Yuen-Khalil).

Claims 14, 40:

Supra, Ground 1A, Claims 14, 40 Analysis; EX1003, ¶¶161-62, 209.

Claim 15:

Supra, Ground 1A, Claim 15 Analysis; EX1003, ¶¶163-64, 208, 210; *see also*, *supra*, Ground 1B, Claims 13, 39 Analysis.

Claim 16:

Supra, Ground 1A, Claim 16 Analysis; EX1003, ¶¶165-67, 211.

Claim 17:

Supra, Ground 1A, Claim 17 Analysis; EX1003, ¶¶168-69, 212.

Claim 18:

Supra, Ground 1A, Claim 18 Analysis; EX1003, ¶¶170-71, 213.

Claim 19:

Supra, Ground 1A, Claim 19 Analysis; EX1003, ¶¶172, 214.

Claim 20:

Supra, Ground 1A, Claim 20 Analysis; EX1003, ¶¶173-74, 215.

Claim 21:

Supra, Ground 1A, Claim 21 Analysis; EX1003, ¶¶175, 216.

Claim 22:

Supra, Ground 1A, Claim 22 Analysis; EX1003, ¶¶176, 217.

Claim 23, 41:

Supra, Ground 1A, Claims 23, 41 Analysis; EX1003, ¶177, 218.

Claims 25, 43:

Supra, Ground 1A, Claims 11, 37 Analysis; EX1003, ¶¶178, 219.

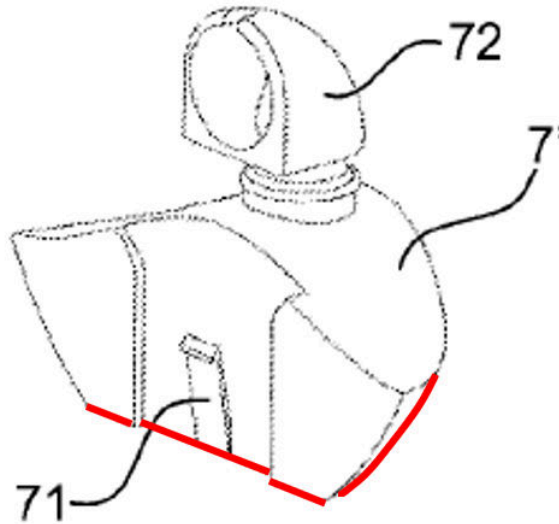
Claims 26, 44:

In the resulting combination, the breast pump device includes an integrated milk container at a lower location of the device such that expressed milk flows under gravity through an opening in the nipple tunnel and into the milk container, in accordance with Fang and Khalil's suggestions. EX1003, ¶220. In particular, in accordance with Khalil's suggestion, milk flows into the container through a one-way "duckbill valve." EX1010, [0053] ("non-return valve 5"/"duckbill valve"), [0069]; EX1003, ¶220.

The "duckbill valve" stays sealed when there is negative air pressure being applied by the pump to ensure that negative air pressure is not applied to the milk container. EX1003, ¶221. During pumping, an overpressure is generated that opens the "duckbill" valve and facilitates milk flow into the container. EX1010, FIGS. 4-5. The "duckbill" valve is closed when subjected to underpressure, sealing off the milk collection container. EX1010, [0058].

Claims 27, 45:

In the combination, the milk container has a curved surface. *Supra*, Ground 1B, Claim 10 Analysis; EX1003, ¶222. The curved surface includes a flat area that serves as a base for the milk container. *Supra*, Ground 1B, Claim 9 Analysis; EX1003, ¶222.



EX1003, ¶222 (annotating EX1010, FIG. 11 (partial))

Claims 28, 46: The breast pump device of claim [1/29], wherein the milk container has a curved surface configured to enable the breast pump device to be held comfortably in a bra.

Supra, Ground 1B, Claims 10, 36 Analysis; EX1003, ¶¶205, 223.

C. Ground 1C: Chang-Fang-Yuen-Khalil-Park Renders Claims 12, 24, 38, And 42 Obvious

1. Chang-Fang-Yuen-Khalil-Park

a. Park

Park describes a wearable breast pump having a diaphragm components and integrated container. EX1014, [1], [8], [10], [37]-[62]. Expressed milk passes through the nipple tunnel and into a container via an opening in a lower surface of the nipple tunnel. *Id.*, [37]-[38]. The diaphragm (e.g., “flow separation membrane”) has a contoured shape that includes a central raised portion and a concentric raised portion. *Id.*, [39], [54]-[56], FIGS. 5, 7-8; EX1003, ¶91.

