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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	4944.0360002
First Named Inventor	Thibault DE BECDELIEVRE
Title	WEARABLE BREAST PUMP SYSTEM
Priority Mail Express® Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. ☑ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☑ **Specification** [*Total Pages* 46] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. ☑ **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 34]
6. **Inventor's Oath or Declaration** [*Total Pages* ____] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. ☐ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
7. ☑ **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   ☐ Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. ☐ Computer Readable Form (CRF)
   b. ☐ Specification Sequence Listing on:
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      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

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ACCOMPANYING APPLICATION PAPERS

10. ☐ **Assignment Papers** (cover sheet & document(s)) Name of Assignee ____
11. ☐ **37 CFR 3.73(c) Statement** (*when there is an assignee*) ☑ **Power of Attorney**
12. ☐ **English Translation Document** (*if applicable*)
13. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
14. ☐ **Preliminary Amendment**
15. ☐ **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. ☐ **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. ☐ **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. ☑ **Other:** Authorization Under 37 C.F.R. § 1.136(a)(3); Certification and Request for Prioritized Examination Under 37 C.F.R. § 1.102(e); Online Credit Card Authorization for $2,480.00 to cover: $680.00 - Application Filing Fees; $1,680.00 - Track One Fee; $56.00 - Processing Fee; $64.00 - Surcharge Fee.

***Note**: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 26111 **OR** ☐ Correspondence address below

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Country		Telephone		Email	

Signature	/Anupma Sahay #78,704/	Date	December 30, 2022
Name (Print/Type)	Anupma Sahay	Registration No. (Attorney/Agent)	78,704

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: *To Be Assigned*
Applicant: Chiaro Technology Limited	Art Unit: *To Be Assigned*
Application No.: *To Be Assigned*	Examiner: *To Be Assigned*
Filed: *Herewith*	Atty. Docket: 4944.0360002
(Continuation of Appl. No. 17/907,347; Filed: September 26, 2022)	

Title: **WEARABLE BREAST PUMP SYSTEM**

Authorization to Treat a Reply as Incorporating an Extension of Time Under 37 C.F.R. § 1.136(a)(3)

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Respectfully submitted,

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	12/30/2022 04:42:11 PM ET	4944.0360002

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	61372542	AUTHORIZED BY	Anupma Sahay
CUSTOMER #	26111	FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1005	E2022BTG45433479	Rolonda Lee

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2830	PROCESSING FEE, EXCEPT IN PROVISIONAL APPLICATIONS	56.00	1	56.00
2817	REQUEST FOR PRIORITIZED EXAMINATION	1680.00	1	1680.00
2111	UTILITY PATENT APPL. SEARCH FEE	280.00	1	280.00
4011	BASIC FILING FEE- UTILITY	80.00	1	80.00
2051	SURCHARGE- LATE FILING FEE, SEARCH FEE, EXAMINATION FEE, INVENTOR'S OATH OR DECLARATION, OR APPLICATION	64.00	1	64.00

	FILED WITHOUT AT LEAST ONE CLAIM OR BY REFERENCE			
2311	EXAMINATION OF ORIGINAL PATENT APPLICATION	320.00	1	320.00
			TOTAL AMOUNT:	**$2,480.00**

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New Applications Under 35 U.S.C. 111

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New International Application Filed with the USPTO as a Receiving Office

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Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Thibault DE BECDELIEVRE	Nonprovisional Application Number (if known):	To Be Assigned
Title of Invention:	WEARABLE BREAST PUMP SYSTEM		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

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ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Anupma Sahay #78,704/	Date December 30, 2022
Name (Print/Typed) Anupma Sahay	Practitioner Registration Number 78,704

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Application Number	To Be Assigned
Filing Date	Herewith
First Named Inventor	Thibault DE BECDELIEVRE
Title	WEARABLE BREAST PUMP SYSTEM
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

SIGNATURE of Applicant or Patent Practitioner

Signature	/Anupma Sahay #78,704/	Date (Optional)	
Name	Anupma Sahay	Registration Number	78,704
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	Chiaro Technology Limited		

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WEARABLE BREAST PUMP SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of U.S. Application No. 17/907,347, filed September 26, 2022, which is the national stage of International Application No. PCT/GB2021/050764, filed March 26, 2021, which claims priority to GB Application No. 2004395.6, filed March 26, 2020, each of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of the invention relates to a wearable breast pump system.

2. Description of the Prior Art

A breast pump system is a mechanical or electro-mechanical device that extracts milk from the breasts of a lactating woman.

Most portable breast pump solutions that include a discreet design are not readily affordable for most parents. There is a need for a design of a wearable breast pump system with a sleek and discreet design as well as a lower price point.

A fully integrated wearable breast pump system is described in W02018229504A1. The wearable breast pump system includes a housing shaped to fit inside a bra. The housing includes an air-pump that drives a diaphragm to generate negative air pressure. The diaphragm is seated on a diaphragm holder that is positioned away from a side of a breast shield flange.

A compact and hands-free human breast milk collection device that fits into a mother's existing nursing or standard brassiere is shown in the system of US20080262420Al. The

hands-free collection device connects to an external regular pump via a vacuum hose that is also configured to apply a vacuum pressure to the internal volume of the collection device. The vacuum hose attaches to a stem located at a fixed position on the top exterior surface of the collection device. The position of the stem is chosen so that the pump will not suction breast milk into the external pump. Because it would be inconvenient and difficult to connect the vacuum hose to the stem located at the top of the device after the device has been placed on the breast, the vacuum hose has to be properly connected to the stem before the milk collection device is being placed on the breast.

A breast milk collection device is also shown in the system of US20180008758A1. The collection device attaches to a vacuum tube via an opening also located at a fixed position on the rim of the exterior surface of the collection device. The opening communicates with an interior chamber including an inflatable/deflatable flexible barrier that allows vacuum pressure to be applied to a breast. The flexible barrier housing that encloses the flexible barrier has an oval cone like shape and is located at the top of the collection device. Disadvantageously, the position of the flexible barrier obstructs the line of sight to the interior of the collection device and to the nipple.

Wearable hands free breast pumps have entered the market, such as the Freemie cups system. The Freemie cup includes a flexible barrier that sits on top of the cup, thereby obstructing the view of the interior of the cup and of the nipple. Further, the cup is also made of a fairly opaque material, making it difficult to have a clear view of the interior of the device and of the nipple and to achieve a correct nipple alignment.

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

SUMMARY OF THE INVENTION

The invention is a breast pump system comprising at least one wearable milk collection hub connected via an air line to a combined external air pump and control unit. The milk collection hub(s) each comprise: a breast shield made up of a breast flange and a nipple tunnel; a flexible diaphragm that is configured to prevent milk from reaching the external air pump; an outer shell that is removably attachable to the breast shield, such that the breast shield and outer shell, when attached, form a vessel for collecting milk, and the front face of the outer shell includes a curved portion; a diaphragm cap that is configured to be secured over the diaphragm, and forms part of the front face or forward facing part of the outer shell, and includes a port connected to the air line.

This arrangement enables the air line to be connected to the front face of the outer shell of the milk collection hub; prior art devices position the diaphragm and air line on the top of the milk collection hub, which obscures the users view down into device, which in turn makes correct nipple positioning difficult. By having a diaphragm cap that forms part of the front face of the outer shell, the user's view down into the device is not obscured by a diaphragm that sits over the nipple; correct nipple positioning is easier to achieve.

In one implementation, the diaphragm cap can be rotated against the outer shell to adjust the position of the air port and hence the position and direction of the port and the air line connected to the port; this enables the user to readily adjust the position of the air line so that it lies comfortably under a bra or other clothing. The diaphragm cap may also be removable from the outer shell; then, the user can place the hub on the breast without the diaphragm cap, and without the inconvenience of an air line connected to the air port. Once a proper nipple alignment is achieved, the diaphragm cap and connected air line can then easily be attached back onto the outer shell of the milk collection hub.

BRIEF DESCRIPTION OF THE FIGURES

Aspects of the invention will now be described, by way of example(s), with reference to the following Figures, which each show features of a wearable breast pump system that implements the invention:

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

Figure 1B shows the wearable breast pump system with the milk collection hubs connected via the air line to the combined control and air pump unit.

Figure 2 shows a perspective front view of a milk collection hub.

Figure 3 shows a perspective rear view of a milk collection hub.

Figure 4 shows a back view of the milk collection hub.

Figure 5 shows a perspective view of the milk collection hub without the outer shell and without the diaphragm.

Figure 6 shows an exploded view of the milk collection hub.

Figure 7 shows the diaphragm.

Figure 8 shows a cross section of a milk collection hub in a relaxed state.

Figure 9 shows a cross section of a milk collection hub showing the diaphragm under maximum negative pressure.

Figure 10 shows a perspective view of the removable diaphragm cap without the air tube.

Figure 11 shows a front view of the removable diaphragm cap connected to the air tube.

Figure 12 shows a perspective view of the removable diaphragm cap including the rigid pressure part.

Figure 13A shows other cross section views of a milk collection hub in a relaxed state, at mid point and under maximum negative pressure.

Figure 13B shows other cross section views of a milk collection hub including the milk port in a relaxed state, at mid point and under maximum negative pressure.

Figure 14 shows a perspective view of the outer shell, without the removable diaphragm cap.

Figure 15 shows a side view of a milk collection hub.

Figure 16 shows a top down view of the control and air pump unit for the breast pump system.

Figure 17 shows a top down view of the control and air pump unit, with the upper case of the unit removed.

Figure 18 shows an exploded view of the control and air pump unit.

Figure 19 shows the components of the pump unit subsystem.

Figure 20 shows a cross section of the airflow block inside the control unit.

Figure 21 shows a cross section of the airflow block inside the control unit.

Figure 22 shows a cross section of the airflow block inside the control unit.

Figure 23 shows the sound valve.

Figure 24 shows a plot of the pumping cycle.

Figure 25 shows schematics of the pump unit subsystem illustrating the pumping cycle.

Figure 26 shows cross-sections of the control unit including the pump unit subsystem illustrating the pumping cycle.

Figure 27 shows a cross section of the control unit including pump unit subsystem.

Figure 28 shows a table listing different examples of vacuum levels.

Figure 29 shows diagrams of a control unit including a multifunction mount.

Figure 30 shows pictures of a control unit including accessories.

Figure 31 shows diagrams of a control unit including a multifunction mount.

Figure 32 shows the tube connection.

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DETAILED DESCRIPTION

An implementation of the invention is a breast pump system for extracting and collecting breast milk. The system comprises a pair of milk collection hubs 10, a combined control and air pump unit 11, and an air tube connection component 12, as shown in **Figure 1A**. In normal use, as shown in **Figure 1B**, air tubes 1, 2 connect each milk collection hub 10 to the air tube connection component 12; the air tube connection component 12 connects air tubes 1, 2 to a single air tube 3, that in turn leads to the control and air pump unit 11.

The milk collection hubs may also be connected to any external control and air pump unit, including any external regular electric or manual control and air pump unit.

An intended use case involves the user placing either one or two milk collection hubs 10 onto their breast(s), connecting one or both collection hubs to the combined control and air pump unit 11 via the air tubes 1, 2 and 3 and the tube connection component 12.

The user controls the device using a user interface 13 located on the control unit 11. Starting the breast pump system, via the user interface 13, activates an air suction pump within the control and air pump unit 11 (also referred as control unit). An air port or hole 14 on the control and air pump unit 11 connects to a tube 3 which splits via a tube splitter in the air tube connection component 12 into two tubes 1, 2, which then deliver suction to the milk collection hubs 10 via air ports or holes 15 in each milk collection hub 10. When the pump in unit 11 is activated, negative air pressure is created between the control unit 11 and the milk collection hub(s) 10, thereby applying negative pressure to the nipple, drawing milk from the breast, and collecting it inside the milk collection hubs 10.

The breast pump system can be operated using either one (single pumping) or two (double pumping) milk collection hubs 10. The breast pump system can generate pressures in the range of 150 to 350 mmHg depending on the level of stimulation selected by the user.

Figures 2 and 3 show perspective views of a milk collection hub. The milk collection

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

The outer shell 20 also includes a removable diaphragm cap 22 that covers and seals a diaphragm located inside the milk collection hub. The diaphragm cap 22 is located at the front of the outer shell 20, and forms a central region on the front surface of the outer shell 20. The diaphragm cap 22 includes the air port or hole 15 which provides the air connection to the control unit 11 via a tube. Because the diaphragm cap 22 is positioned at the front of the outer shell 20, it does not block the user's view down through the transparent outer shell 20 into the interior of the milk collection hub; it hence enables the user to see whether the collection hub 10 is correctly positioned on a breast and whether milk is being successfully expressed into the collection hub 10.

The diaphragm cap 22 is easily removable with one hand from the outer shell 20 of the hub in normal use or normal disassembly. Because the air line 1, 2 is connected to the air hole 15 in the diaphragm cap 22, removing the diaphragm cap 22 from the outer shell 20 provides a robust, easy, quick release of the suction connection between the hub 10 and the control unit 11, and, similarly, a robust, easy, quick installation of the suction connection between the hub 10 and the control unit 11. Generally, air lines 1, 2 remain fixed to their respective diaphragm cap 22, so the user does not have to worry about the potentially difficult process of attaching the air lines to the air port 15 in each collection hub 10.

The removable diaphragm cap 22 can be rotated against outer shell 20 to adjust the position of the air port on the outer shell and hence the position and direction of the air lines 1, 2; this enables the user to readily adjust the position of the air lines 1, 2 so that they lie comfortably under a bra or other clothing . The user can place the hub 10 on

the breast without the diaphragm cap and without the inconvenience of an air tube 1, 2 connected to the air port 15. Once a proper nipple alignment is achieved, the diaphragm cap 22 and connected tube can easily be attached on the hub 10.

In **Figure 3**, the breast shield 21 includes a nipple tunnel 31 shaped to receive a nipple and a flange 32. Preferably, the breast shield 21 including the flange 32 and the nipple tunnel 31 is a single piece item made of a single moulding with a single smooth internal surface. There are no joins along the nipple tunnel; joins may aggravate the delicate nipple tissue as the nipple extends and contracts during pumping.

The breast shield 21 may be configured to slide onto the outer shell using a single push action. The breast shield 21 and outer shell 20 may also attach using magnets.

Preferably, the breast shield 21, and the outer shell 20 and the diaphragm cap 22 are all substantially rigid and optically clear or substantially transparent, e.g. in order to provide an unobstructed view of the nipple and the inside of the hub 10. The breast shield 21, the diaphragm cap 22 and the outer shell 20 may for example all be made substantially of clear, rigid, dishwasher-safe material such as polypropylene, or a polycarbonate, or a co-polyester like Tritan™, or include sections of those materials sufficient to enable the user to clearly see inside the milk collection hub 10. Being dishwasher-safe is important as it enables these components to all be easily cleaned in a normal dish-washing cycle. This also allows different components of the wearable breast pump system to be easily washed and/or sterilised. This rigidity and transparency helps achieve correct nipple alignment when placing the entire milk collection hub 10 onto the breast, as well as to enable the user to readily check whether the alignment is maintained while pumping. Milk collection hubs made of very flexible silicone can be harder to correctly position on breast. The nipple tunnel is also clearly visible to the user through the substantially transparent walls of the hub 10, further ensuring that the spacing between the nipple and the side walls of the nipple tunnel 31 is correctly maintained while pumping.

During a pumping session, the user is also able to view the inside of the milk collection hub 10 and is able to ensure milk is being expressed inside the hub 10 and have an indication of the level of collected milk inside the hub. A scale 24 located on the outer

shell 20 indicates the volume of milk inside the hub 10.

The breast shield 21 may also include guide lines 33 running parallel to the sides of the breast shield in order to help with nipple alignment; these guide lines 33 are designed to be positioned generally horizontally in use, and to be easily seen by the user when looking down at the breast shield 21 when positioned on breast; the lines enable the user to correctly position the breast shield 21 so that the nipple is positioned generally along the centre-line leading through the nipple tunnel (e.g. central axis 81 shown in **Figure 8**).

The outer shell also includes a milk pouring opening which can be closed using a removable part 23 to cover the milk pouring opening during pumping and general handling.

The breast shield 21 and/or outer shell 20 may be made of a substantially rigid polypropylene material, or a polycarbonate or a co-polyester material such as the Tritan material that is optically clear and dishwasher safe. The material may be particularly chosen as a balance of cost and acceptable achievable transparency.

Figure 4 shows a back view of the milk collection hub. As shown, the nipple tunnel 31 includes a milk hole 41 through which expressed milk flows onto the milk collection hub. Guide lines 33 are positioned above the central axis of the nipple tunnel 31 and are not aligned with that central axis; this compensates for the slight parallax arising when viewing the guide lines 33 and nipple from above.

Figure 5 shows a perspective view of the one-piece, rigid breast shield 21 but without the outer shell and without the diaphragm. Breast shield 21 includes an annular diaphragm housing 53; diaphragm housing 53 has an outer, approximately cylindrical side wall 55 that is generally parallel to the nipple tunnel 31, and a generally concentric, approximately cylindrical inner side wall 56 that forms the outer wall of the nipple tunnel 31. Diaphragm housing 53 has a front wall 57 that forms the end of the nipple tunnel; it also has an annular rear wall 54 that joins the concentric inner wall 56 and the outer wall 55.

Figure 8 provides a cross-section showing these features. A flexible membrane 61 (see **Figures 6 – 9 and Figures 13A and 13B)** sits flush against these walls of the annular diaphragm housing 53 in the relaxed state (i.e. when no negative air pressure is applied) and hence has a similar shape, with a generally cylindrical outer membrane wall 64 that sits flush against housing cylindrical outer wall 55; a concentric inner membrane wall 65 that sits flush against housing cylindrical inner wall 56; a front wall 66 that sits over the end of the housing front wall 57 that forms the end of the nipple tunnel; and an annular rear wall 63 that sits flush against the diaphragm housing rear wall 54.

Diaphragm cap 22 sits over the flexible diaphragm or membrane 61 and a negative pressure chamber is hence formed between diaphragm cap 22 and one side of the flexible diaphragm 61. The diaphragm 61 hence moves within an air-pump chamber formed on one side by the diaphragm housing 53 and on the other side by the diaphragm cap 22; flexible diaphragm 61 is pulled forwards, along the direction of central axis 81, moving through this negative pressure chamber when suction is applied. As the flexible diaphragm 61 is pulled forwards, it creates a low air pressure region on the other side of the flexible diaphragm 61, i.e. the side between the flexible diaphragm 61 and the diaphragm housing 53. This in turn reduces the air pressure inside the nipple tunnel 31, since milk hole 41 in the nipple tunnel 31 ensures air pressure equivalence between the inside of the nipple tunnel 31 and the inside of the diaphragm housing 53; the pressure reduction draws the nipple forward and causes milk to be expressed from the nipple. Milk passes through the milk hole 41 of the nipple tunnel 31, and then passes through a second milk hole or opening 52 located on the diaphragm housing 53, and then flows inside the collection hub via a non-return valve 51 that is mounted on the second milk hole or opening 52. The non-return valve enables milk to pass into the milk container in one direction. Note that the diaphragm housing 53, and hence the diaphragm 61, is placed towards the end of the nipple tunnel 31, away from the breast shield 21. Diaphragm 61 in fact extends over the end of nipple tunnel 31. This structure has the benefit of giving the user a clearer view down through the nipple tunnel 31 when positioning the nipple inside the nipple tunnel 31: if the diaphragm housing 53 were closer to the breast shield 21, then that view would be blocked. The downside however is that the milk collection hub 10 is not compact in the direction of the nipple tunnel and is shaped to fit inside an inner portion of a bra.

Preferably, the non-return valve is removable for easy cleaning.

When the outer shell 20 is fitted on the breast shield 21, the collection hub forms a vessel in which milk is collected after it passes through the non-return valve with a capacity to collect approximately 5 fluid ounces (148ml).

The hub also includes a vent hole located for example at the top of the outer shell such that atmospheric pressure is maintained inside the vessel, even during negative pressure cycles.

Figure 6 shows an exploded view of the milk collection hub 10. In this example, the wearable milk collection hub 10 comprises the following user-removable parts: the breast shield 21, the outer shell 20, the diaphragm 61 and the diaphragm cap 22. The diaphragm cap 22 fits over with an air-tight seal to the flexible diaphragm 61. An air tight seal between the breast shield 21 and outer shell 20 is provided by a removable seal member 62.

The flexible diaphragm 61 may either be fully removable from the hub 10 or may form an integral part of the outer shell 20. When it is removable, it push-fits into the outer shell 20, forming an air and liquid tight seal. When it is an integral part of the outer shell, the flexible diaphragm 61 is typically laser welded at its single outer, circular edge, to a single, circular edge in the outer shell 20.