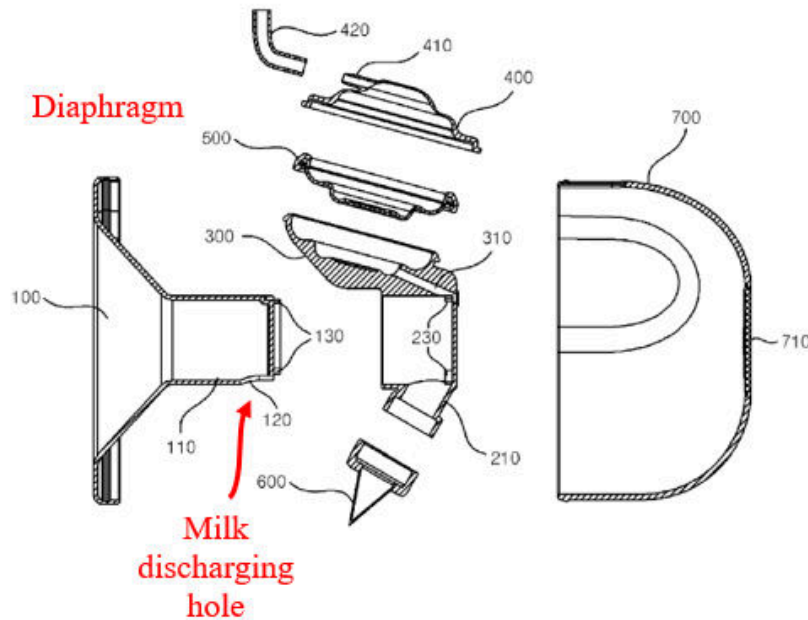


FIG. 5

EX1003, ¶92 (annotating EX1014, FIG. 5)

b. Combination of Chang-Fang-Yuen-Khalil and Park

In the aforementioned Chang-Fang-Yuen-Khalil combination (Ground 1B), Fang and Khalil describe conventional pump configurations that utilize a flexible diaphragm and a milk flow path through a nipple tunnel and into a container below via gravity. Park complements these teachings through additional suggestions for diaphragm shape and positioning a milk outlet on a lower surface of a nipple tunnel, to achieve known advantages. EX1003, ¶224. In the resulting system, the diaphragm/membrane would have had a contoured shape having a central raised portion and a concentric raised portion, and the nipple tunnel would have included

an opening on a lower surface for milk to pass through via gravity, in accordance with Park's suggestions. *Id.*, ¶225.

Multiple reasons would have prompted a POSITA to implement the Chang-Fang-Yuen-Khalil combination (from Ground 1B) in accordance with Park's suggestions. EX1003, ¶225.

First, a POSITA would have been prompted to combine Park with the Chang-Fang-Yuen-Khalil combination to enhance system operation by promoting effective diaphragm action. EX1003, ¶226. Fang describes an "elastic diaphragm." Park provides an example of a diaphragm having, in a relaxed state inner and outer raised areas. A POSITA would have recognized from Park that its diaphragm profile having inner and concentric raise portions promotes a springy and structurally stiff diaphragm that quickly returns to its relaxed state when pressure is released. EX1003, ¶226. In doing so, the diaphragm profile enhances system operation, driving out milk and air during each cycle. *Id.*

Second, a POSITA would have been prompted to combine Park with the Chang-Fang-Yuen-Khalil combination to include an opening in the lower surface of the nipple tunnel for the milk flow path. EX1003, ¶227. The milk path already flows downward via gravity into a container positioned below the pump housing. A POSITA would have recognized that a lower opening on the nipple tunnel provides a path from the milk in a configuration that promotes assembly/disassembly and

cleaning. EX1014, [8] (“is capable of preventing breast milk from flowing backward, and is easily cleaned and maintained.”). Moreover, a POSITA would have recognized advantages of facilitating a horizontally compact design by positioning an opening on the lower surface (e.g., versus an extended space to accommodate passage at a lateral end of the nipple tunnel). EX1003, ¶227.

Third, a POSITA would have been prompted to combine Park and Chang-Fang-Yuen-Khalil 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). *KSR*, 550 U.S. at 417. Indeed, the modifications would have amounted to a simple modification to use known diaphragm and nipple tunnel features. *Id.*; *Intel*, 61 F.4th at 1381. A POSITA would have had a reasonable expectation of success in making the proposed modifications based on the similarity of the devices and because the modifications would have been implemented largely through straightforward mechanical modifications that do not significantly alter the underlying device. EX1003, ¶228.

2. Application to Challenged Claims

Claims 12, 38:

In the resulting system, the nipple tunnel includes on a lower surface of the nipple tunnel an opening through which expressed milk flows under gravity into the

milk container, in accordance with Park's suggestions. EX1003, ¶229; *supra*, §VI.C.1 (Chang-Fang-Yuen-Khalil-Park); EX1014, [37]-[38].

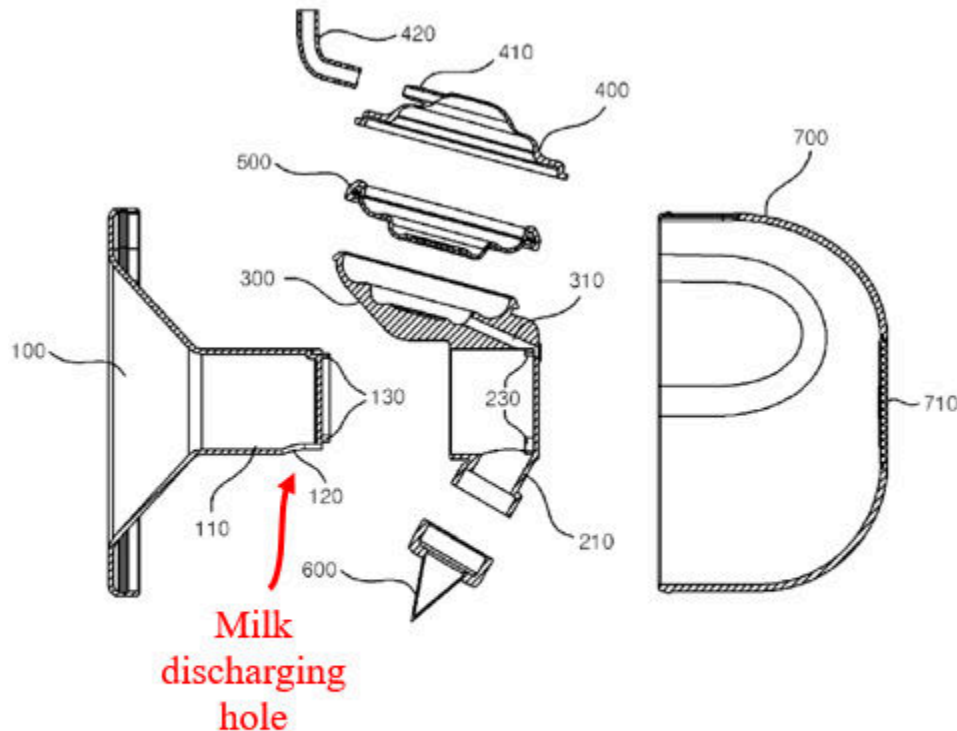


FIG. 5

EX1003, ¶229 (annotating EX1014, FIG. 5)

Claims 24, 42:

The resulting combination includes a diaphragm/membrane that is flexible and generally circular. *Supra*, Ground 1A, Claims 24, 42 Analysis; EX1003, ¶230. In a relaxed state, the diaphragm includes an inner raised area and a concentric outer raised area, in accordance with Park's suggestions. *Supra*, §VI.C.1 (Chang-Fang-Yuen-Khalil-Park combination).