As noted above, the breast shield 21 includes a diaphragm housing portion 53, in which the flexible diaphragm 61, can move in and out, when assembled. The diaphragm housing portion 53 includes an air hole that transfers negative air pressure to the nipple tunnel 31; this may be the milk hole 41 in the nipple tunnel 31 or another hole (not shown). The diaphragm 61 flexes when negative air pressure is applied to it by the external air pump unit subsystem located in the control unit and transfers negative air-pressure to pull the breast and/or nipple against the breast shield and apply suction to the nipple, to cause milk to be expressed.

Figure 7 shows the diaphragm 61 in side view and also perspective view. The diaphragm 61 is configured to prevent milk from reaching the pump unit housed inside

the control unit 11.

The overall dimensions of the diaphragm are about 77.3 mm in diameter and 24 mm in height (ie depth along the long axis 81 of the nipple tunnel). The volume of air displaced by the diaphragm when under maximum suction is approximately 17550mm^3. Typical variants may have dimensions that are ± 25% of these dimensions.

The shape of the diaphragm 61 is not a substantially flat or ridged, convex membrane, as for example found in the Elvie Pump. Instead, it has an outer, approximately cylindrical side wall 64 that is generally parallel to the nipple tunnel 31, and an inner, approximately cylindrical side wall 65 that is also is generally parallel to the nipple tunnel 31. Diaphragm 61 has a front wall 66 that caps the inner side wall 65 and lies over the end of the nipple tunnel 31. It also has an annular rear wall 63 that joins the outer and the inner sides walls 64, 65.

Figure 8 is a cross section of a breast 85 inserted inside a milk collection hub in a relaxed state, showing the diaphragm 61 in relation to the axis of the nipple tunnel 81, milk port 41 and the pressure chamber 82. The flexible diaphragm 61 includes outer side wall 64 and inner side wall 65, which each substantially run parallel to the center axis of the nipple tunnel 81, and some portions, which substantially run perpendicular to the center axis of the nipple tunnel 81. As illustrated, the diaphragm 61 includes inner annular wall 63 and end cap wall 66 which are perpendicular to the centre axis 81. Much of the flexible diaphragm 61 lies over milk port 41 and also to the right (i.e. away from the breast) of the milk port 41. Milk collection hub 10 is therefore not designed to be compact in the direction of the axis of the nipple tunnel 81. Further, inside the nipple tunnel, the entire volume or space to the right of the nipple and breast is subject to negative pressure; the negative pressure zone hence starts at the skin/air boundary and so flexible diaphragm 61 is entirely to the right (i.e. away from the breast) of the negative pressure zone that is adjacent to the breast. Again, this leads to milk collection hub 10 not being compact in the direction of the axis of the nipple tunnel 81. But that compromise is necessary in order to give the user a clear view down through the clear material of the breast shield 21 nipple and outer shell 20 so that the nipple can be correctly positioned within nipple tunnel 31: correct positioning is very important for comfort and also effective milk expression.

Figure 9 is a cross section of the breast 85 inserted inside a milk collection hub showing the diaphragm 61 under maximum negative pressure. During a negative air pressure phase the flexible diaphragm 61 flexes and moves towards the right; even the rear wall 63 moves past the milk port 41. The central section 66 of the diaphragm 61 is at all times located substantially to the right of (i.e. extending beyond) the end of the nipple tunnel 31. During suction, the central section 66 also moves forward into a pair of chambers 84 in the diaphragm cap 22; this additional movement of the diaphragm 61 contributes significantly to the suction achieved inside the nipple tunnel, and hence the milk pumping efficacy.

The diaphragm 61 and associated diaphragm cap 22 are also positioned at the front of the hub 10 so as not to obstruct the mother's view of the nipple when placing the collection hub 10 onto her breast.

Figure 10 shows perspective views of the removable diaphragm cap 22. The diaphragm cap 22 includes a pair of hollow or recessed finger grip features 30, making it easily handled using only two fingers. The diaphragm cap 22 is easily rotated so as to adjust the position of the air port 15 and hence the position of air tube 1, 2 (not shown) that would be connected to the air port 15.

Figure 11 shows a front view of the removable diaphragm cap 22 connected to an air tube 1. The air tube 1 may pass through a passage way located at the center of the diaphragm cap 22, providing an additional protection for the air tube 1 so that it is not, in use, easily pulled out, and so that the direction of the tube 1 conforms with the surface of the inner bra. The diaphragm cap 22 may also be configured to attach to the outer shell 20 by means of a latch system. The diaphragm cap 22 may latch into the outside shell when spring plungers, such as ball bearings 100 in the diaphragm cap, locate into small indents in the outer shell 20. An audible and/or haptic feedback may confirm that the removable diaphragm cap 22 and air tube 1 are properly assembled.

Figure 12 shows a side view of the removable diaphragm cap 22 including an additional rigid part 91. The additional part 91 is removable from the diaphragm cap 22 and is also shown in isolation. Alternatively, the additional part 91 may be an integral

part of the diaphragm cap 22. Additional part 91 reduces the volume of the pump chamber and hence leads to an improved pumping efficiency.

Figure 13A shows cross sections of a breast 85 inserted in the milk collection hub 10 including the additional rigid part 91 located in the pressure chamber. **Figure 13B** shows similar cross sections of the milk collection hub, but without the nipple. Note that the nipple sizing is approximate and that there are considerable variations in nipple size and in how nipples extend when under suction. Note also that these device cross sections are just one example and commercially available devices may differ. Diaphragm 61 is positioned over the end of nipple tunnel 31 and extends beyond the milk port 41 in the direction of axis 81 for the reasons given earlier, namely to provide a clear view of the nipple in the clear nipple tunnel 31. Cross sections illustrate the diaphragm 61 movements from a relaxed state 101, to a mid-point 102 and finally under maximum suction 103. The diaphragm 61 is shown in a relaxed state, in relation to the axis of the nipple tunnel 81, milk port 41 and the pressure chamber. The rigid pressure chamber part 91 reduces the volume of air inside the pressure chamber by limiting the movement of the diaphragm 61 under negative pressure, for example by blocking the pair of chambers 84 in the diaphragm cap 22. The central section 66 of the diaphragm 61 is at all times located substantially to the right of (i.e. extending beyond) the end of the nipple tunnel 31. When suction is applied, the member 61 moves forward along the direction of the central axis 81 of the wearable hub through the negative pressure chamber, as shown in the mid-point illustration 102. The diaphragm 61 becomes flush with the rear surface of the rigid pressure chamber part 91 when it is fully displaced under maximum negative pressure.

In this configuration, by minimizing the volume of air in the pressure chamber, a faster response time and faster cycle time is achieved for single and double pumping, as well as greater peak negative pressure. In one implementation, using single pumping, the minimum pressure is 50mmHg at cycle time of 75 cycles/min, and the maximum pressure is 350mmHg at cycle time 30 cycles/min. Using double pumping, the minimum pressure is 30mmHg at cycle time of 75 cycles/min and the maximum pressure is 280mmHg at cycle time 30 cycles/min.

Figure 14 shows a perspective view of the outer shell 20 including the milk pouring

opening 111.

Figure 15 shows a side view of a milk collection hub. The overall width dimension of the milk collection hub 10 along the central axis of the nipple tunnel is about 5.7cm; it is not designed to be particularly thin or compact in the direction of the axial arrow and has a width dimension that is similar or greater than earlier breast collection hubs, such as the Playtex Embrace™. The milk collection hub 10 includes a flat portion 120 located on the diaphragm cap 22, so that the entire milk collection hub 10 can rest on a flat surface with the breast shield 21 uppermost.

Alternatively, the milk collection hub 10 may also include a flat portion on the base of the outer shell 20 such that the entire milk collection hub 10 can rest on a flat surface with the milk opening 111 uppermost.

Control unit

The control unit 11 is configured to generate negative air pressure for the breast pump system. The control unit 11 has a discreet form and is shaped to comfortably fit in the palm of the hand and be readily gripped by a single hand.

The control unit 11 is shaped to fit inside a pocket (or even a bra). Preferably, the control unit is less than 120mm in length, less than 70mm in width and less than 45mm in height. Preferably, the control unit is less than 0.2kg.

A user interface 13, provided on the control unit 11, may include buttons, haptic feedback, sliders, any form of display, lights, or any other componentry necessary to control and indicate the use of the breast pump system. The user interface is configured to be intuitive and easy to use.

A particular example of the user interface 13 is provided in **Figure 16** showing the top view of the control unit 11. A power on/off button 131 powers on or off the breast pump system. One button 132 switches the pumping profile, such as between stimulation or expression modes. The buttons 133 and 134 adjust the pressure generated by the pump and hence the vacuum pressure applied to the user's breast(s). A dual function pump/pause button 130 is also provided for the user to interrupt the pumping process

without turning the device off.

A visual indicator includes a series of LEDs 135 that change appearance, with more LEDs being illuminated, as the pressure generated by the pump increases. Another visual indicator includes an LED 136 that changes appearance when the pumping profile changes. For example, one color indicates stimulation and another color indicates expression. As another example, the LED is turned off to indicate stimulation and is on to indicate expression. Another visual indicator includes an LED 137 that indicates the battery status. For example, the color red indicates low battery; orange indicates that the battery is charging; while green indicates when the battery is fully charged.

The battery is a rechargeable battery which can be charged via USB. Hence the control unit includes a USB charging socket 138 for transferring power to a power charging circuit housed inside the control unit.

The information provided through the user interface may also be supplemented by or alternatively conveyed solely through haptic feedback. The user interface may also take the form of a touchscreen.

Figure 17 shows the control unit with the upper case removed. The visual indicators 135 136 and 137 including LEDs are mounted or attached on the chassis 140.

Figure 18 shows an exploded view of the control unit 11 with some of the key internal elements. The outside surface of the control unit is made of an upper case 151 and a lower case 152, which when assembled together are adapted to house, hold and protect the internal components of the control unit 11.

The control unit 11 houses an air pump unit subsystem 154 for generating a negative pressure in the milk collection hub(s), as well as a battery 155 and control electronics on PCB 153. The chassis 140 holds in place the main components such as the air pump unit 154, the battery 155 and the PCB 153. The chassis also includes the actuators between the user interface and the PCB switches.

The breast pump system has been configured to deliver quiet operation in normal use. In particular, the control unit has been configured to both reduce motor vibration and attenuate sound from the pump unit subsystem 154.

The components of the pump unit subsystem 154 are shown in **Figure 19**. A pump unit 161, including a pump driven from a motor, is configured to generate negative air pressure. The pump unit 161 is connected to a bleed valve, such as a solenoid valve 162 that is configured to reset the system to ambient pressure when the motor stops.

Reduction of motor vibration and attenuation of sound

The breast pump system is designed to be more discreet compared to available solutions with respect to volume and sharpness of noise. This is enabled by one or more of the following: reducing the sound generated by the pump unit 161; soundproofing the control unit 11; reducing the power of the pump unit 161, reducing the bleed sound by slowing down the airflow speed during rapid return to ambient air pressure after each pumping cycle, and absorbing the vibration of the pump motor in the pump unit subsystem 154.

The motor vibrations are reduced by holding the pump unit 161 in place between two silicone parts: a sound attenuating motor mount 163 and an airflow block 164. The sound attenuating motor mount 163 holds the back of the pump motor and absorbs part of the vibration of the pump motor. The airflow block 164 includes an air port or hole for routing the airflow from the pump unit 161 to the tube connector 14 and also absorbs part of the vibration of the pump unit. By using the two silicone parts, the vibration transmitted to the hard plastic case 151, 152 is greatly reduced and hence the unit is significantly quieter than other pumping units; a major advantage when discretion is sought, and to reduce disturbance to baby.

Both the sound attenuating motor mount 163 and the airflow block 164 are one-piece items made of either compression-moulded or ISR moulded silicone.

Figures 20 to 22 provide cross sections of the airflow block that illustrates the air paths inside the airflow block. The airflow block 164 is a multifunctional block that:

- routes or directs the airflow from the tube connector 14 or inlet to the pump unit

161 (see **Figure 20**).

- directs the air from the motor exhaust 181 to the atmosphere through a simple straight hollow tube with an exit path at one end (see **Figure 21**).
- provides the mounting for the solenoid valve inlet 171 and outlet 172 (see **Figures 20 and 22**).
- provides an isolation barrier for motor vibrations.

The airflow block 164 therefore is configured to both attenuate sound and to reduce motor vibration.

A number of components may be used to further reduce the sound generated by the pump unit subsystem including, but not limited to:

- A solenoid foam cap 165 to reduce bleed flow as well as bleed sound.
- A sound valve 166 (as shown also in **Figure 23**) located in the lower portion of the case 152. The sound valve 166 allows the internal pressure of the control unit 11 to remain at ambient pressure without high levels of sound escaping from the control unit 11. A sound valve cap 167 is also used to protect the sound valve 166 from the external environment.
- Sealing the control unit 11 so as to further attenuate sound. For example, a seal member 173 (see **Figure 23**) is included in between the upper part 151 and lower part 152 of the case, around the periphery of the control unit 11, hence allowing no air to escape from the control unit 11, to reduce the pump unit 161 sounds from travelling outside the control unit 11. Optionally, the airflow block 164 may also be integrated with a portion of the seal member 173.
- Mufflers or silencers can also be used reduce the airborne noise emitted from air inlets and/or exhausts. One silencer can be connected to the solenoid 162 and another silencer can be connected to the pump motor.

The sound valve 166 located on the lower part 152 of the case is shown in **Figures 19 and 23**. The sound valve 166 is a silicone part configured to deform under pressure. Hence it allows the air to pass in and out of the control unit 11, whilst significantly attenuating the motor and pump noise from travelling out of the control unit 11. The sound valve 166 also ensures that the inside of the control unit 11 remains at ambient

pressure and that the pump unit 161 is working in the right conditions.

The sound valve may include a small cross section cut.

The pumping cycle is now described in **Figures 24 to 26**.

Once the system is activated, a pumping cycle begins: the air-pressure pump turns on and creates negative air pressure during a first phase of the pumping cycle, referred to as the pumping time (P). When negative air pressure is applied to the milk collection hubs 10, the flexible diaphragm 61 flexes and negative air pressure is conveyed to the inside of the nipple tunnel 31, to pull the breast and/or nipple, thus drawing milk 251 from the nipple. During this first phase of the pumping cycle (P), the air-pressure pump 161 is configured to be on for a pre-defined amount of time in order to provide a target negative air pressure. During this first phase, the solenoid valve 162 is configured to be turned off.

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

During this second phase of the pumping cycle, the solenoid valve 162 opens to reset the pressure in the milk collection hubs 10 to ambient, which causes a rush of air into the solenoid valve 162 and generates a sound, such as a sharp, high frequency sound. As discussed above, using a solenoid foam cap 165, as shown in **Figure 27**, reduces the rush of air entering the solenoid valve 162 and therefore reduces the overall sound generated by the solenoid valve 162. The solenoid foam cap 165 includes one or more small openings or holes that are configured to reduce and control air speed when entering the solenoid valve 162. The solenoid foam cap 165 may be a one-piece item made of plastic.

The pumping cycle may be programmed to follow different modes, such as a stimulation mode and an expression mode, by controlling the pumping time and the bleed time. The pumping cycle and/or modes may also be programmed to reach

different vacuum levels.

Stimulation mode is configured to encourage milk flow and expression mode is configured to maximize pumping efficiency. Each mode contains a number of different vacuum levels, such as 10 different vacuum levels, which can be selected via the user interface on the control unit.

Figure 28 lists an example of 10 different vacuum levels for stimulation and expression modes and for single and double pumping. This is one example and commercially available devices may differ. Adjusting the power delivered to the pump motor also reduces the sound generated by the system.

Hence a desired vacuum level and sound for a particular mode may be achieved by controlling the time of both phases of the pumping cycle and the power delivered to the pump motor.

The perimeter of the control unit has a complete seal 173 (see **Figure 23**), dramatically reducing the airborne noise leaving the unit. This seal creates a significantly quieter product for the user.

Overall, in operation, the noise level is less than 50dB and preferably less than 45dB.

A number of removable accessories may be used that attach to the control unit 11 to improve the user experience. These may include for example:

- a removable, auxiliary battery pack for increasing the length of time a user can pump for between charges.
- a tube wrap device that clips to the back of the control unit, allowing the user to neatly store the tubes by wrapping them. This may also allow the user to customise the length of their tubes during use.
- a belt clip that allows the user to attach the control unit to their clothing, wearing it on their waistline or elsewhere.
- a lanyard that clips to the control unit, allowing the user to wear the control unit by hanging it around their neck.

The attachment method for accessories may involve an O-ring style loop that stretches over the control unit in multiple positions, allowing a control unit to be mounted in either portrait or landscape orientation.

Accessories for the control unit

The control unit may also include a number of easily removable accessories.

Figure 29 shows diagrams of a control unit 11 including a multifunction mount such as an O-ring 290. The multifunction mount enables the control unit 11 to be easily held by the user's fingers in different modes, such as portrait 291 or landscape mode 292.

Figure 30 shows pictures of the control unit 11 including a tube wrap accessory 241 located under the bottom case of the control unit 11, and of the control unit including a battery accessory 242 located under the bottom case of the control unit 11, such as a battery pack.

Figure 31 shows a picture of a control unit 11 including an o-ring 290 mount extending around a periphery of the control unit 11. The mount including a removable waistband clip 261 enabling the control unit to be, for example, clipped to a belt or trousers.

Tube connection

Figure 32 shows the tube connection 12 including the tube splitter 261. The tube splitter 12 in effect splits the air line 3 that comes from the combined control and air pump unit 11 into two separate air lines 1, 2 that attach to the two milk collection hubs 10. Tube splitter 12 attaches to one end of the air lines 1, 2 that are connected at their other end to the air port 14 in each milk collection hub 10. The tube splitter attaches to one end of the air line 3 that is connected at its other end to the combined control and air pump unit 11. Tube splitter 12 includes a bung or stopper 262 that can be rotated in order to configure the breast pump system for single pumping or double pumping, by creating an air path that leads from air line 3 into either the left airline 1 or the right air line 2 to activate respectively just the left hub or the right hub; or it can create an air path that leads from air line 3 into both left airline 1 and also right air line 2, for double pumping.

Application running on a connected device

Pump system related data may be sent by the system to a connected smartphone or other computer device. The data may be further analysed by a data analysis subsystem. The data may also be displayed on an application running on the computing device.

The application may provide one or more of the following features:

- Discreet/Remote control of device, such as: play/pause, mode change, intensity setting change.
- Battery life indication.
- Session time and date tracking.
- Milk volume tracking.
- Integration with other devices, such as other breast pump system.

Appendix 1

Key features of the breast pump system are now generalized into the following categories:

A. User experience: Nipple Visibility
B. Cost Engineering: Simplicity
C. User Experience: Low Noise
D. User experience: Product Handling

Note that any feature can be combined with any one or more other features. The invention is however defined in the appended claims. Note further that, whilst the implementation described above is a breast pump system with one or two in-bra wearable milk collection hubs, each connected to an external air pump, it is possible to integrate an air pumping mechanism, rechargeable battery and control electronics inside each milk collection hub, in much the same way as the Elvie Pump (see WO 2018/229504) integrates an air pump, rechargeable battery and control electronics into an in-bra wearable unit that includes a user-attachable milk collection container. The following features do not, unless otherwise explicitly stated, require an external air pump, but should be expansively construed to cover breast pump systems that can utilise an external or internal air pump. Similarly, whilst the implementation described above is a breast pump system with a closed-loop air pump (i.e. the pump is protected from any possibility of milk contamination through the flexible membrane), the following features do not, unless otherwise explicitly stated, require a closed-loop air pump, but should be expansively construed to cover breast pump systems that are both closed loop and also open loop.

A. User experience innovations: nipple visibility

Feature 1: visibility of the nipple

One implementation of this invention envisages a wearable milk collection hub for a breast pump system that provides a clear and unobstructed view of the nipple for easy nipple alignment. This ensures that a correct alignment is maintained while pumping. The breast shield and outer shells are both substantially clear providing a clear and

unobstructed view of the nipple when the assembled system is placed on the breast. This further enables the user to ensure proper nipple suction when the breast pump system is placed on the breast and while pumping.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the breast shield and the outer shell are substantially transparent, providing, to the mother placing the collection hub onto her breast, a clear and unobstructed view of the nipple to facilitate correct nipple alignment.

Feature 2: visibility of the nipple and of the flexible diaphragm

In addition to the clear and unobstructed view of the nipple, the system also provides a clear and unobstructed view of the diaphragm inside the hub. A user is able to see any movement of the diaphragm while pumping and ensure the system is correctly operating. The diaphragm is placed so as not to obstruct the line of sight to the nipple, hence providing both a view of the nipple and of the flexible diaphragm.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the breast shield and the outer shell are substantially transparent, providing simultaneously to the mother placing the collection hub onto her breast (i) a clear and unobstructed view of the nipple to facilitate correct nipple alignment and (ii) a view of the diaphragm to ensure the breast pump system is operating correctly.