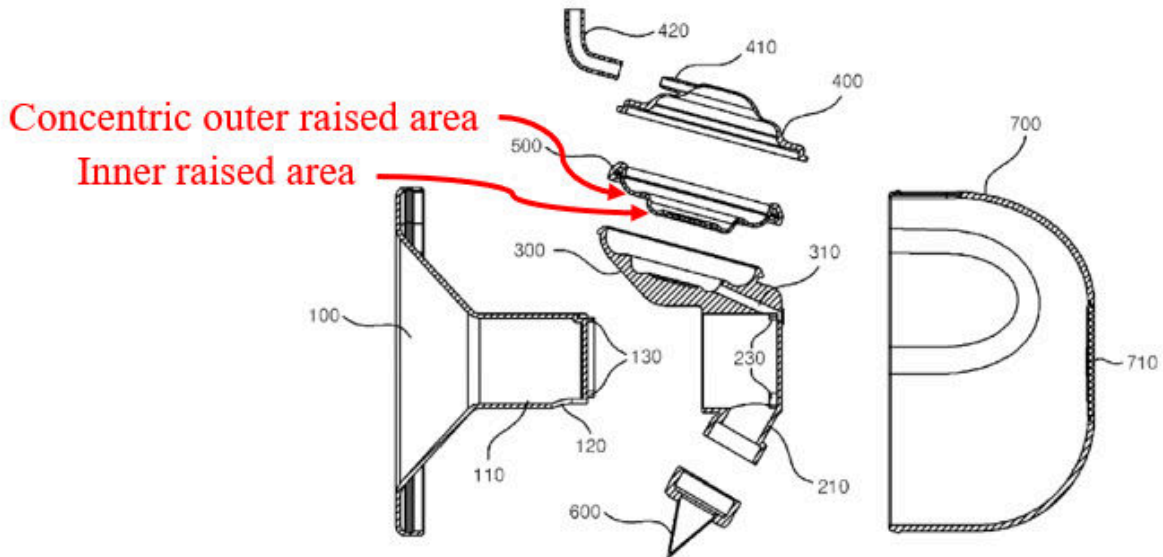


FIG. 5

EX1003, ¶230 (annotating EX1014, FIG. 5)

D. Ground 1D: Chang-Fang-Yuen-Khalil-Chen Renders Claim 20 Obvious

1. Chang-Fang-Yuen-Khalil-Chen

a. Chen

Chen describes a breast pump that includes a diaphragm housing attached to a breast shield. EX1015, FIGS. 2-4. Notably, Chen expressly describes that the breast shield and diaphragm housing are “integrally molded,” provides an express benefit of doing so to “make disassembly and assembly more convenient.” EX1015, [0015]; *see also* [0003] (“too many joints may cause improper[] assembly”); EX1003, ¶¶93-94.

b. Combination of Chang-Fang-Yuen-Khalil and Chen

Based on Chen's express suggestion, a POSITA would have implemented the breast shield and second diaphragm housing (of the Chang-Fang-Yuen-Khalil combination described in Ground 1B) as an integral part to achieve known benefits. EX1003, ¶231. The combined system already includes a second diaphragm housing attached with the breast shield (e.g., above the nipple tunnel). *Supra*, Ground 1B, Claim 15 Analysis; EX1009, Fig. 7, [0019]-[0025]. Chen describes an example in which these components of a breast pump device are integrally formed with one another. EX1015, [0015]. In the combined system, the second diaphragm housing and breast shield would have their existing configuration/location according to Chang-Fang-Yuen-Khalil, and would have been integrally formed, in accordance with Chen's suggestion. EX1003, ¶231.

First, A POSITA would have been prompted to combine Chen with Chang-Fang-Yuen-Khalil in order to avail the breast pump of the express benefit of integral parts, as suggested by Chen. EX1003, ¶232. Chen expressly articulates a benefit of an integrated diaphragm housing and breast shield component—"to make disassembly and assembly more convenient." EX1015, [0015]. A POSITA would have been motivated to integrally form the breast shield and second diaphragm housing as a single part in order to avail the combined system of this expressly articulated benefit. Relatedly, a POSITA would have recognized such

combination to facilitate cleaning. Here again, a POSITA would have recognized from Chen's express teachings the benefit of enhanced cleanability due to fewer interfaces between parts, and more a more streamlined cleaning process (e.g., due to fewer parts to assemble/disassemble during cleaning). EX1003, ¶232.

Second, a POSITA would have been prompted to implement Chen's suggestion in the Chang-Fang-Yuen-Khalil combination 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. *KSR*, 550 U.S. at 417. Moreover, the evidence here confirms a POSITA would have had a reasonable expectation of success, especially in view of the similarity of the cited systems and that Chen expressly teaches that such components be integrally formed. EX1003, ¶233.

2. Application to Challenged Claims

Claim 20:

In the combined system, the second diaphragm housing is an integral part of the breast shield, in accordance with Chen's suggestion. EX1015, [0015]; EX1003, ¶234; *supra*, §VI.D.1 (Chang-Fang-Yuen-Khalil-Chen).

VII. CONCLUSION

Inter Partes Review of the challenged claims is respectfully requested.

VIII. DISCRETIONARY FACTORS FAVOR INSTITUTION

A. The *Fintiv* Factors Favor Institution - §314(a)

Essentially all of the *Fintiv* factors weigh against exercising discretionary denial. The related litigation in the Western District of Washington (2:23-cv-00631) remains in its infancy. Petitioner filed the complaint in the Lawsuit on April 28, 2023, seeking declaratory judgment of noninfringement and invalidity of one of PO's patents. EX1016, Dkt.1. Patent Owner subsequently counterclaimed to allege infringement of two patents—the initial patent and the '380 patent challenged here. *Id.*, Dkt.69.

On May 1, 2024—more than a year after the lawsuit commenced—Patent Owner then added counterclaims to assert two more patents. *Id.*, Dkt.114. In view of Patent Owner's recent expansion of the patents and issues in the case, the District Court struck the trial schedule in its entirety, and adopted a reset (partial) schedule that set some initial dates through claim construction briefing in February 2025 while leaving subsequent dates, including a trial date, undefined. EX1026, 3-5; EX1027, 11-12. Petitioner did not receive infringement contentions until June 2024, and has been diligent in preparing this Petition, including filing within only a few weeks of learning of highly pertinent art (e.g., Fang; *supra*, Section IV.B).

Factor 1—No motion to stay has been filed. This factor is neutral or favors institution.

Factor 2—Factor 2 heavily favors institution. In May 2024, PO added multiple patents to the litigation, doubling the number of patents more than a year after the lawsuit commenced. The District Court then essentially reset the schedule in June 2024—striking the existing schedule in its entirety. EX1026, 3-5; EX1027, 11-12. All dates subsequent to the claim construction briefing, including a trial date, remain undefined and will not be scheduled until after the *Markman* hearing (which itself has an undefined date sometime in 2025). *Id.* The Board’s final decision will thus surely precede the not-yet-scheduled trial in district court.

Factor 3—Neither part has invested in *Markman* briefing, and discovery remains in its infancy. Petitioner diligently filed this petition, less than ten weeks after receiving the initial infringement contentions and then learning, during its subsequent work on invalidity contentions, of highly pertinent art (e.g., Fang; *supra*, Section IV.B). As such, the investment “in the []lawsuit, particularly as related to any validity issues, has not been substantial.” *Illumina, Inc. v. Ravgen, Inc.*, IPR2021-01271, Paper 12, 27 (January 26, 2022).

To be clear, the average time to trial from initial complaint (30.8 months) has limited bearing where, as here, the trial date and case schedule was essentially reset more than a year after the initial complaint in order to accommodate newly-added patents. If anything, this average time should be applied from the starting point of the counterclaims introduced in 2024. EX1026, 3.

Factors 4 and 5—Factors 4 and 5 are neutral or favor institution. Petitioners are the defendants in the co-pending litigation. Resolution by the Board is expected in advance of a decision in the District Court, which mitigates against duplication of effort and serves efficiency and integrity goals.

Factor 6—The merits of this Petition are compelling as demonstrated by Grounds 1A-1D. Factor 6 weighs heavily in favor of institution.

B. The *Advanced Bionics* Test Favors Institution—§325(d)

None of Chang, Fang, Yuen, or Chen, were applied in a rejection during prosecution of the '380 Patent, and each is relied upon for disclosure of subject matter that is materially different than applied within references cited during prosecution. The Petition thus does not involve the same or substantially the same art or arguments previously presented. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8-9 (PTAB February 13, 2020) (precedential).