Feature 3: visibility of the nipple and of a substantial part of nipple tunnel

The system is also able to provide an unobstructed view of the nipple tunnel for easy nipple alignment when the system is placed on the breast and while pumping. This further ensures that the spacing between the nipple and the side walls of the nipple tunnel is correctly positioned and maintained while pumping.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the breast shield and the outer shell are substantially transparent, providing to the mother placing the collection hub onto her breast (i) a clear and unobstructed view of the nipple to facilitate correct nipple alignment and (ii) a clear and unobstructed view of a substantial part of the nipple tunnel.

Feature 4: Diaphragm is removably mounted.

The wearable milk collection hub also includes a removable diaphragm that is configured to separate the air pump side from the milk side located in the hub, and thus prevents any contamination of the air pump unit by any milk. The diaphragm is shaped so that it includes portions which are either substantially parallel to the center axis of the nipple tunnel or substantially perpendicular to the center axis of the nipple tunnel.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a substantially transparent breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) a substantially transparent outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the diaphragm is removably mounted onto the breast shield and/or the outer shell, and in which the diaphragm includes a portion that is arranged over the end or tip of the nipple tunnel.

Feature 5: specific shape and location of the diaphragm

The diaphragm is also positioned so that it does not obstruct a mother's view of the nipple when placing the collection hub onto her breast. Hence a mother is able to see any movement of the diaphragm when the air pump is activated, thereby further ensuring the proper function of the breast pump system.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the diaphragm is removably mounted onto the breast shield and/or the outer shell and is positioned behind a diaphragm cap that forms part of the front or forward facing part of the outer shell, so as not to obstruct a mother's view of the nipple when placing the collection hub onto her breast.

B. Cost Engineering Innovations: Simplicity

Feature 6: Removable diaphragm cap

The wearable milk collection hub includes a removable diaphragm cap that is configured to cover and seal the diaphragm. The diaphragm cap is easily removable or attachable with a single push action when the collection hub has been placed onto the breast. The diaphragm cap includes an air port or hole to connect a tube between the milk collection hub and an external control unit housing a pump unit subsystem.

Hence a mother can place the collection hub on her breast first without the diaphragm cap and without the inconvenience of a tube connected to the air port. Once the milk collection hub is correctly placed on the breast, the mother can easily attach the diaphragm cap together with the tube with a single push action.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the outer shell includes a removable diaphragm cap that covers and seals the diaphragm; and in which the diaphragm cap forms part of the front or forward facing part of the outer shell and includes an air port configured to transfer negative air pressure from the external air pump subsystem to the diaphragm.

Feature 7: Removable diaphragm cap is omnidirectional

A further advantage of the diaphragm cap is that it is omnidirectional and can be easily rotated on the rear surface of the outer shell, therefore providing the user with the ability to change or rotate the position of the air port on the diaphragm cap. This also helps the user modify the placement of a tube connected to the diaphragm cap. This feature also provides added versatility and/or flexibility to be used by different users and body shape with different clothing to achieve comfort and/or discretion.

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

in which the outer shell includes a removable diaphragm cap that covers and seals the diaphragm; and in which the diaphragm cap forms part of the front or forward facing part of the outer shell and includes an air port configured to transfer negative air pressure from the external air pump subsystem to the diaphragm; and in which the removable diaphragm cap is configured to rotate to enable the position of the air port on the outer shell to be adjusted by a user.

Feature 8: 3 user-removable parts from the breast shield

We can generalize to:

A wearable milk collection hub for a breast pump system comprising:

(a) a breast shield made up of a breast flange and a nipple tunnel;

(b) a flexible diaphragm that is configured to prevent milk from reaching an external air pump subsystem;

(c) an outer shell that is configured to removably attach to the breast shield, such that the breast shield and outer shell form a vessel for collecting milk;

(d) a diaphragm cap that forms part of the front or forward facing part of the outer shell;

and in which the only user removable items from the breast shield are: the outer shell, the diaphragm, and the diaphragm cap, in normal use or normal disassembly.

C. User experience innovations: low noise

Feature 9: Airflow block

We can generalize to:

A control unit for generating negative air pressure for a breast pump system, the control unit including:

(a) a rechargeable battery;

(b) a power charging circuit for controlling the charging of the rechargeable battery;

(c) control electronics powered by the rechargeable battery;

(d) a pump powered by the rechargeable battery and generating negative air pressure; and

(e) a motor for driving the pump;

(f) a casing;

in which the control unit further includes an airflow block that is configured to transfer suction from the pump to a suction or air port on the control unit and is further configured to attenuate sound from the pump and/or the motor reaching from reaching the casing.

Feature 10: Sound valve

We can generalize to:

A control unit for generating negative air pressure for a breast pump system, the control unit including:

(a) a rechargeable battery;

(b) a power charging circuit for controlling the charging of the rechargeable battery;

(c) control electronics powered by the rechargeable battery;

(d) a pump powered by the rechargeable battery and generating negative air pressure; and

(e) a motor for driving the pump;

and in which the control unit further includes a sound valve that is configured to air to pass in and out of the control unit sufficient for pressure equalisation between the inside and outside of the control unit, while minimizing sound from the pump and/or motor escaping from the control unit.

Feature 11: Solenoid foam cap

We can generalize to:

A control unit for generating negative air pressure for a breast pump system, the control unit including:

(a) a rechargeable battery;

(b) a power charging circuit for controlling the charging of the rechargeable battery;

(c) control electronics powered by the rechargeable battery;

(d) a pump powered by the rechargeable battery and generating negative air pressure and;

(e) a motor for driving the pump;

(f) a solenoid valve for controlling the generated negative air pressure;

and in which the control unit further includes a cap or other structure that is configured to reduce the speed of air that enters the solenoid valve when the solenoid valve opens to ambient air pressure.

D. User experience innovations: product handling

Feature 12: Multifunction mount

We can generalize to:

A control unit for generating negative air pressure for a breast pump system, the control unit including:

(a) a rechargeable battery;

(b) a power charging circuit for controlling the charging of the rechargeable battery;

(c) control electronics powered by the rechargeable battery;

(d) a pump powered by the rechargeable battery and generating negative air pressure and;

(e) a motor for driving the pump;

and in which the control unit further includes a removable multifunction mount configured to attach to the control unit in at least two different positions, such that the control unit can be held in either upright/portrait or longwise/landscape mode.

Feature 13: Tube management feature

We can generalize to:

A control unit for generating negative air pressure for a breast pump system, the control unit including:

(a) a rechargeable battery;

(b) a power charging circuit for controlling the charging of the rechargeable battery;

(c) control electronics powered by the rechargeable battery;

(d) a pump powered by the rechargeable battery and generating negative air pressure and;

(e) a motor for driving the pump;

and in which the control unit further includes or, is removably attached to a tube management structure configured to enable an air tube attachable to the control unit to be wound around that tube management structure.

Generally applicable optional features that can be combined with any one or more of the above features and can themselves be combined with one another:

Breast shield

- breast shield is rigid or semi-rigid.
- breast shield is made up of a breast flange and a nipple tunnel; in which the nipple tunnel is configured to receive a nipple.
- breast shield comes in different sizes, each of which are configured to attach to the same outer shell.
- different sizes of the breast shield each provide a different spacing of the nipple from side walls of the nipple tunnel, when the breast shield is positioned onto a breast.
- breast shield integrates the breast flange and nipple tunnel as a single one-piece item with no joins.
- nipple tunnel includes a milk hole through which express milk flows into the milk collection hub via a non return valve.

- breast shield includes a diaphragm housing that has sides that are parallel to the nipple tunnel.
- diaphragm housing includes an air hole that transfers negative air pressure to the nipple tunnel.
- air-pump chamber is a substantially annular chamber with walls that are parallel to the long or central axis of the nipple tunnel and those parallel walls lie over a region of the nipple tunnel that is subject in use to negative air pressure.
- diaphragm housing has an outer, approximately cylindrical side wall that is generally parallel to the nipple tunnel, and an inner, approximately cylindrical side wall that is also is generally parallel to the nipple tunnel.
- diaphragm housing has a front wall that forms the end of the nipple tunnel.
- diaphragm housing has an annular rear wall that joins the outer and the inner sides walls and that annular rear wall lies over a region of the nipple tunnel that is subject in use to negative air pressure.
- diaphragm moves within an air-pump chamber formed on one side by the diaphragm housing with walls that are parallel to the long or central axis of the nipple tunnel and on another side by the diaphragm cap.
- breast shield is integrated with the diaphragm housing portion as a single, one piece moulded item.
- breast shield includes a removable perimeter seal that provides an air-tight seal between an outer edge of the breast shield and the outer shell.
- breast shield is a transparent or optically clear, dishwasher safe polypropylene, polycarbonate or copolyester, such as Tritan™, breast shield.

Outer shell

- outer shell is rigid.
- the outer shell removably attaches, fits or latches onto the breast shield and so the breast shield provides a rear surface that is in contact with milk.
- outer shell is attachable to the breast shield with a single push action.
- outer shell attaches to the breast shield using magnets.
- outer shell includes an air opening or vent hole such that atmospheric pressure is maintained inside the milk collection hub.

- outer shell is directly removable from the breast shield in normal use or normal disassembly
- outer shell is removable from the breast shield together with a flexible diaphragm that is attached, permanently or removably, to the outer shell.
- outer shell is an integral part of the breast shield.
- outer shell includes a diaphragm cap that sits over a diaphragm.
- outer shell and diaphragm are together a single item.
- outer shell includes a pouring opening which can be closed for transportation of the milk collection hub.
- outer shell has a front surface that is curved to fit inside a bra and to contact the inner surface of the bra.
- outer shell is a transparent or optically clear, dishwasher safe polypropylene, polycarbonate or copolyester, such as Tritan™, outer shell.
- outer shell is a self-contained milk collection hub and so the breast shield does not provide a surface in contact with milk.

Diaphragm

- diaphragm is flexible, and deforms to create negative pressure.
- diaphragm is not sufficiently flexible to deform to create negative pressure but serves instead solely to prevent milk from passing through it and filling the air lines or reaching the motor.
- diaphragm is substantially rigid and serves instead solely to prevent milk from passing through it and filling the air lines or reaching the motor.
- diaphragm includes inner and outer side walls that are substantially parallel to the center axis of the nipple tunnel.
- diaphragm includes substantially cylindrical inner and outer side walls that are substantially parallel to the center axis of the nipple tunnel.
- diaphragm, when under negative pressure, moves past a milk opening in the nipple tunnel towards the over the end or tip of the nipple tunnel.
- diaphragm includes portions which are substantially parallel to the center axis of the nipple tunnel and includes portions which are substantially perpendicular to the center axis of the nipple tunnel.

- diaphragm is shaped to be flush to a diaphragm housing that has an outer, approximately cylindrical side wall that is generally parallel to the nipple tunnel, and an inner, approximately cylindrical concentric side wall that is also is generally parallel to the nipple tunnel.
- diaphragm flexes when negative air pressure is applied to it by an air pump subsystem, and transfers that negative air-pressure to pull the breast and/or nipple against the breast shield to cause milk to be expressed.
- diaphragm is positioned such as not to obstruct a mother's view of a substantial part of the nipple tunnel when placing the collection hub onto her breast;
- diaphragm is moulded as part of, or otherwise attached to, the outer shell.
- the outer shell and diaphragm are formed or joined together to form a single item.
- diaphragm includes portions that run substantially parallel to the center axis of the nipple tunnel.
- diaphragm is a single flexible membrane shaped to include inner and outer substantially cylindrical walls that are generally parallel to the center axis of the nipple tunnel.
- diaphragm includes a portion that sits over the end of the nipple tunnel, facing away from the breast.
- diaphragm is removably attached to the outer shell.
- diaphragm is removable from the outer shell for cleaning.
- diaphragm is configured to self-seal under the negative air pressure to a diaphragm holder that is part of the breast shield.
- diaphragm is a one-piece item devoid of any holes or openings.
- diaphragm is permanently fixed to the outer shell.
- diaphragm is a single flexible membrane shaped to include inner and outer substantially cylindrical walls that are generally parallel to the center axis of the nipple tunnel, an annular wall that joins the inner and outer substantially cylindrical walls, and an end wall that sits over the end of the nipple tunnel.

Diaphragm cap

- diaphragm cap is removable.
- diaphragm cap forms the front of the outer shell.

- diaphragm cap includes an air port that is configured to deliver air pressure to the milk collection hub.
- diaphragm cap is configured to fit or latch onto the outer shell with a single push action.
- diaphragm cap includes recesses or features configured to be gripped with the fingers of one hand.
- diaphragm cap includes a pair of recesses configured to enable the cap to be gripped and removed from the outer shell, and installed into the outer shell, with a single hand.
- diaphragm cap is rotatable in the outer shell to adjust the position of the air port on the diaphragm cap.
- diaphragm cap includes a passage way for the air tube.
- diaphragm cap includes a flat portion such that the milk collection hub can rest on a flat surface positioned on this flat portion.
- diaphragm cap is is shaped to fit inside an inner portion of a bra.
- diaphragm cap is a transparent or optically clear, dishwasher safe polypropylene, polycarbonate or copolyester, such as Tritan™, diaphragm cap.

Entire system

- the system is a closed system.
- the system has a capacity of approximately 5 fluid ounces (148ml).
- width of the milk collection hub is of about 5.7cm in the direction of the central axis of the nipple tunnel.
- each milk collection hub is, in-use, bra-worn, for example is shaped to be worn inside a maternity bra.
- the system makes less than 50dB noise at maximum power when the motor is running, and preferably less than 45dB.

Control Unit

- control unit is configured to control suction delivered to one or two wearable milk collection hubs.

- control unit houses an air pump subsystem that is configured to generate negative air pressure and transfer negative air pressure to a wearable milk collection hub.
- control unit does not house an air pump subsystem but controls an air pump that is external to the control unit
- air pump subsystem is held in place between a sound attenuating motor mount and an airflow block, each configured to absorb vibration from the pump unit.
- control unit includes a wireless data communications system powered by a rechargeable battery;
- control unit includes one or more buttons which are configured to control at least one wearable collection hub.
- control unit includes a visual and/or haptic indicator that indicates whether milk is flowing or not flowing into the hub.
- control unit includes a visual and/or haptic indicator that indicates the activated pumping profile or pattern.
- control unit includes a visual and/or haptic indicator that indicates the rechargeable battery status.
- control unit includes a USB charging socket connected to the power charging circuit;
- multifunction mount is an o-ring.

Airflow block

- airflow block is configured transfer air or suction from the pump unit and also to absorb vibrations from the pump unit.
- airflow block is made of a compression moulded silicone.
- airflow block is directly connected to the air pump subsystem outlet.
- airflow block is located near a solenoid valve.
- airflow block is a one-piece item.
- control unit is sealed such as to further attenuate sound.
- control unit includes an housing with a top portion and a bottom portion.
- the bottom and top portions are sealed together using a seal perimeter.
- airflow block is integrated with a portion of the seal perimeter.

- airflow block connects to an air port or hole for a tube that delivers air to a wearable milk collection hub.

Sound valve

- sound valve is configured to regulate the pressure inside the control unit so that the inside of the control unit remains at ambient pressure and also to attenuate noise from the pump unit escaping from inside the control unit.
- sound valve is located on the bottom portion of the control unit.
- sound valve includes a small cut that is configured to deform under pressure.
- sound valve is made of silicone.

Foam cap

- solenoid foam cap is configured to reduce the speed of air that enters the solenoid valve when the solenoid valve opens to ambient air pressure and hence to reduce the sound of that air entering the solenoid valve.
- solenoid foam cap is a one piece item made of plastic.
- foam cap includes one or more small opening or holes.
- control unit also includes two silencers (or muffler) in which one silencer is connected to the solenoid valve and the other silencer is connected to the motor.

Note

It is to be understood that the above-referenced arrangements are only illustrative of the application for the principles of the present invention. Numerous modifications and alternative arrangements can be devised without departing from the spirit and scope of the present invention. While the present invention has been shown in the drawings and fully described above with particularity and detail in connection with what is presently deemed to be the most practical and preferred example(s) of the invention, it will be apparent to those of ordinary skill in the art that numerous modifications can be made without departing from the principles and concepts of the invention as set forth herein.

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WHAT IS CLAIMED IS:

1. A wearable milk collection hub comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising a closed end and a milk port, the milk port being intermediate to the breast flange and the closed end; and

an outer edge;

a diaphragm configured to deform to create negative air pressure in the nipple tunnel, the diaphragm being at least partially arranged over the closed end of the nipple tunnel; and

an outer shell comprising an outer groove configured to receive the outer edge of the breast shield such that the outer shell is configured to be removably attachable to the breast shield, the outer shell further configured to receive expressed milk via the milk port.

2. The wearable milk collection hub of claim 1, wherein the outer shell is configured to be removably attachable to the breast shield such that the outer shell is configured to contact the breast shield at a rear end of the outer shell and the breast shield is configured to contact the expressed milk at a front end of the breast shield.

3. The wearable milk collection hub of claim 1, wherein the outer shell comprises a top end comprising a pouring opening configured to release the expressed milk.

4. The wearable milk collection hub of claim 1, wherein the outer shell comprises a base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface.

5. The wearable milk collection hub of claim 1, wherein the breast shield comprises a diaphragm housing part comprising an air hole configured to transfer negative air pressure to the nipple tunnel.

6. The wearable milk collection hub of claim 1, wherein the diaphragm is configured to be removably mounted between the breast shield and the outer shell.

7. The wearable milk collection hub of claim 1, wherein the breast shield and the outer shell are substantially transparent, providing, to the mother placing the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment, and

wherein the outer shell is configured to support an air port configured to provide an air connection to a control unit via a tube, the air port being disposed through an opaque portion of the wearable milk collection hub.

8. A wearable milk collection hub configured to connect to an external negative pressure generating control unit comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising an end remote from the breast flange and a milk port intermediate to the breast flange and the end; and

a diaphragm housing part;

a diaphragm configured to be removably mounted to the diaphragm housing part, and to deform based on negative air pressure generated by the control unit to create negative air pressure in the nipple tunnel; and

an outer shell comprising a rear end configured to removably attach the outer shell to the breast shield such that the breast shield and the outer shell form a vessel to receive expressed milk via the milk port, a front end opposing the rear end, the front end comprising a curvature, a base intermediate to the rear end and the front end, the base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface, and a top end opposing the base, the top end comprising a pouring opening configured to release the expressed milk.

9. The wearable milk collection hub of claim 8, wherein a structure comprising the diaphragm is configured to be at least partially arranged over the closed end of the nipple tunnel.

10. The wearable milk collection hub of claim 8, further comprising an air port configured to provide an air connection to the control unit via a tube.

11. The wearable milk collection hub of claim 10, further comprising a movable cap positioned over the air port.

12. The wearable milk collection hub of claim 11, wherein the movable cap is disposed on a front end of the outer shell.

13. The wearable milk collection hub of claim 8, wherein the breast shield and the outer shell are substantially transparent, providing, to the mother placing the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment, and

wherein the wearable milk collection hub is shaped to be worn inside a bra.

14. The wearable milk collection hub of claim 8, wherein the rear end of the outer shell is configured to receive an outer edge of the breast shield such that an air-tight seal is formed between the breast shield and the outer shell.

15. The wearable milk collection hub of claim 8, wherein the breast shield is semi-rigid.

16. A breast pump system comprising:

a control unit comprising:

a battery, and

a pump configured to be powered by the battery and to generate negative air pressure; and

a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising a closed end and a milk port intermediate to the breast flange and the closed end; and

a diaphragm housing part;

a diaphragm configured to be removably mounted to the diaphragm housing part, and to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel; and

an outer shell comprising a rear end configured to removably attach to the breast shield, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk via the milk port.

17. The wearable milk collection hub of claim 16, wherein the diaphragm housing part is disposed between the breast shield and the outer shell such that the diaphragm is configured to be removably mounted between the breast shield and the outer shell.

18. The wearable milk collection hub of claim 16, wherein the breast shield comprises an outer edge configured to be received by the rear end of the outer shell.

19. The wearable milk collection hub of claim 16, wherein the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield.

20. The wearable milk collection hub of claim 16, wherein the control unit further comprises:

a wireless data communications system configured to be powered by the battery;

one or more buttons configured to control the wearable milk collection hub;

at least one of a visual indicator or a haptic indicator configured to indicate the activated pumping profile or pattern;

at least one of a visual indicator or a haptic indicator configured to indicate a status of the battery; and

a Universal Serial Bus (USB) charging socket configured to be connected to a power charging circuit.