***Advanced Bionics* Part 1**—This petition presents references that were not previously considered (e.g., Fang, Yuen, Park, and Chen) and highlights pertinent disclosures that disclose the very features that formed the Examiner's stated reasons for allowance. *SHDS, Inc., et al. v. Truinject Corp.*, IPR2020-00935, Paper 12 at 9-12 (PTAB Nov. 17, 2020) ("the noted limitation is the very one that, in the Examiner's view, placed the claims . . . into a condition for allowance."). For

example, this Petition presents Grounds that achieve a system that includes each element of the independent claims, including based on Fang's straightforward description of diaphragm housing features identified as Examiner's reasons for allowance. *Supra*, Section IV.B. Factors (a), (b), and (d), counsel in favor of institution.³

Advanced Bionics Part 2—The Board need not reach part 2 of the *Advanced Bionics* framework because Part 1 is not satisfied. And yet, if assessing part 2, original examination involved multiple material errors in failing consider relevant disclosures of Chang, Fang, Yuen, Khalil, Park, and Chen, and other pertinent prior art, and each of *Becton*, *Dickenson* factors (c), (e), and (f) favors institution. This Petition presents pertinent teachings from the references in unexamined manners never contemplated in any office action or response. *Advanced Bionics*, IPR2019-01469, Paper 6 at 8 n.9. As explained above and in the pertinent testimony of Mr. Bauer (EX1003), the record here amply demonstrates the examiner overlooked or otherwise erred in the reasons for allowance. The '380 patent is ripe for review.

³ Khalil was applied during prosecution of the '380 patent in a different manner, and without the benefit of Fang and the other references of the Grounds herein. *See* EX1002, 550.

C. The *General Plastic* Factors Favor Institution

This Petition is a “parallel petition” with another petition filed in an earlier proceeding (IPR2024-00953), and Petitioner ranks the present Petition as a higher priority than that of the earlier proceeding. *See* Petitioner’s Notice Ranking Petitions (submitted with this Petition).

As noted above, Patent Owner doubled the number of patents in the co-pending litigation, resulting in a recently adjusted schedule. EX1026, 3-5; EX1027, 11-12. Petitioner did not receive the initial infringement contentions until June 2024 (after filing the earlier petition), which were then updated on August 1, 2024 to further increase the quantity of asserted claims from the ’380 patent. During Petitioner’s subsequent work on the invalidity contentions (*see* EX1027, 12 (“to prepare invalidity contentions”)), Petitioner uncovered a pertinent prior art teaching that highlights the examiner’s mistaken reasoning for allowing the ’380 patent (e.g., Fang; *supra*, Section IV.B). Less than a few weeks after uncovering this new art—and intentionally before any POPR in the earlier proceeding to thereby dispel any “roadmap” concerns, Petitioner rapidly filed this parallel Petition to highlight to the Board this new and more meaningful prior art.

Notably, Petitioner requested that the earlier petition (IPR2024-00953) be dismissed in a good faith effort to reduce any potential burden imposed upon the Board (e.g., by eliminating the need for two institution decisions). *CSC*

Serviceworks, Inc., v. Payrange, Inc., IPR2023-01449, Paper 14, 11 (April 12, 2024)

(“Where the first-filed petition ... otherwise was not evaluated on the merits”). The request to dismiss remains pending at the present time. Even if the earlier petition is not dismissed, both petitions are worthy of institution on the persuasive merits, and the *General Plastic* factors heavily weigh against discretionary denial.

Factor 1: Petitioner’s Multiple Petitions Do Not Prejudice Patent Owner

Factor 1 favors institution. In the event the first petition (IPR2024-00953) is maintained, this second petition is a “parallel petition” (filed before any POPR and before any institution decision) that does not impart prejudice to Patent Owner. It is not uncommon for petitioners to submit more than one petition against the same patent with an understanding that the Board will typically institute no more than one of them. *See* CTPG at 59-61 (discussing “parallel petitions”). Here, (i) Petitioner has not seen a preliminary response or institution decision regarding the first petition; and (ii) Petitioner could not reasonably leverage any of the filings or decisions regarding any other IPR proceeding against Patent Owner. A parallel petitioner does not introduce prejudice by requesting institution of multiple petitions, especially where Patent Owner is asserting more than forty claims from the patent and there are no “roadmap” abuses. *Apple v. Sonrai Memory Ltd.*, IPR2023-00975, Paper 9 13-15 (Dec. 14, 2023) (finding the petitions to be “parallel” and “[t]hus, Patent Owner’s *General Plastic* analysis is inapposite).