Abstract

A breast pump system comprises at least one wearable milk collection hub connected via an air line to a combined external air pump and control unit. Each milk collection hub comprises: (a) a breast shield made up of a breast flange and a nipple tunnel; (b) a flexible diaphragm that is configured to prevent milk from reaching the external air pump; (c) an outer shell that is configured to removably attach to the breast shield, such that, when attached, the breast shield and outer shell form a vessel for collecting milk; and (d) a diaphragm cap that is configured to be secured over the diaphragm, forms part of the front face of the outer shell, and includes a port connected to the air line.

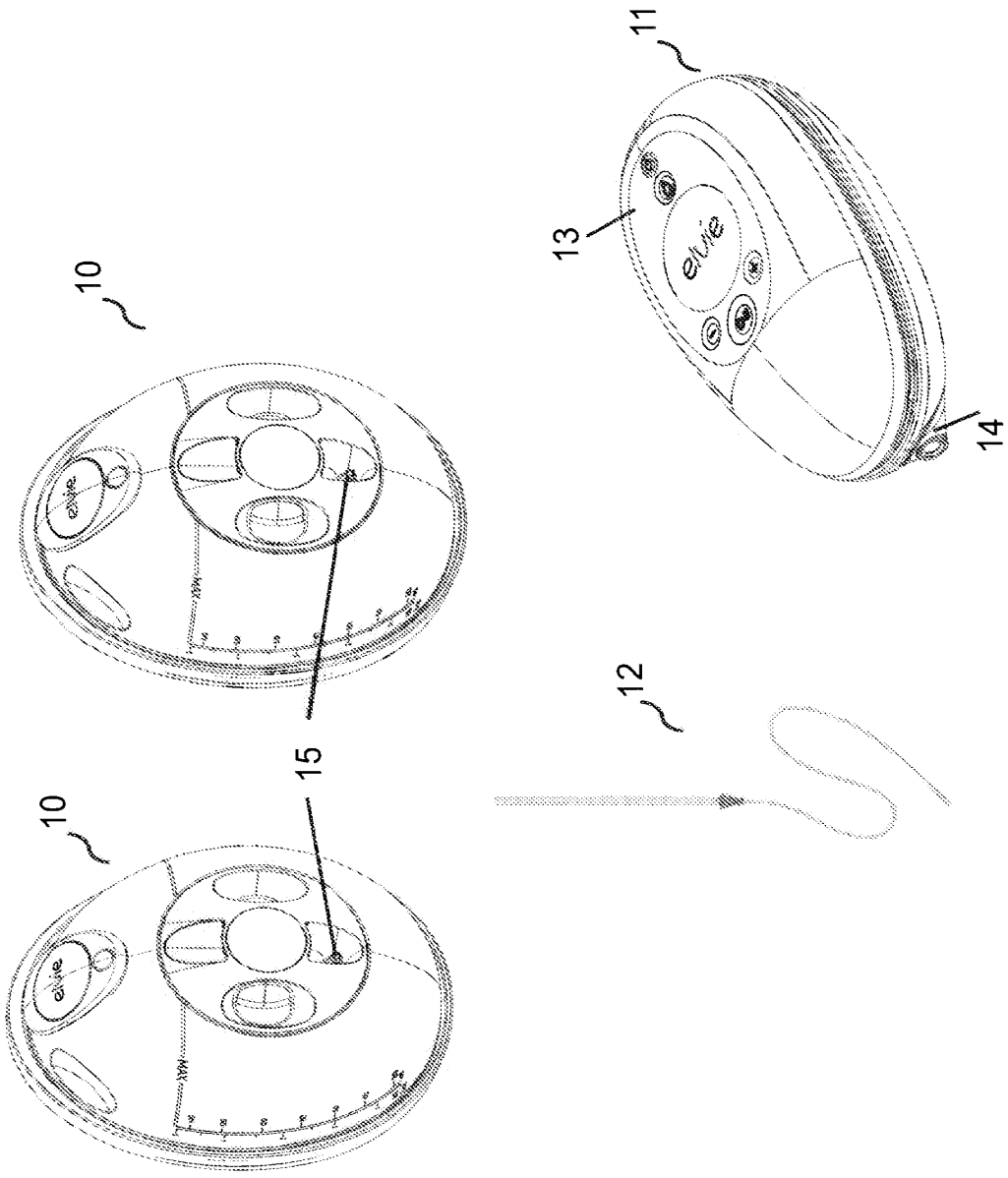


FIGURE 1A

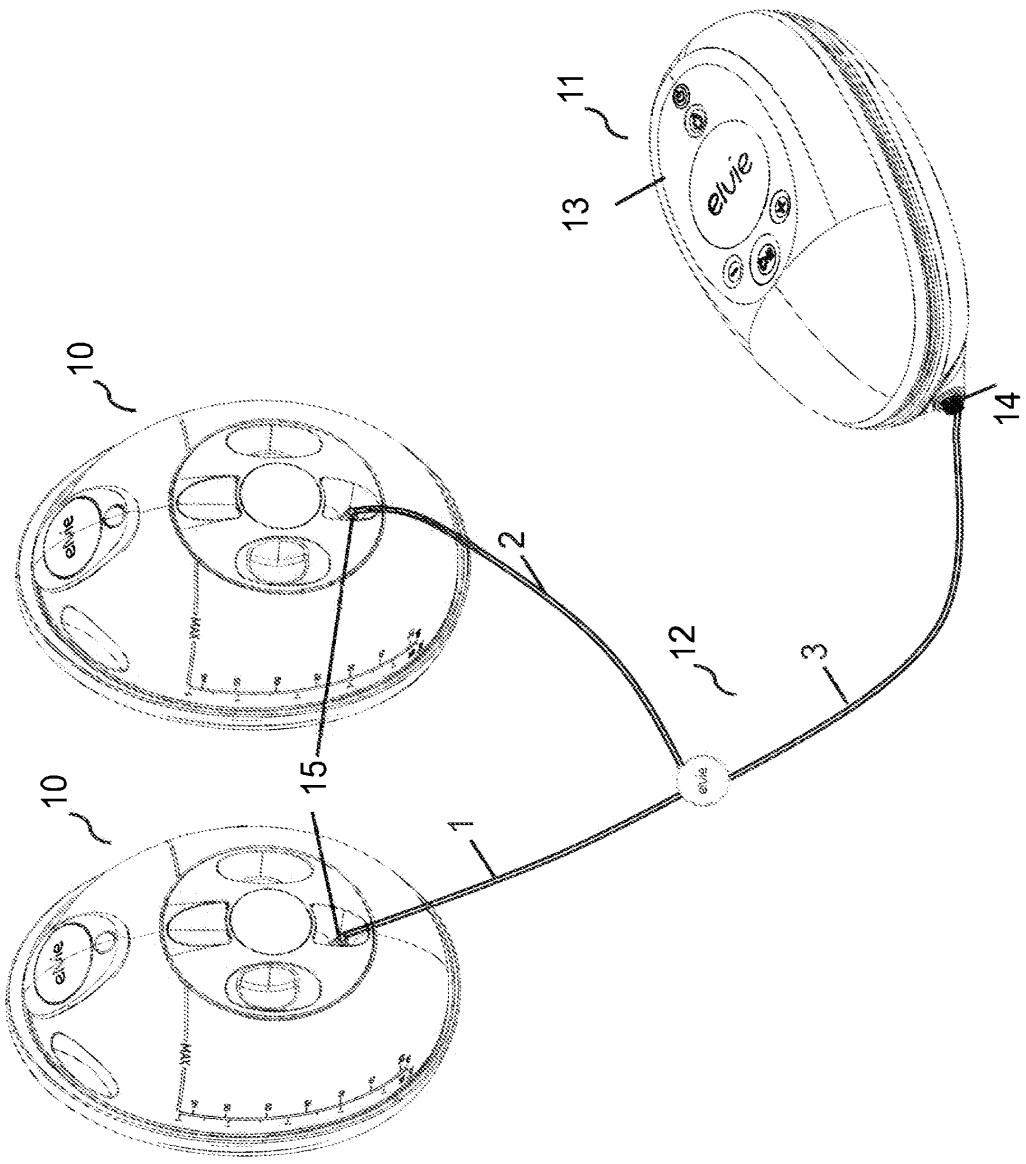


FIGURE 1B

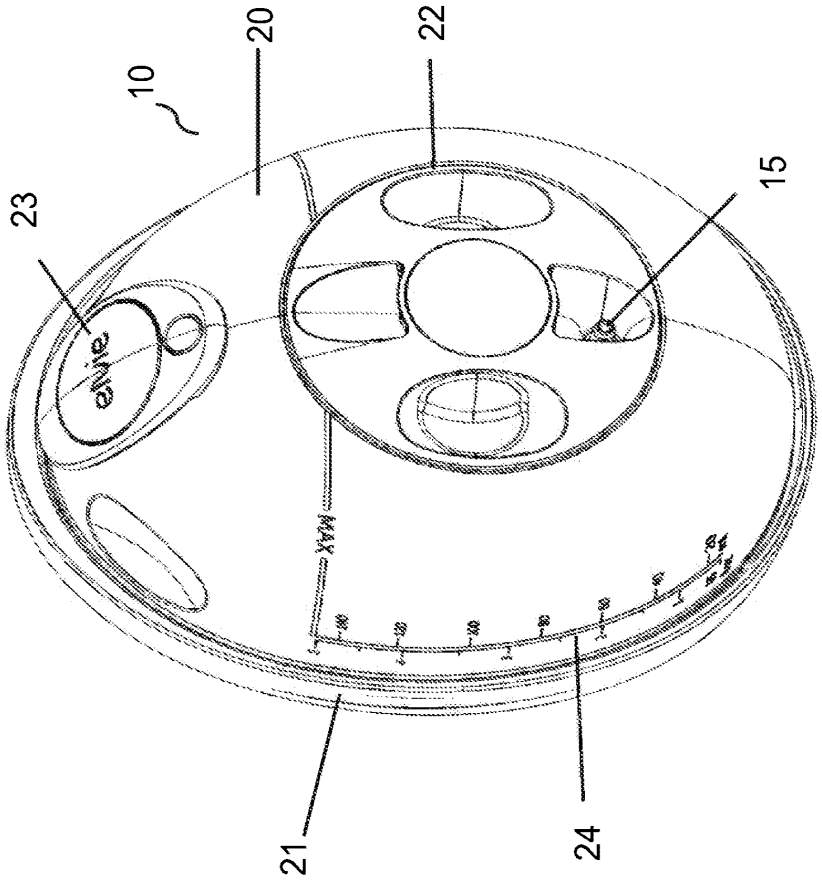


FIGURE 2

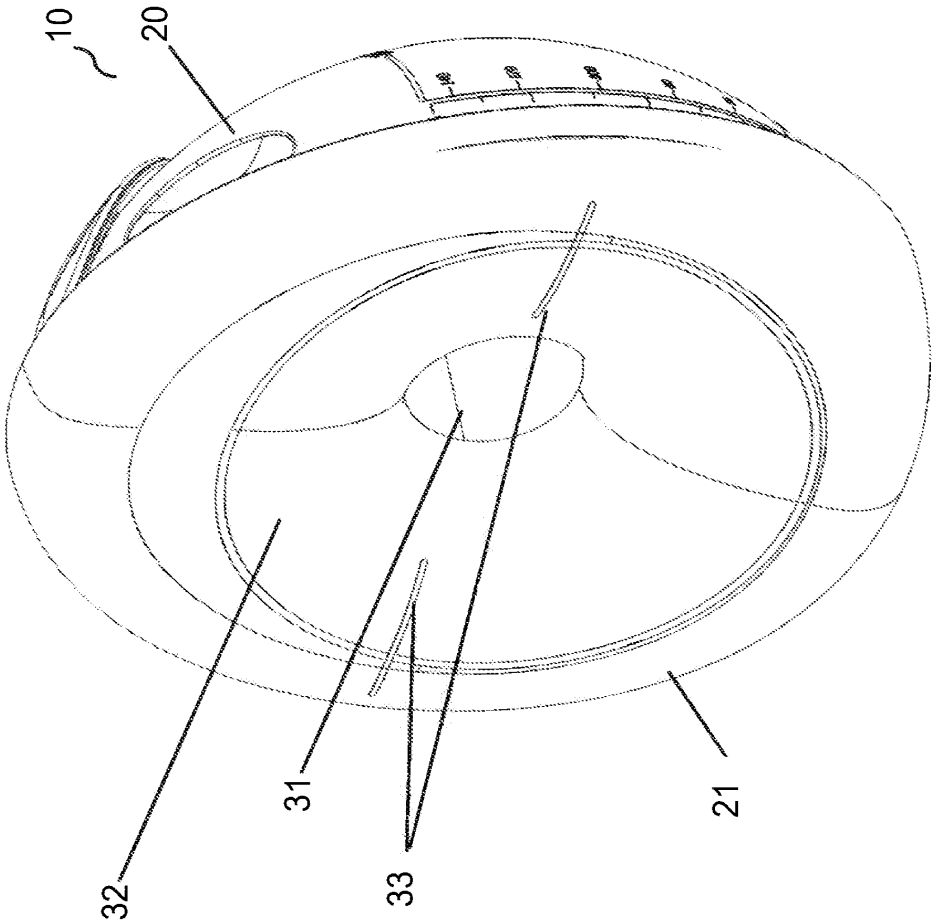


FIGURE 3

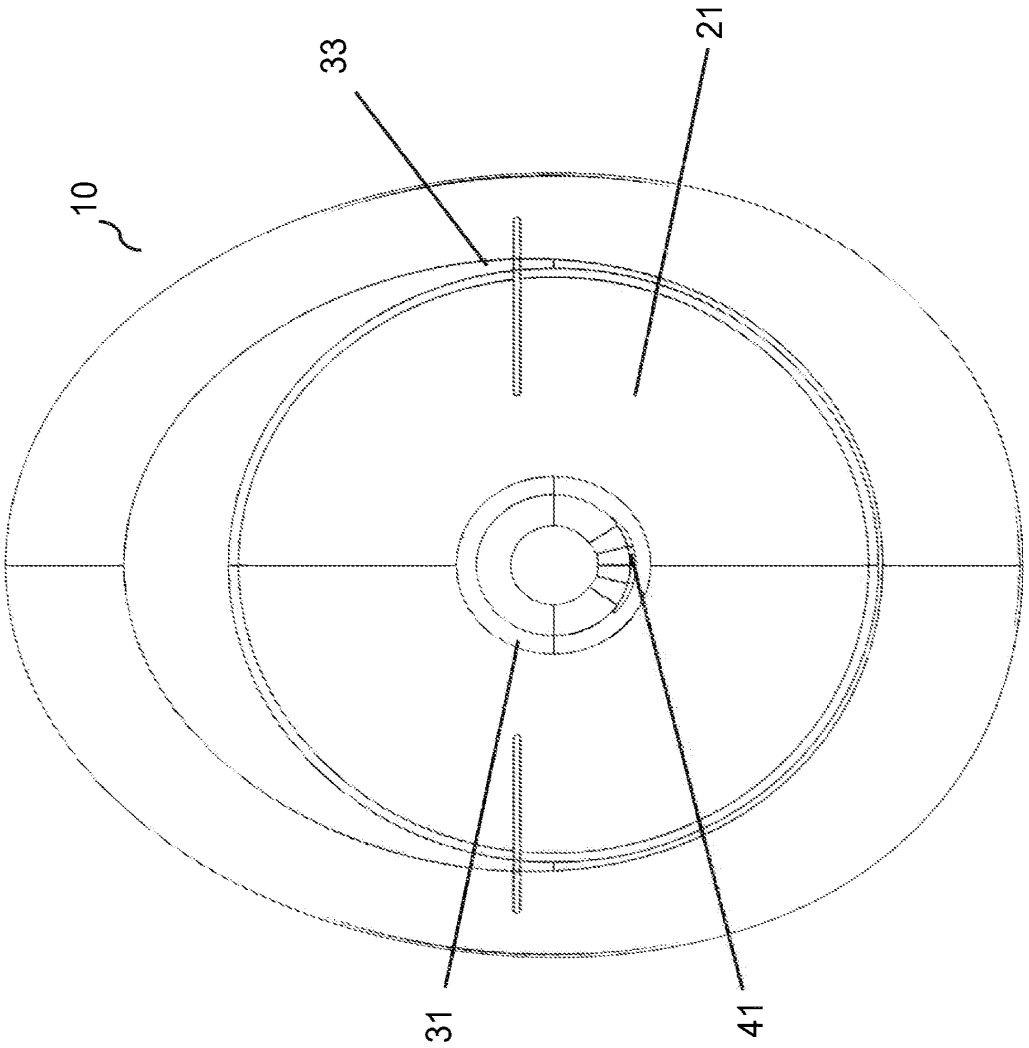


FIGURE 4

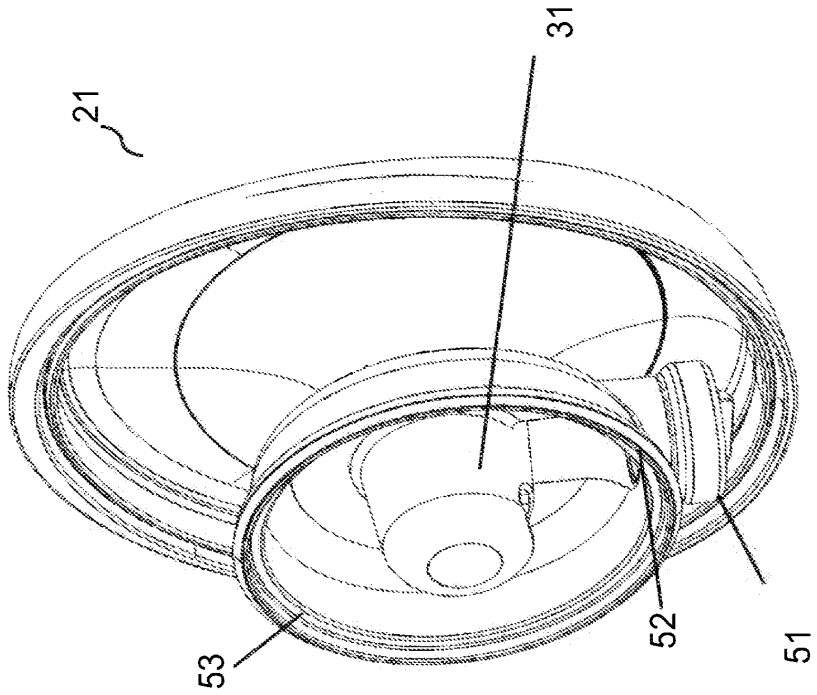


FIGURE 5

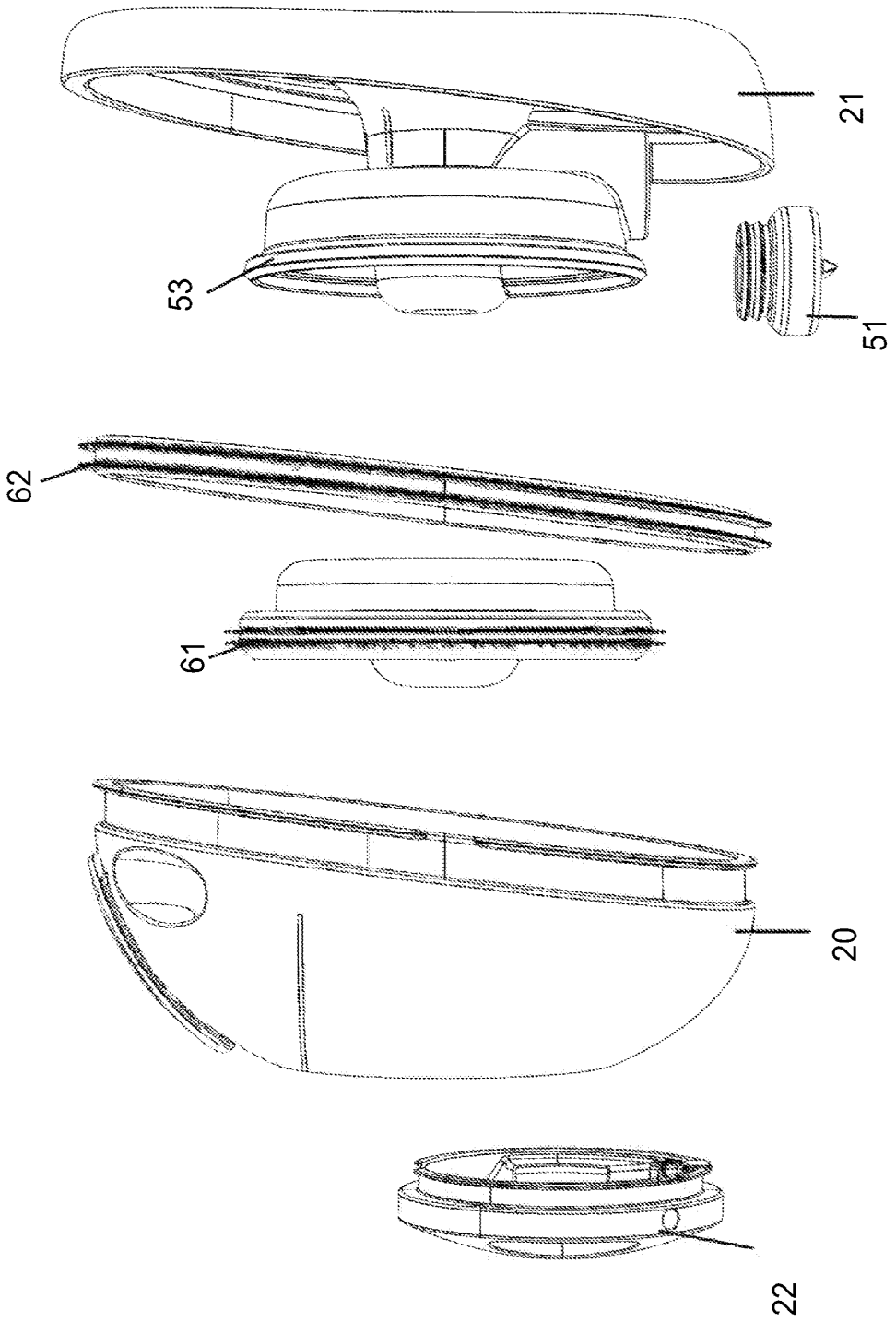


FIGURE 6

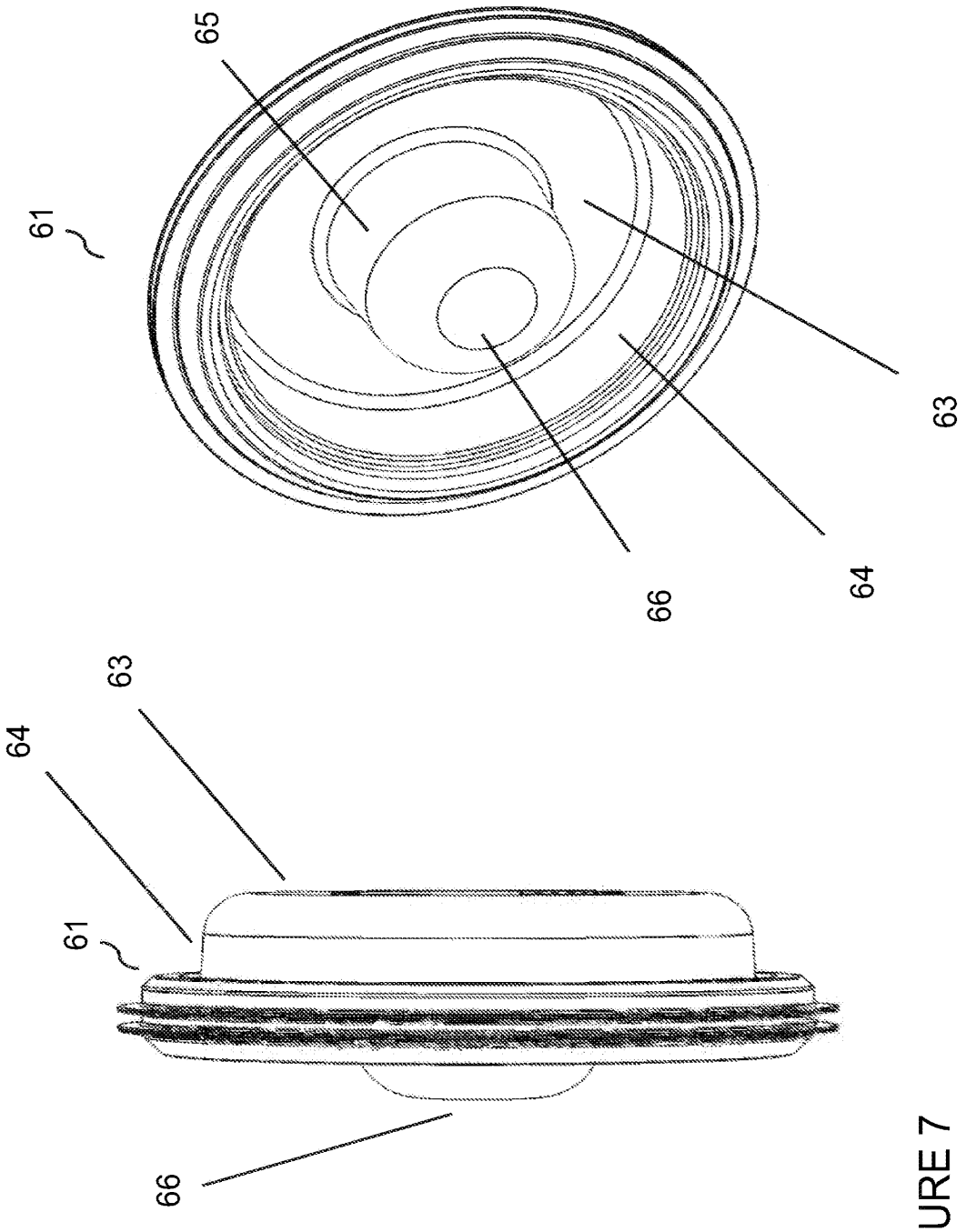


FIGURE 7

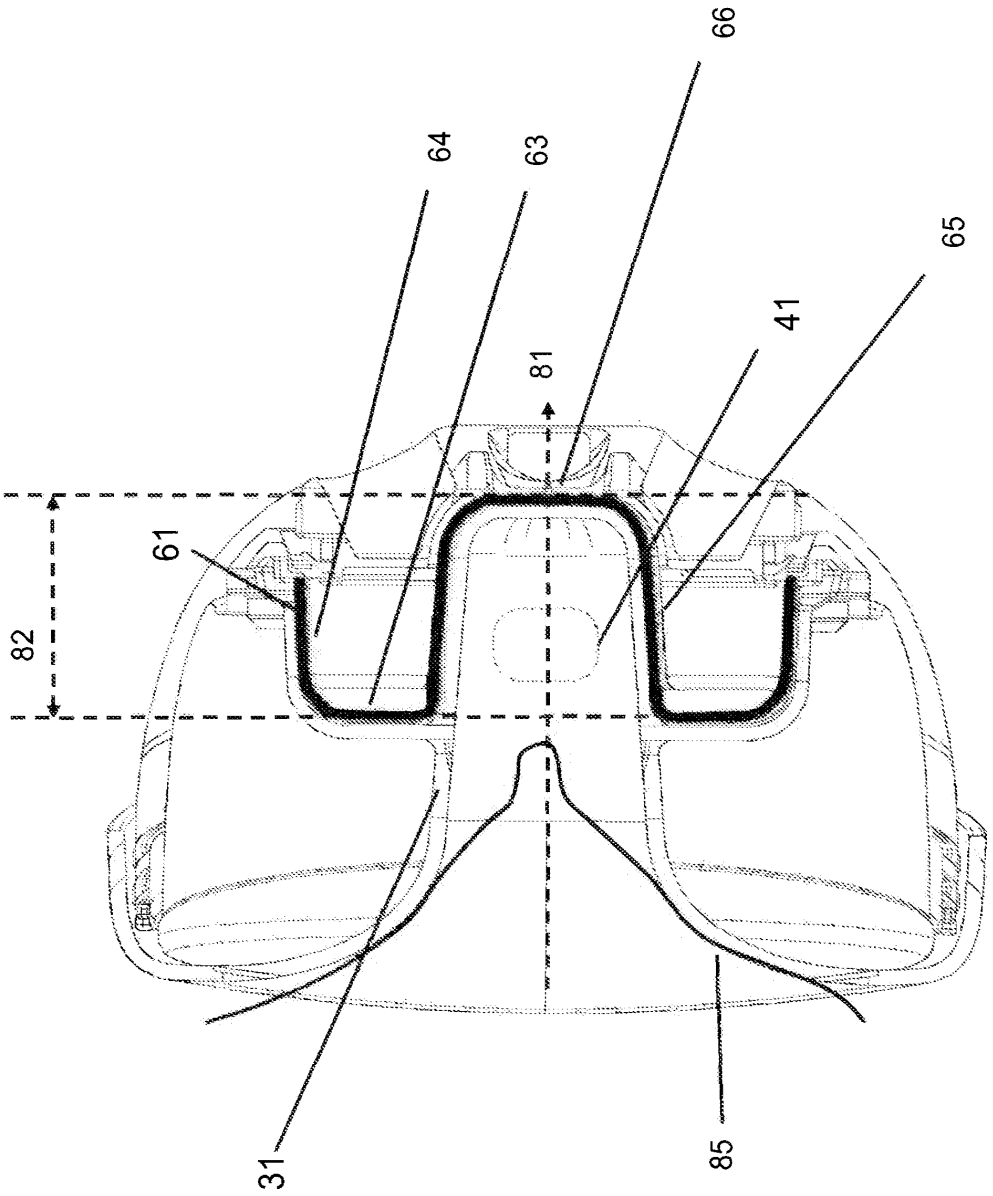


FIGURE 8

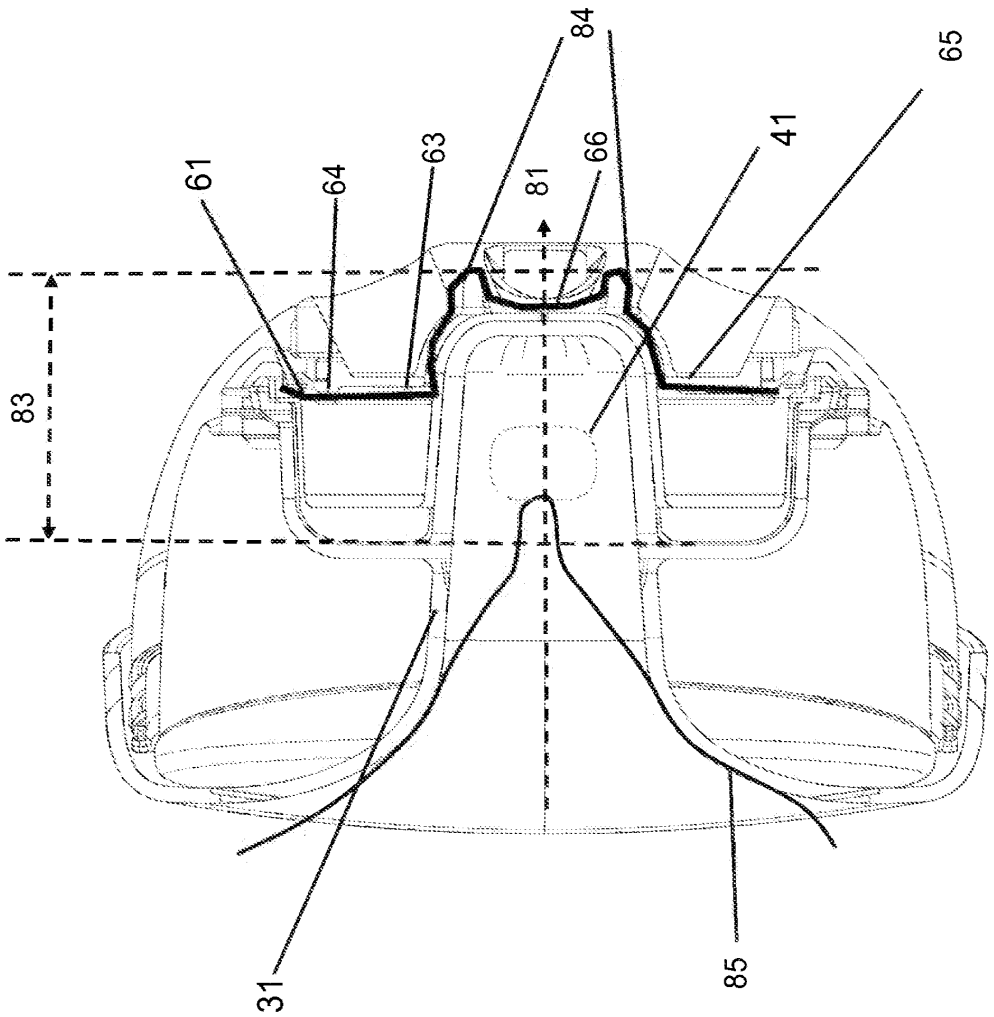


FIGURE 9

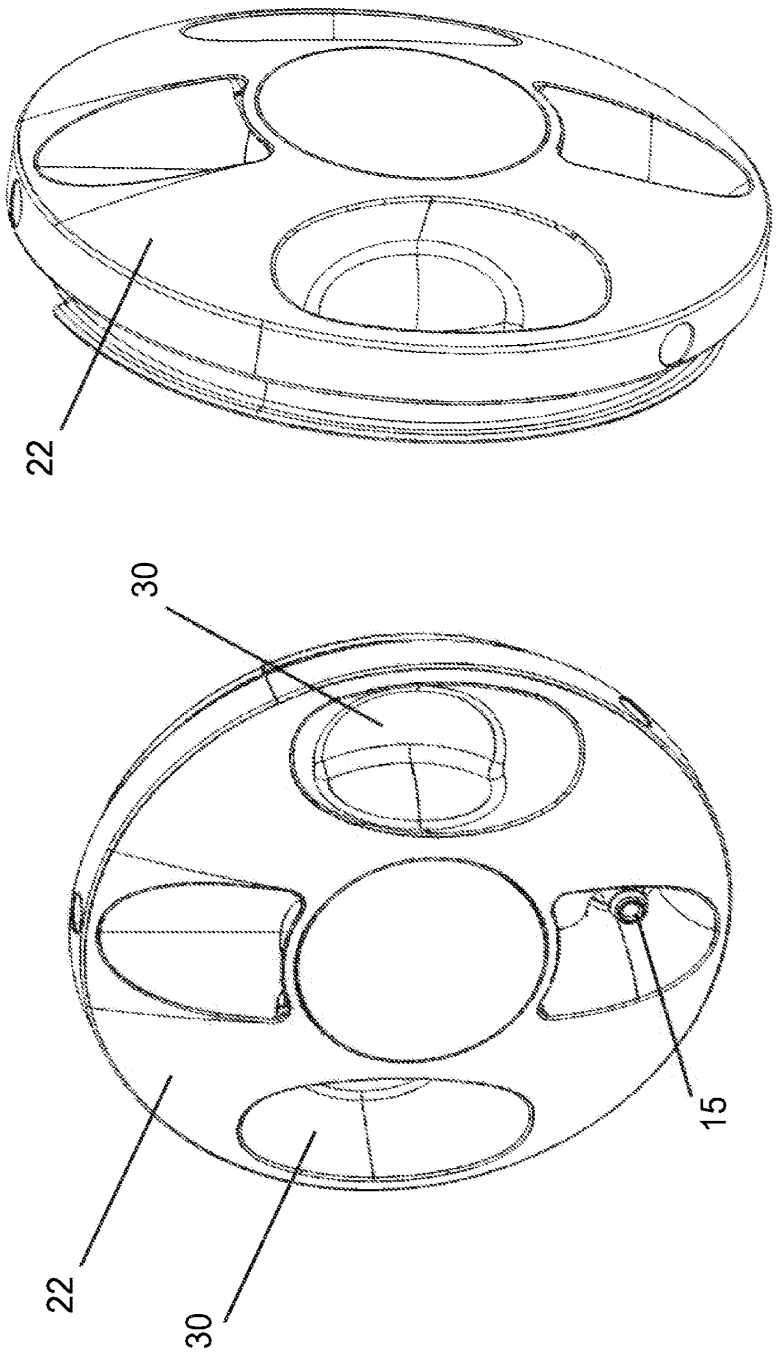


FIGURE 10

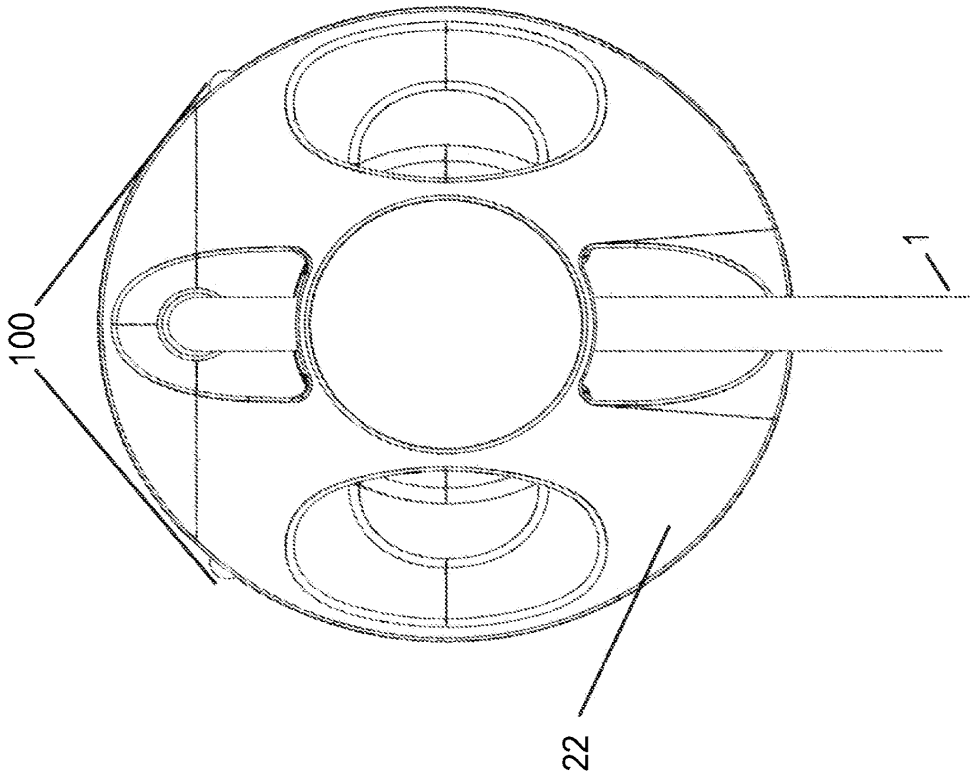


FIGURE 11

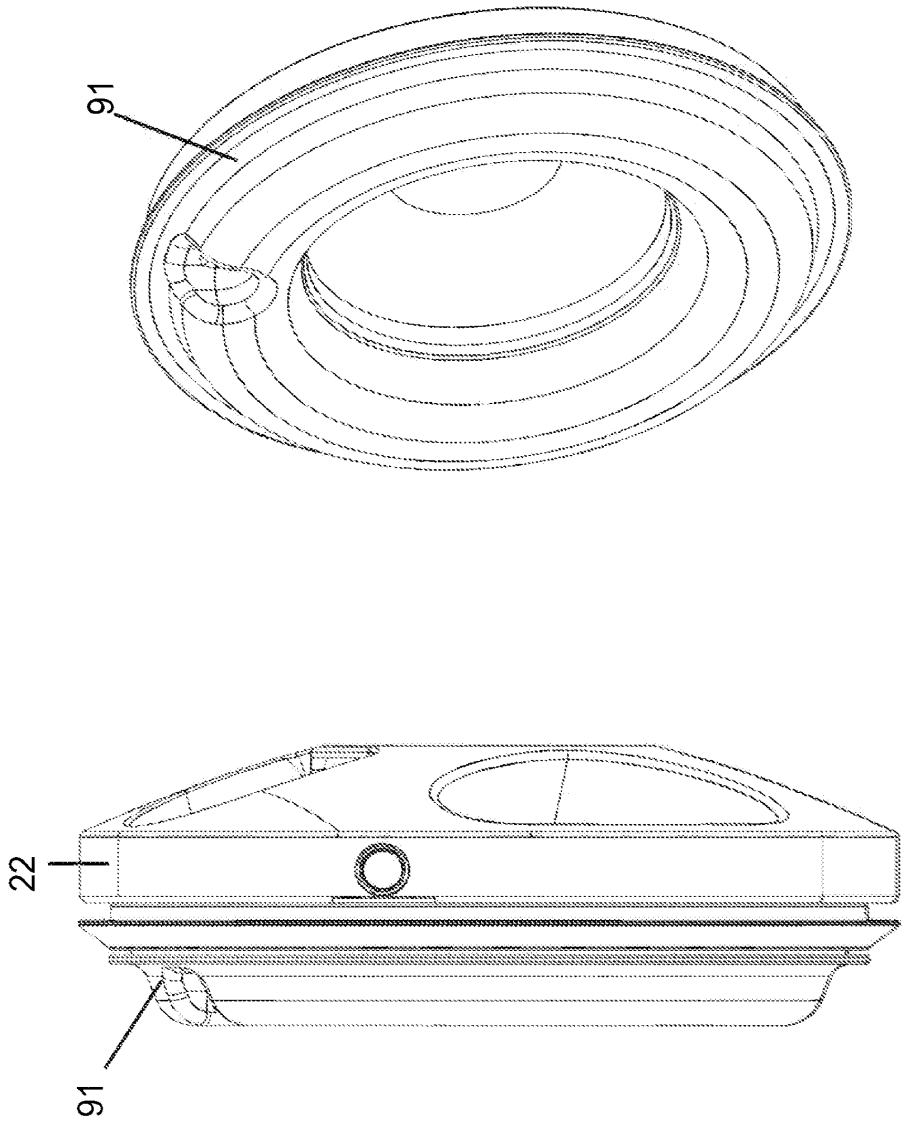


FIGURE 12

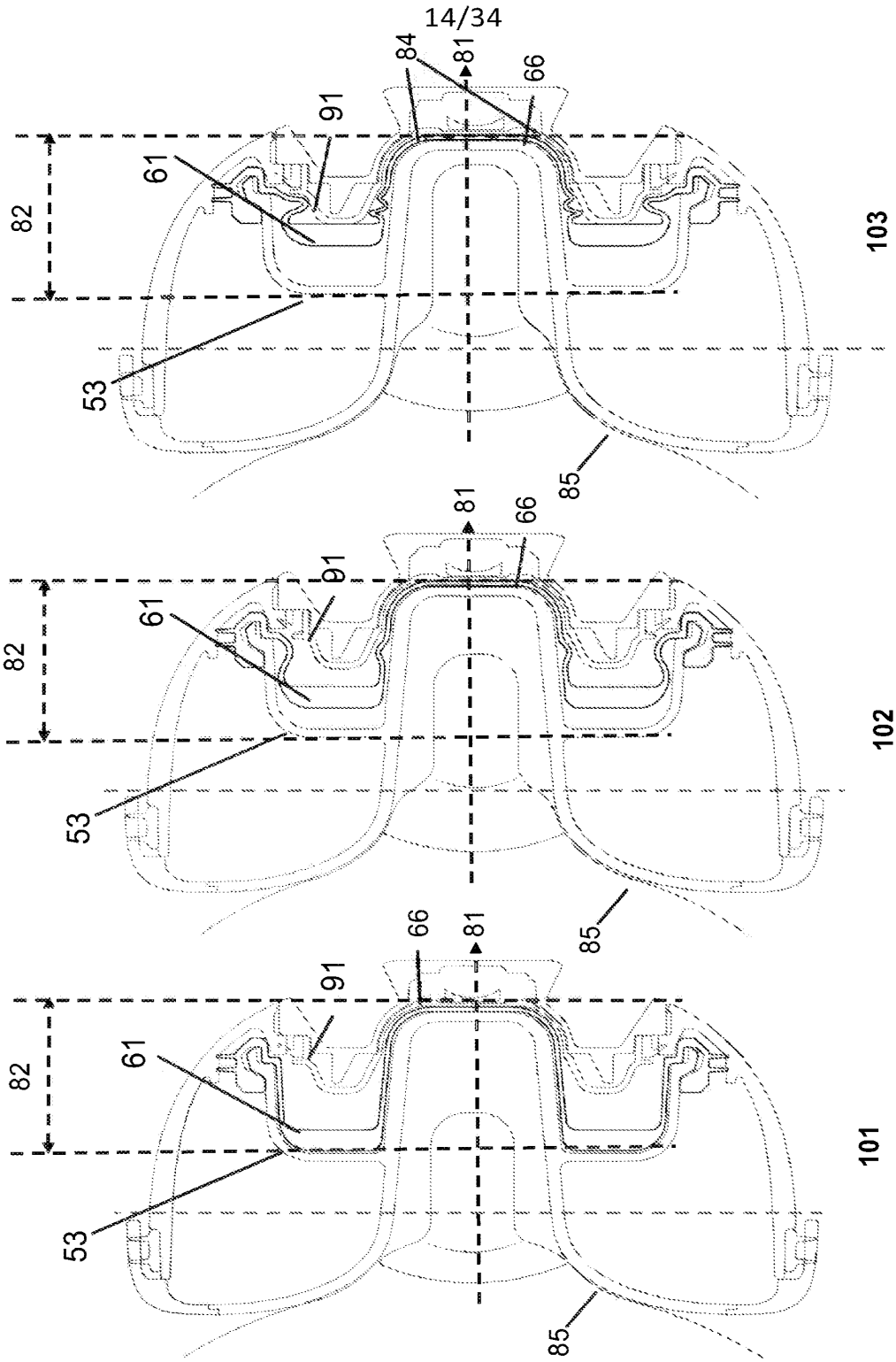


FIGURE 13A

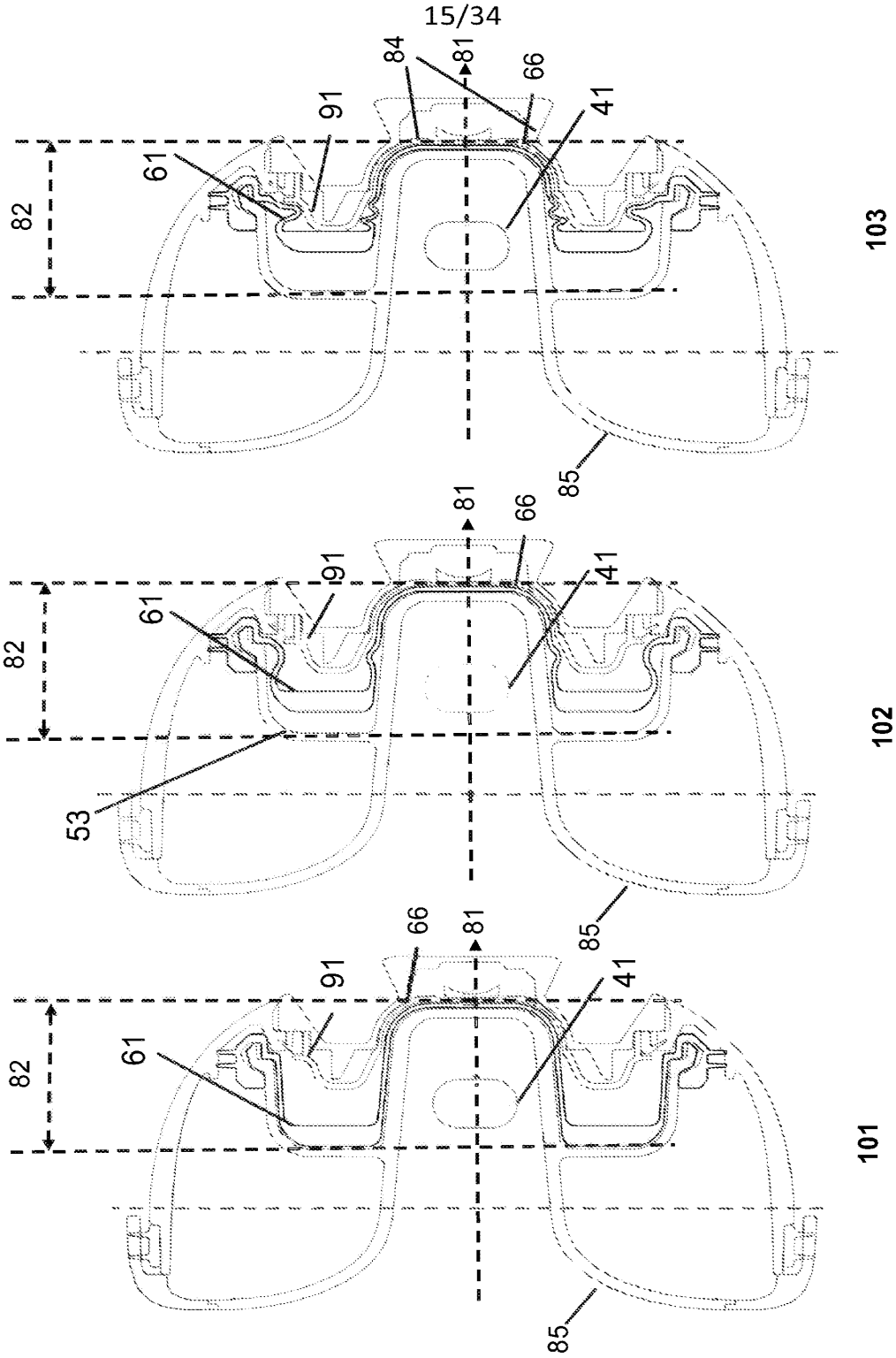

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FIGURE 13B

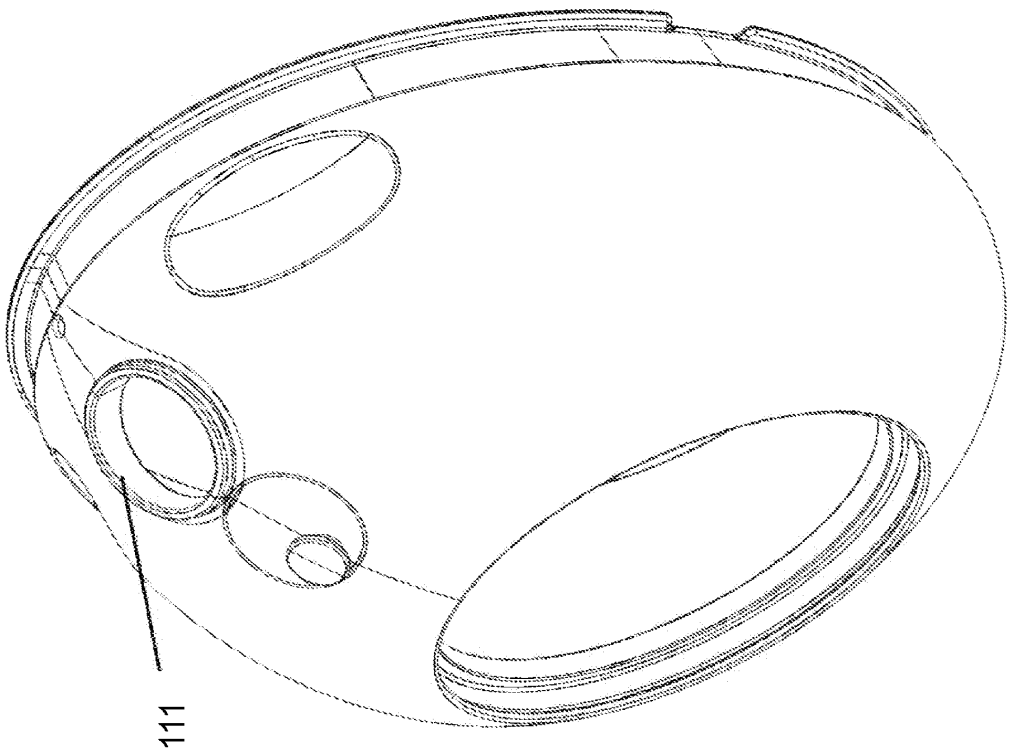


FIGURE 14

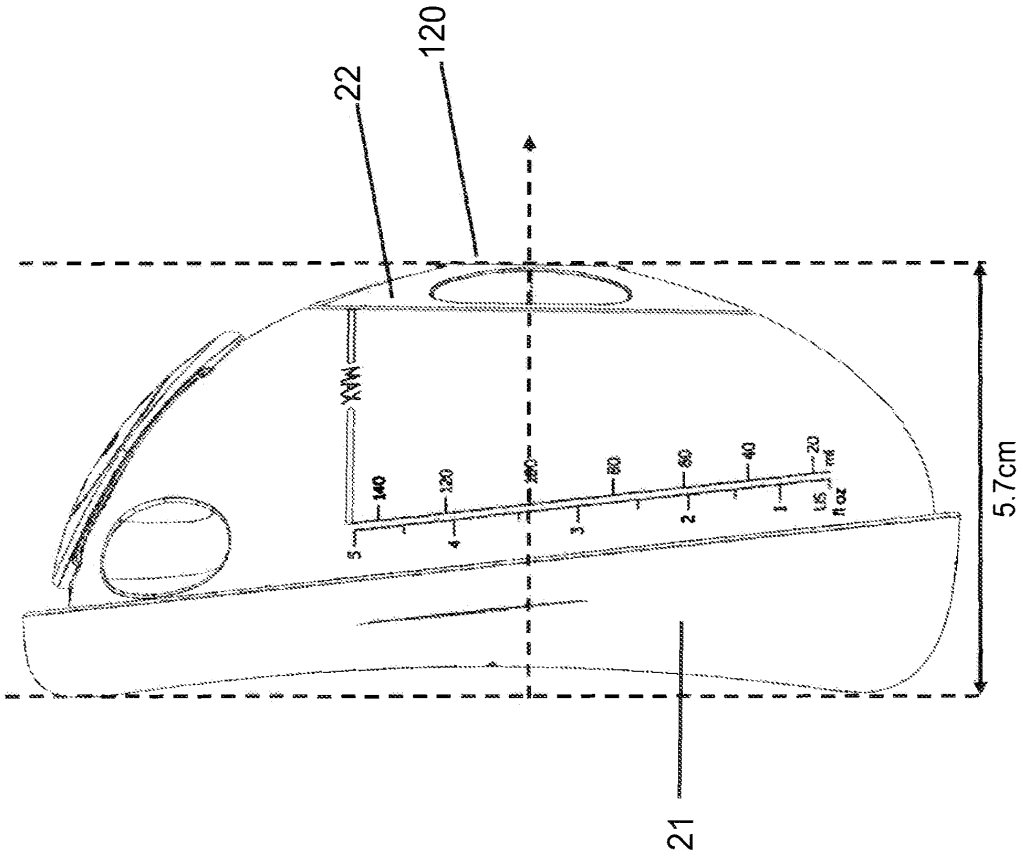


FIGURE 15

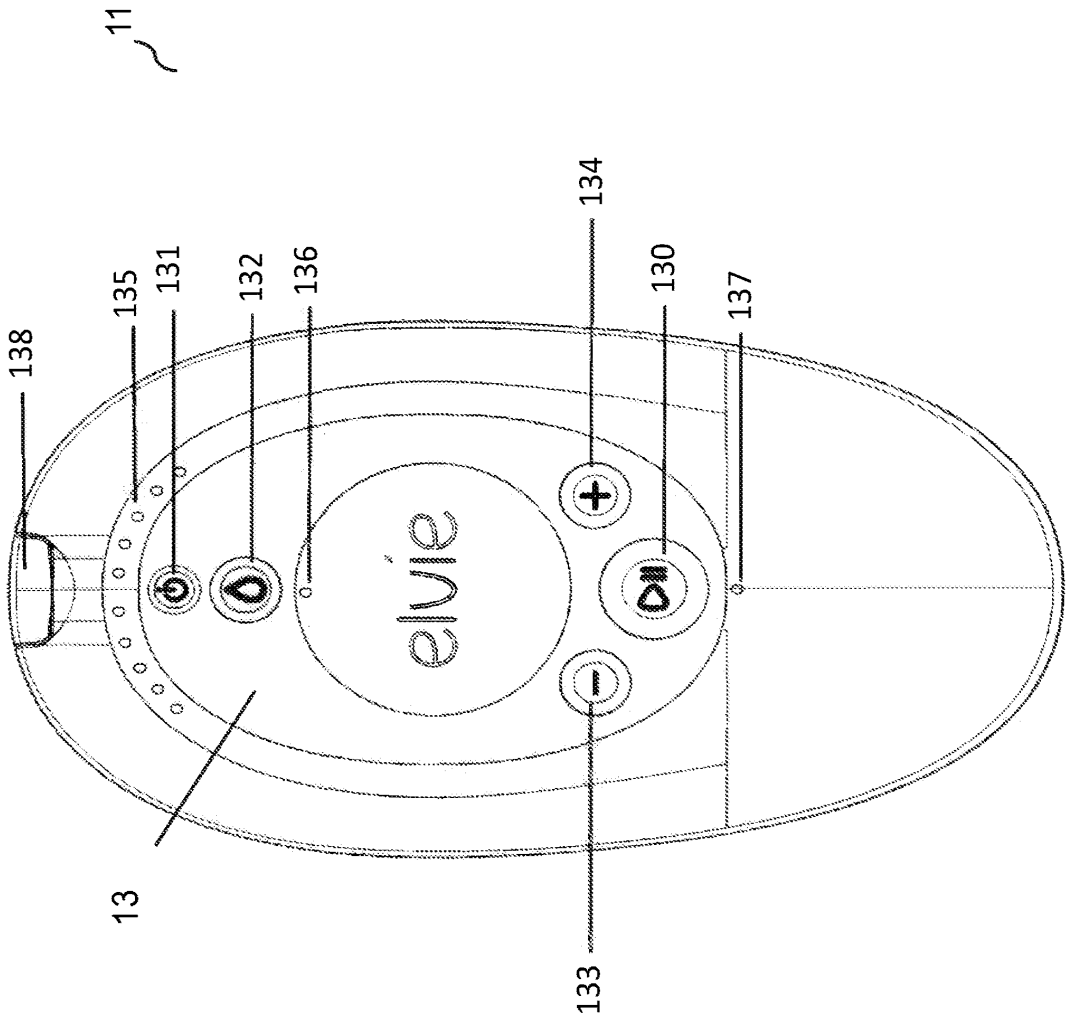