Factor 2: The Second Petition Includes Newly-Uncovered Prior Art

Factor 2 favors institution. As noted above, this petition includes highly-pertinent art (e.g., Fang; *supra*, Section IV.B) uncovered only weeks ago—after filing of the first petition and after Patent Owner’s infringement contentions (which then triggered further substantive work on the invalidity contentions). EX1027, 12 (“to prepare invalidity contentions”).

Factor 3: This Petition Does Not Implicate Road-Mapping or Playbooking Concerns

Factor 3 favors institution because there are no road-mapping concerns. No POPR or institution decision has been received in response to the first petition (IPR2024-00953). Here again, an impetus for filing this Petition was a combination of the significantly delayed trial schedule (in which a trial date has not yet been set) and recently-uncovered art that is directly relevant to the examiner’s mistaken reasons for allowance. *Supra*, Sections IV.B, VIII.A. The present Petition was filed rapidly after uncovering this meaningful prior art, thereby avoiding any such “roadmap” concerns. *CSC Serviceworks*, IPR2023-01449, Paper 14 at 11.

Factors 4 and 5: Petitioner Diligently Prepared This Petition

Factors 4 and 5 favor institution. Again, this Petition was diligently filed within weeks of newly-identified references (e.g., including Fang), and within ten weeks after receiving Patent Owner’s initial infringement contentions (and within two weeks after receiving Patent Owner’s updated infringement contentions on

August 1, 2024 that doubled the number of asserted claims from the '380 patent).

Supra, Sections IV.B, VIII.A. These changed circumstances after the first petition—in combination with the particular pertinence of Fang's teaching to the examiner's mistaken reasons for allowance—justify consideration of this Petition on the merits. *Peloton Interactive, Inc. v. NEC Corp.*, IPR2023-01241, Paper 17, 16-17 (Feb. 7, 2024).

Factors 6 and 7: Institution Efficiently Promotes Patent Quality

The Board's finite resources are well spent here. Careful vetting of the '380 patent's claims did not occur during prosecution, and it is fully consistent with the AIA's goals for the Board to review the validity of the overly broad claims Patent Owner presently asserts against Petitioner. *General Plastic*, 16. Indeed, Petitioner voluntarily requested early dismissal of its first petition—an option that would eliminate the need for two institution decisions and any added burden on the Board's resources. Notably, it was Patent Owner, not Petitioner, that opposed this most efficient option.

IX. MANDATORY NOTICES

A. Real Party in Interest

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

Shenzhen Root Technology Co., Ltd., which 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.

B. Related Matters

The '380 patent is involved in the litigation in the Western District of Washington, as identified above (case no. 2:23-cv-00631). Also, the '380 patent is involved in a different litigation in the Eastern District of Texas (*Willow Innovations, Inc. v. Chiaro Technology, Ltd.*, case no. 2:23-cv-00229), which does not involve the Petitioner here. Lastly, the '380 patent is the subject of *Shenzhen Root Technology Co. Ltd v. Chiaro Technology Ltd*, IPR2024-00953. See Petitioner's Notice Ranking Petitions (submitted with this Petition).

C. Notice of Counsel and Service Information

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X. PAYMENT OF FEES – 37 C.F.R. § 42.103

Petitioner authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and further authorizes payment for any additional fees to be charged to this Deposit Account.

Respectfully submitted,

Dated August 14, 2024

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(Control No. IPR2024-01296)

Attorneys for Petitioner

CERTIFICATE OF WORD COUNT UNDER 37 CFR § 42.24(d)

Pursuant to 37 C.F.R. §42.24(a), Petitioners hereby certify that portions of the above-captioned Petition for *Inter Partes* Review of U.S. Patent 11,413,380, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,897. Pursuant to 37 C.F.R. §42.24(a), this word count is in compliance and excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing. This word count was prepared using Microsoft Word.

Respectfully submitted,

Dated August 14, 2024

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that true copies of the Petition for *Inter Partes* Review of U.S. Patent No. 11,413,380 and supporting materials (Exhibits and Power of Attorney) were served via overnight delivery on the Patent Owner at the correspondence address of record as listed on PAIR:

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Respectfully submitted,

Date: August 14, 2024

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