FIGURE 16

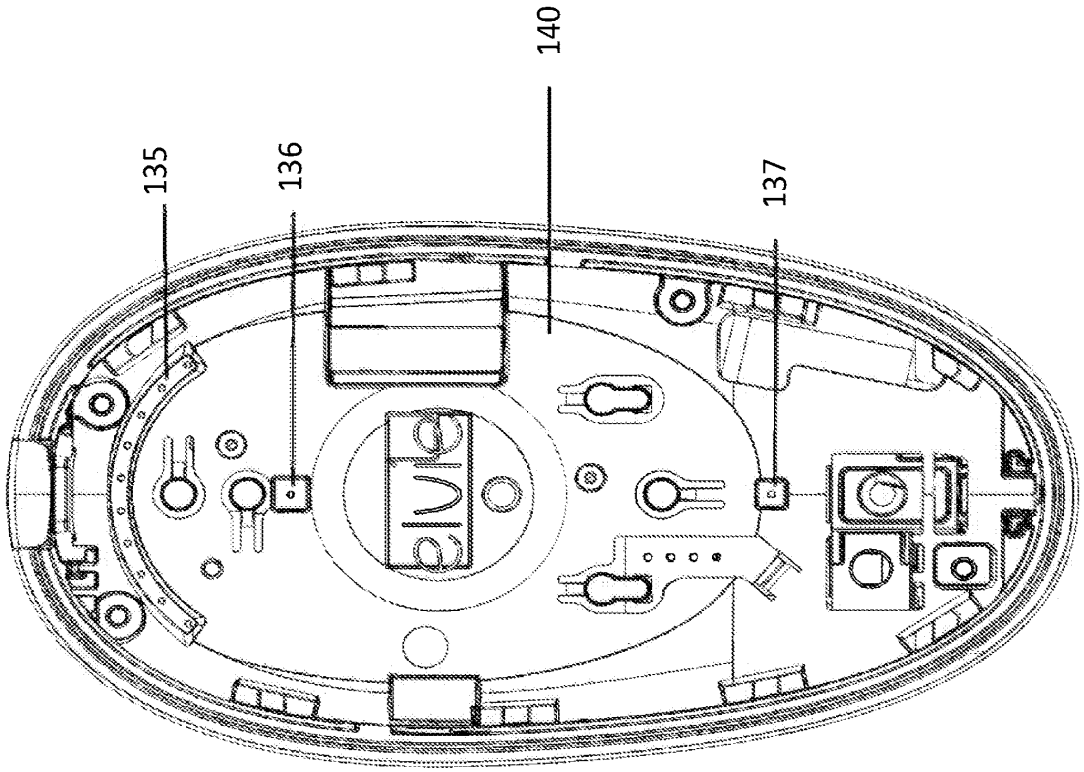


FIGURE 17

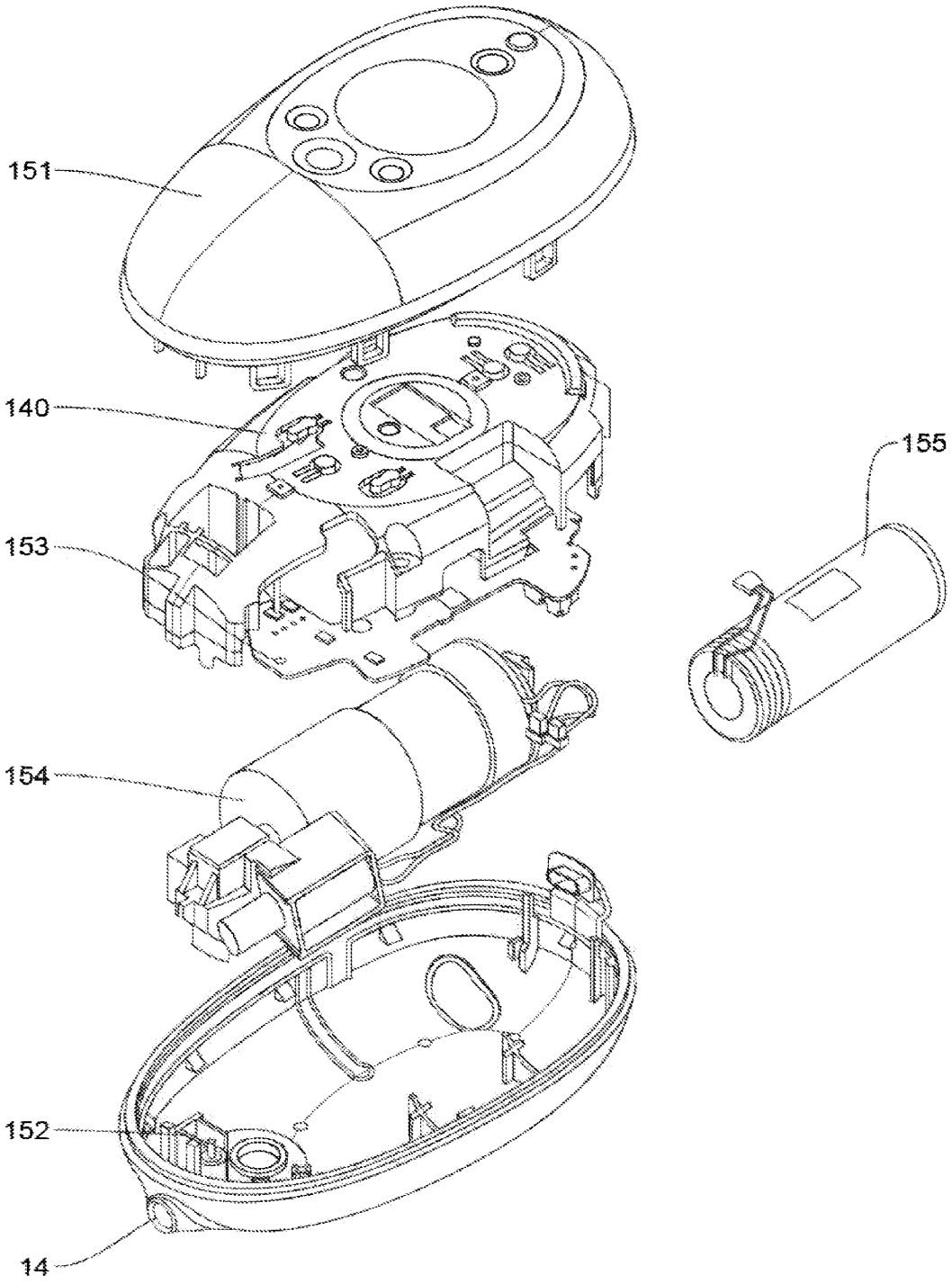


FIGURE 18

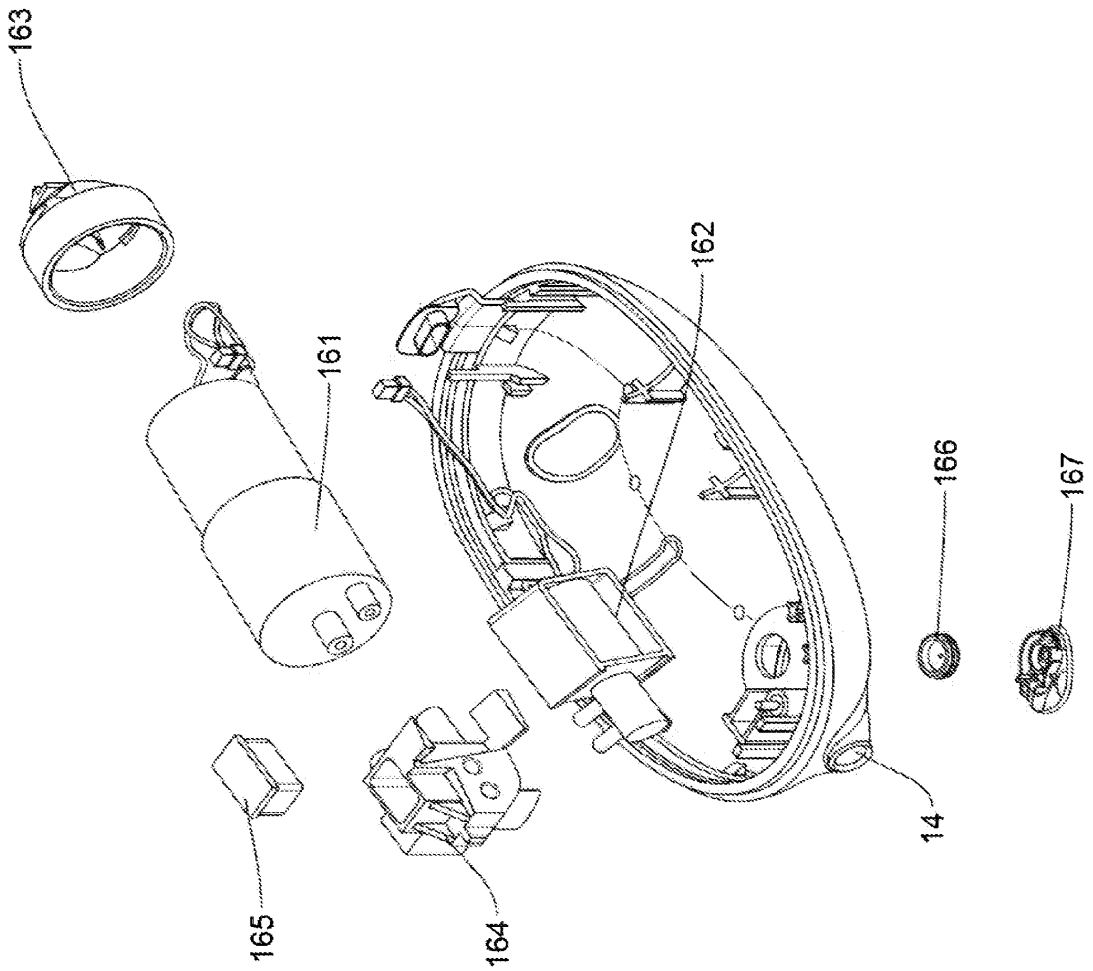


FIGURE 19

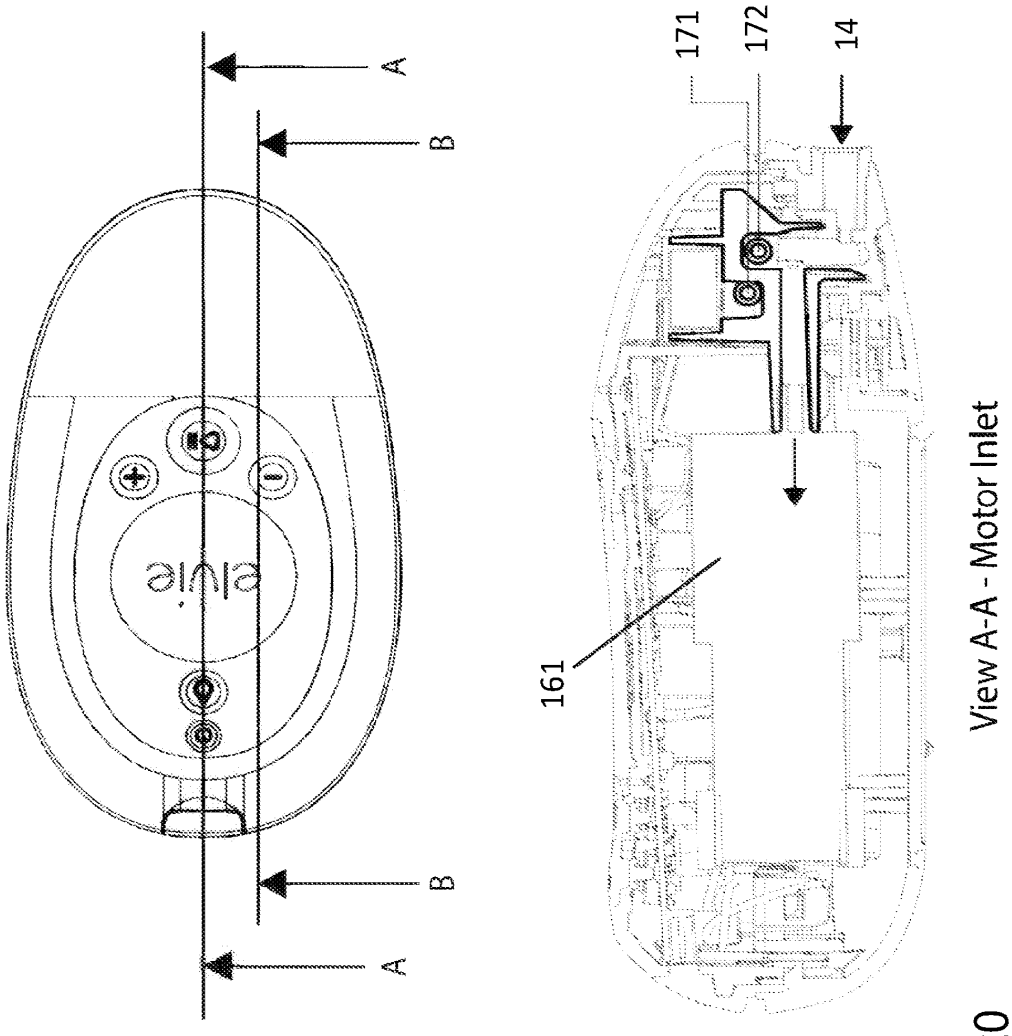
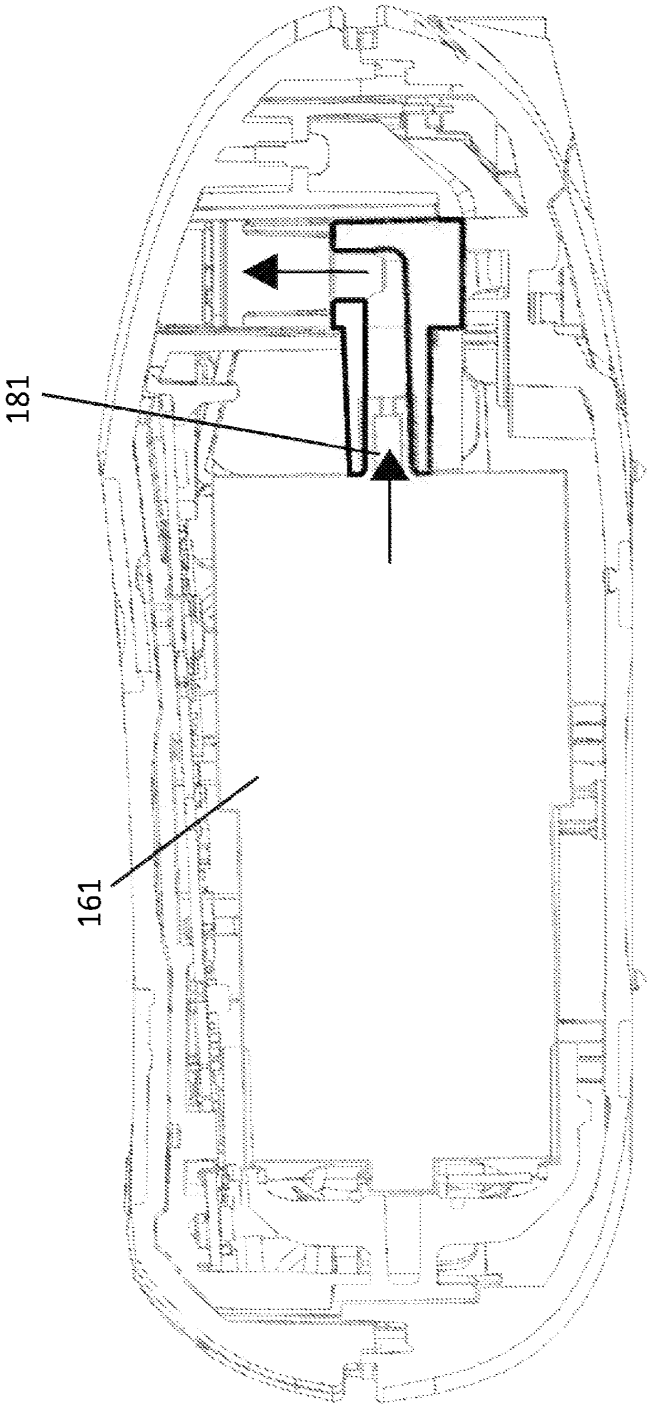


FIGURE 20



View B-B - Motor exhaust

FIGURE 21

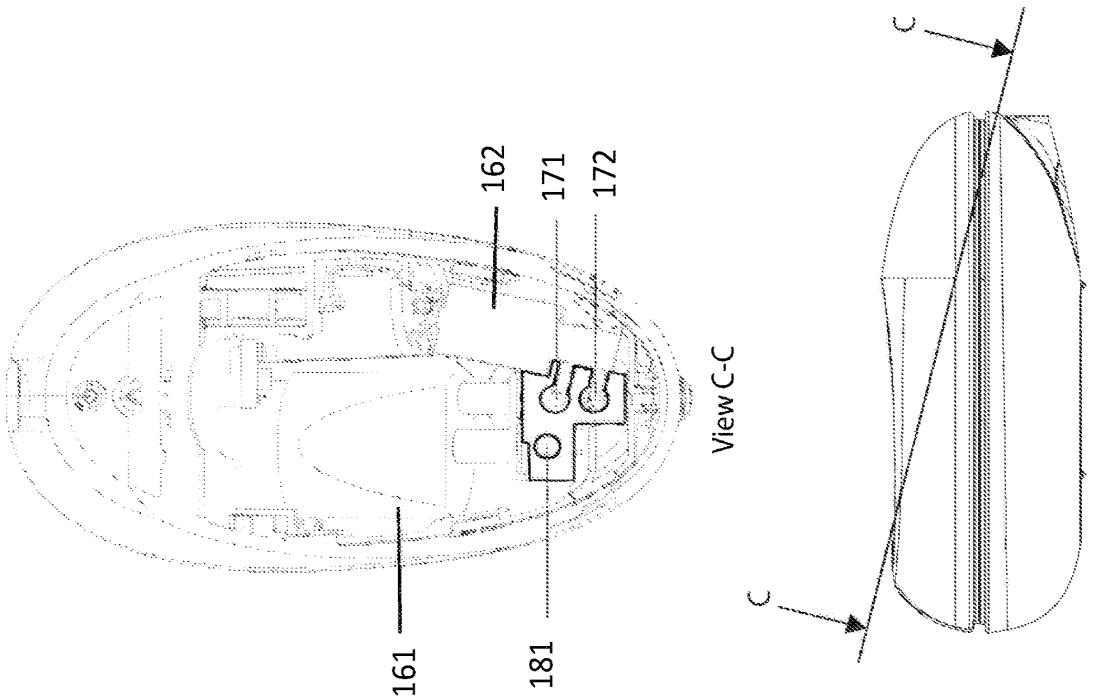


FIGURE 22

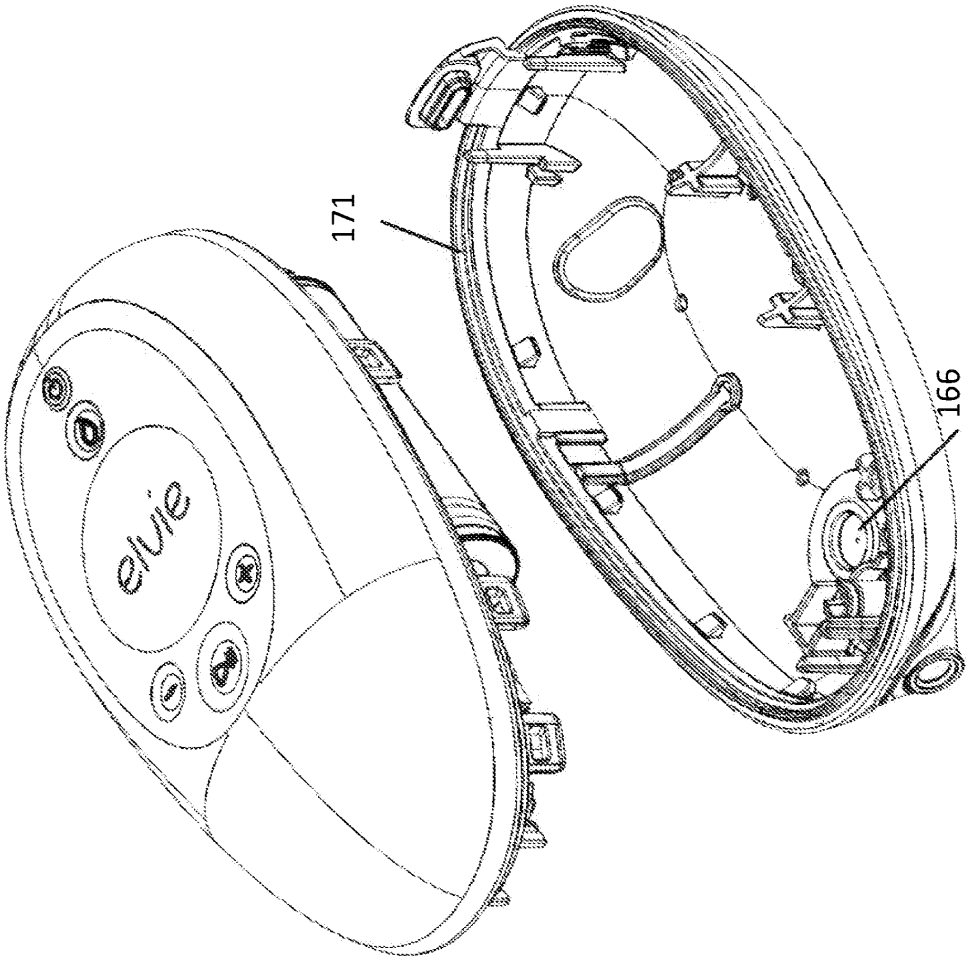


FIGURE 23

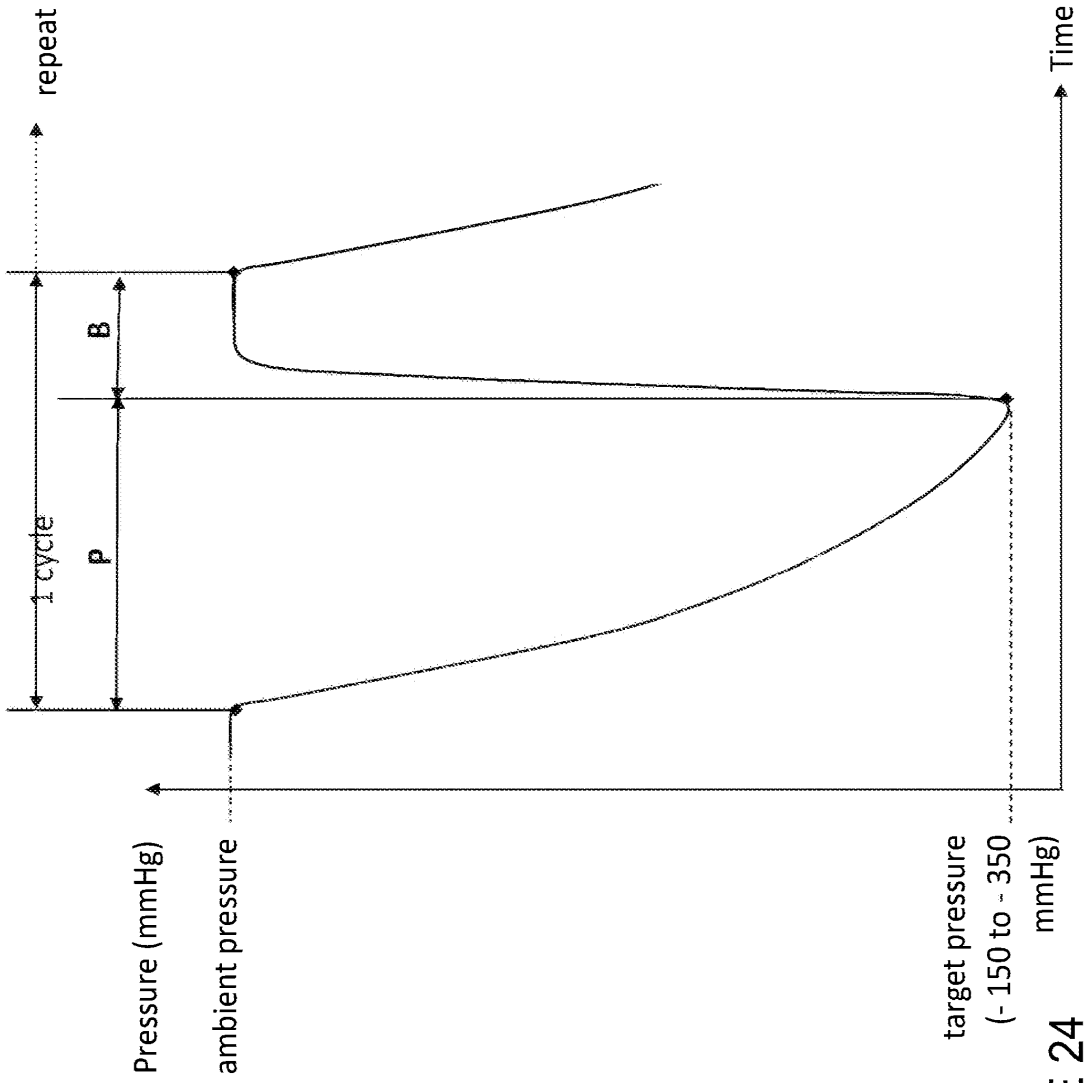

repeat
Time
B
P
1 cycle
Pressure (mmHg)
ambient pressure
target pressure
(- 150 to - 350
mmHg)

FIGURE 24

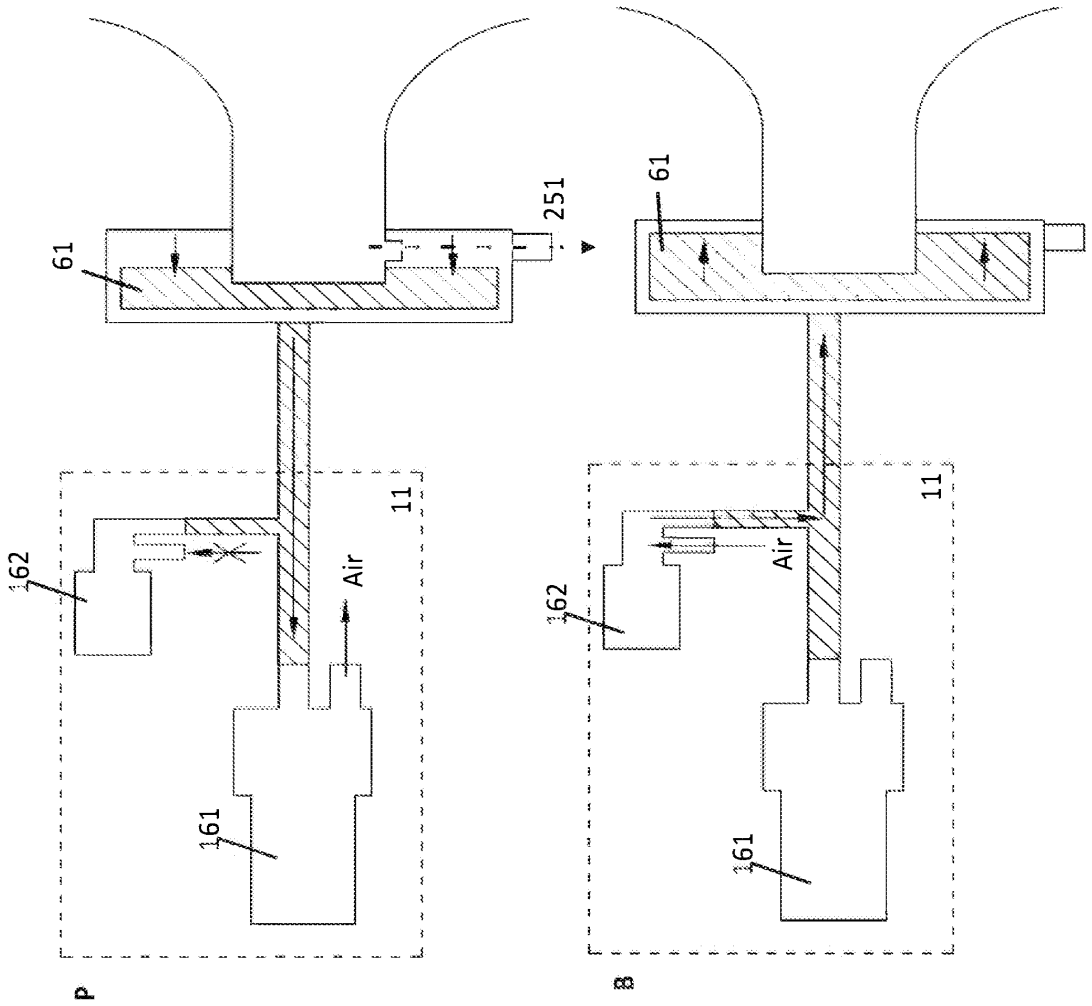


FIGURE 25

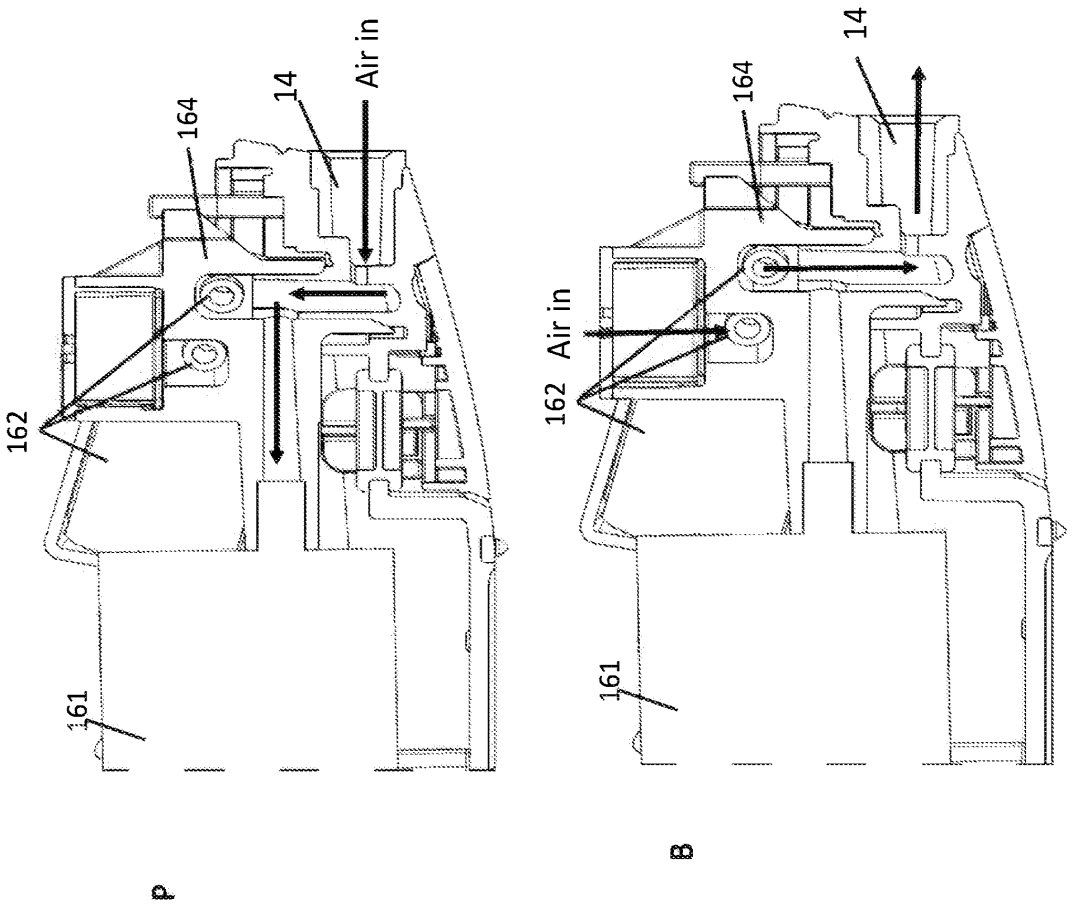


FIGURE 26

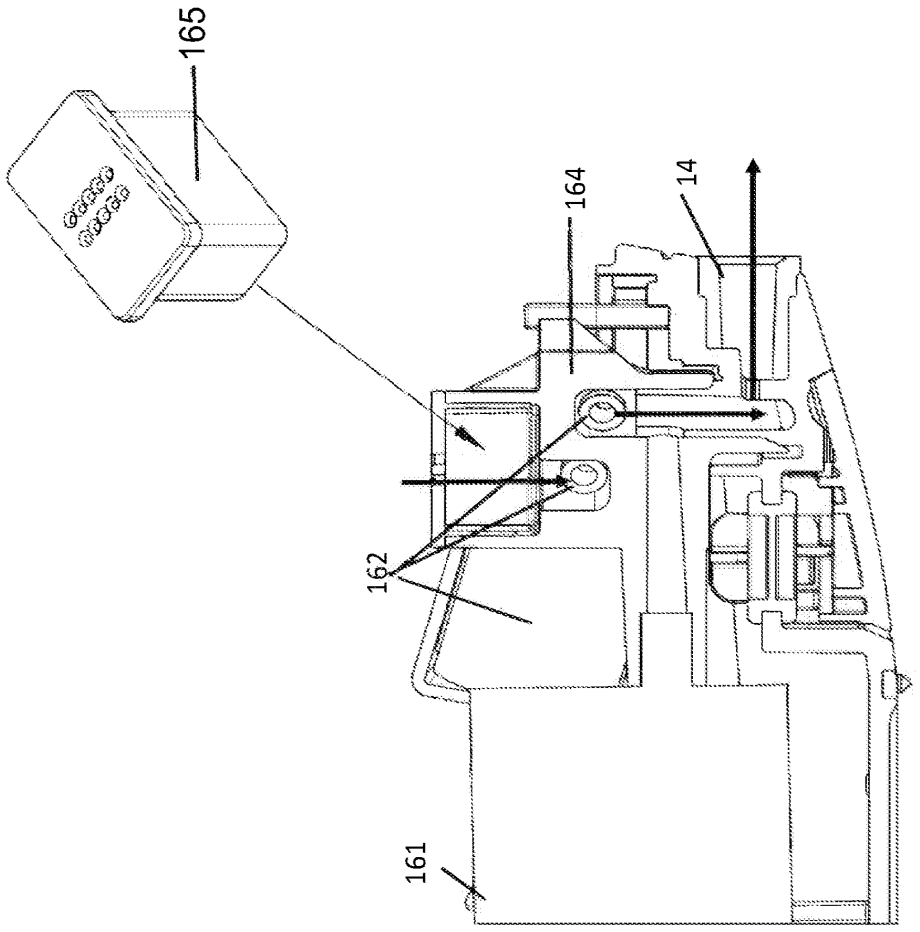


FIGURE 27

	Lima Single Profile	Lima Double Profile	Power Motor
STIMULATION			
Level 1	-60	-35	45%
Level 2	-85	-55	50%
Level 3	-105	-65	50%
Level 4	-115	-70	55%
Level 5	-135	-85	60%
Level 6	-170	-110	65%
Level 7	-190	-125	65%
Level 8	-210	-140	70%
level 9	-230	-155	70%
level 10	-250	-170	70%
EXPRESSION			
Level 1	-60	-35	45%
Level 2	-90	-55	50%
Level 3	-130	-80	60%
Level 4	-170	-110	65%
Level 5	-200	-130	65%
Level 6	-240	-160	70%
Level 7	-275	-190	73%
Level 8	-310	-220	75%
level 9	-340	-260	80%
level 10	-365/350	-300	80%

FIGURE 28

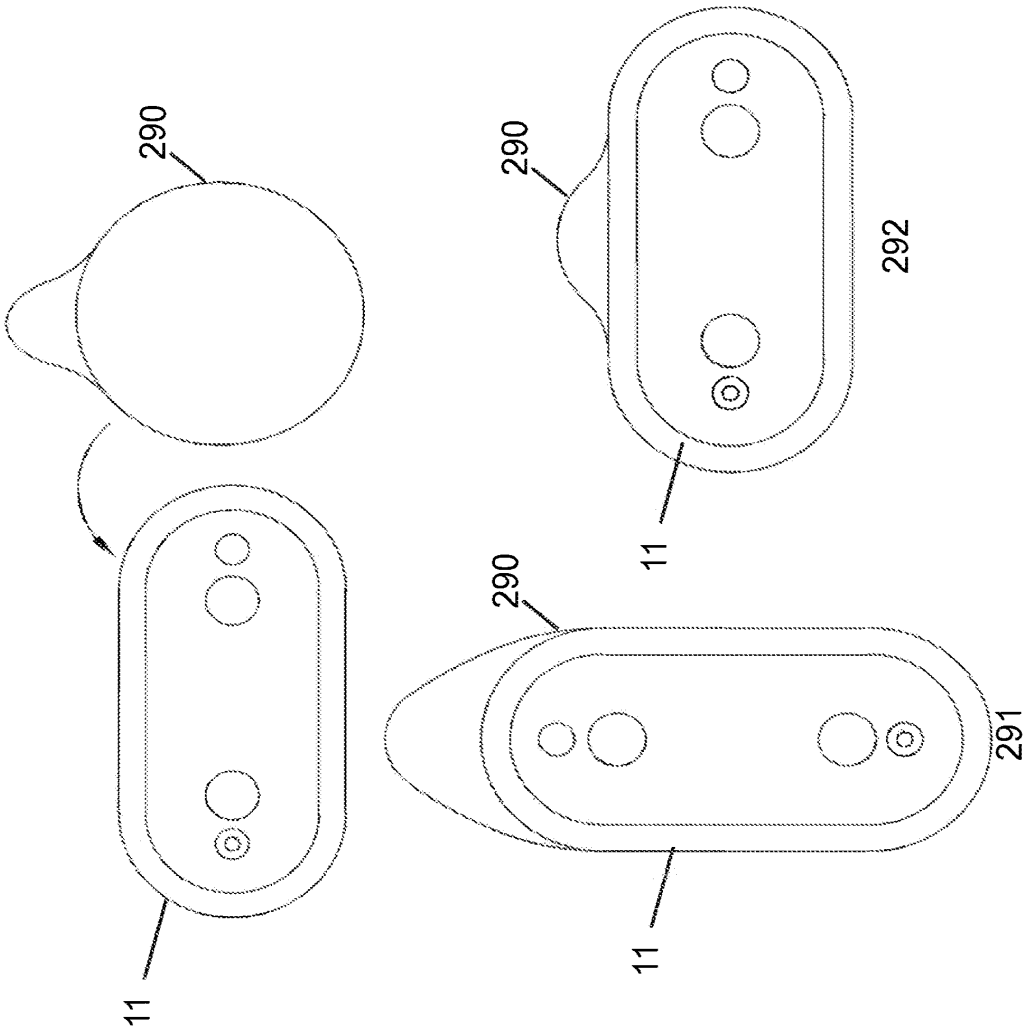


FIGURE 29

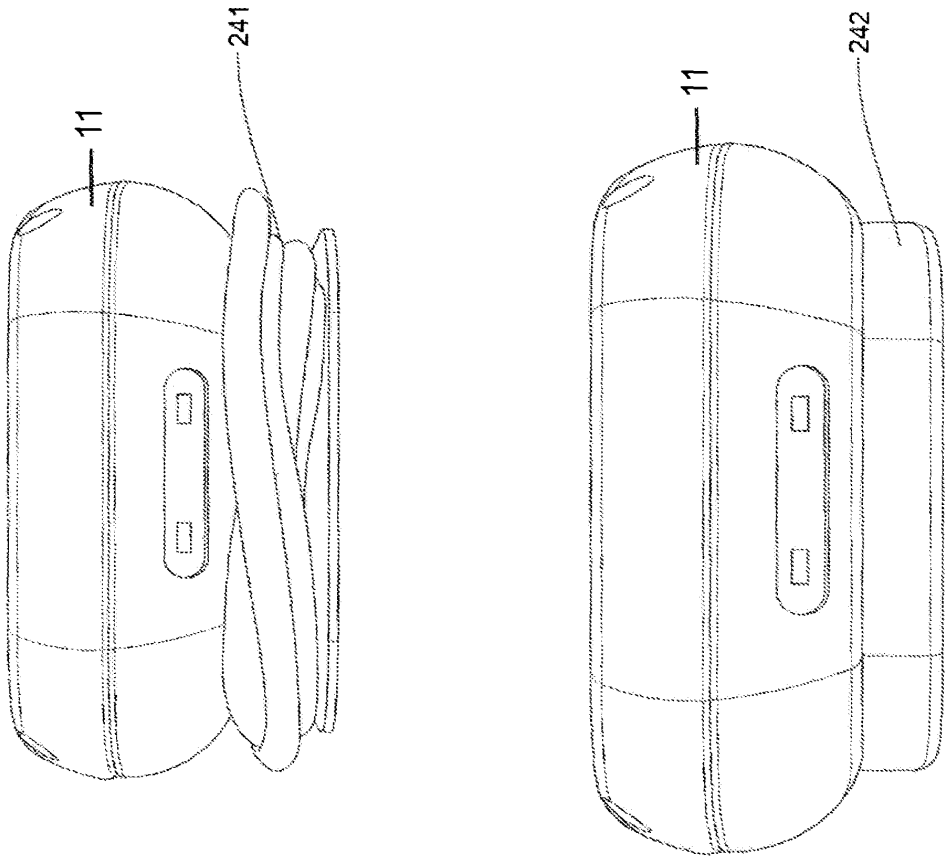


FIGURE 30

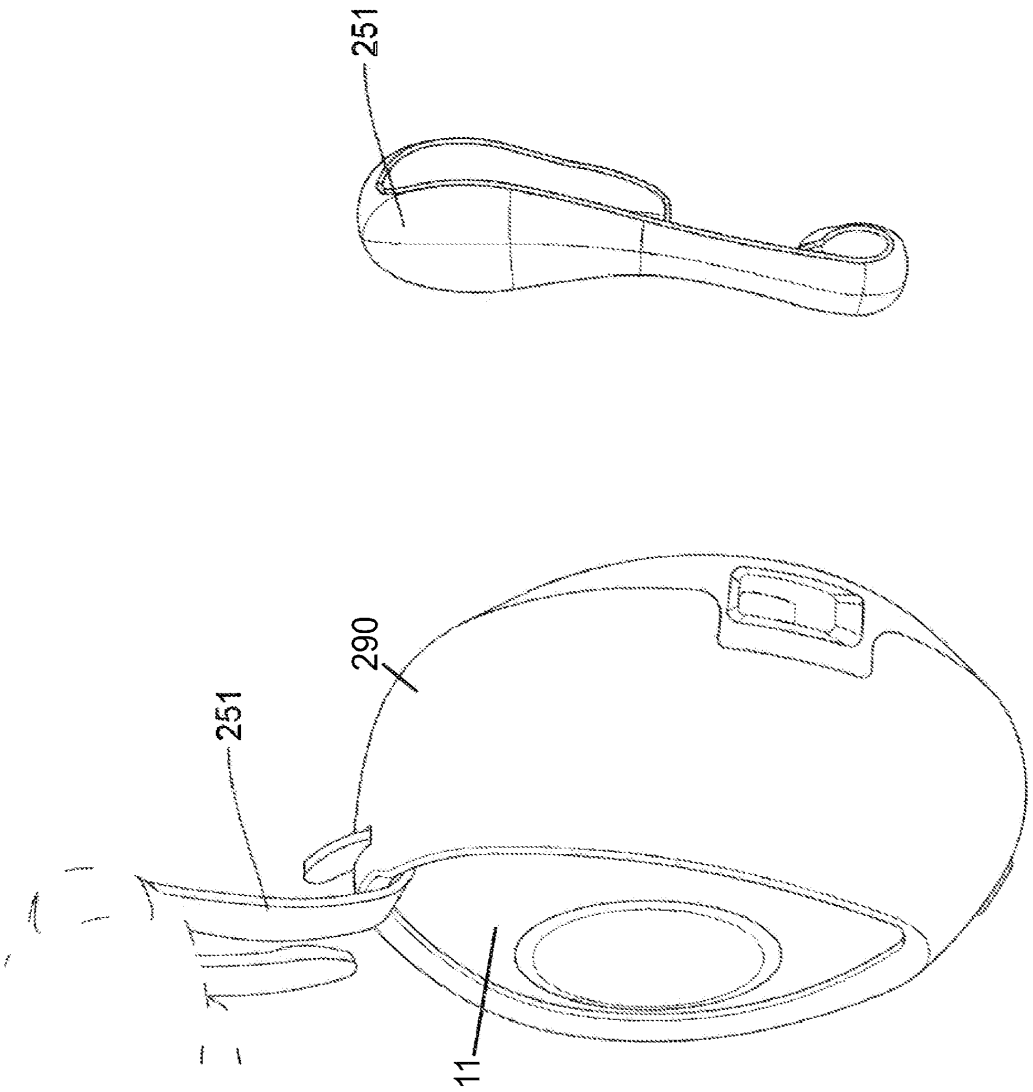


FIGURE 31

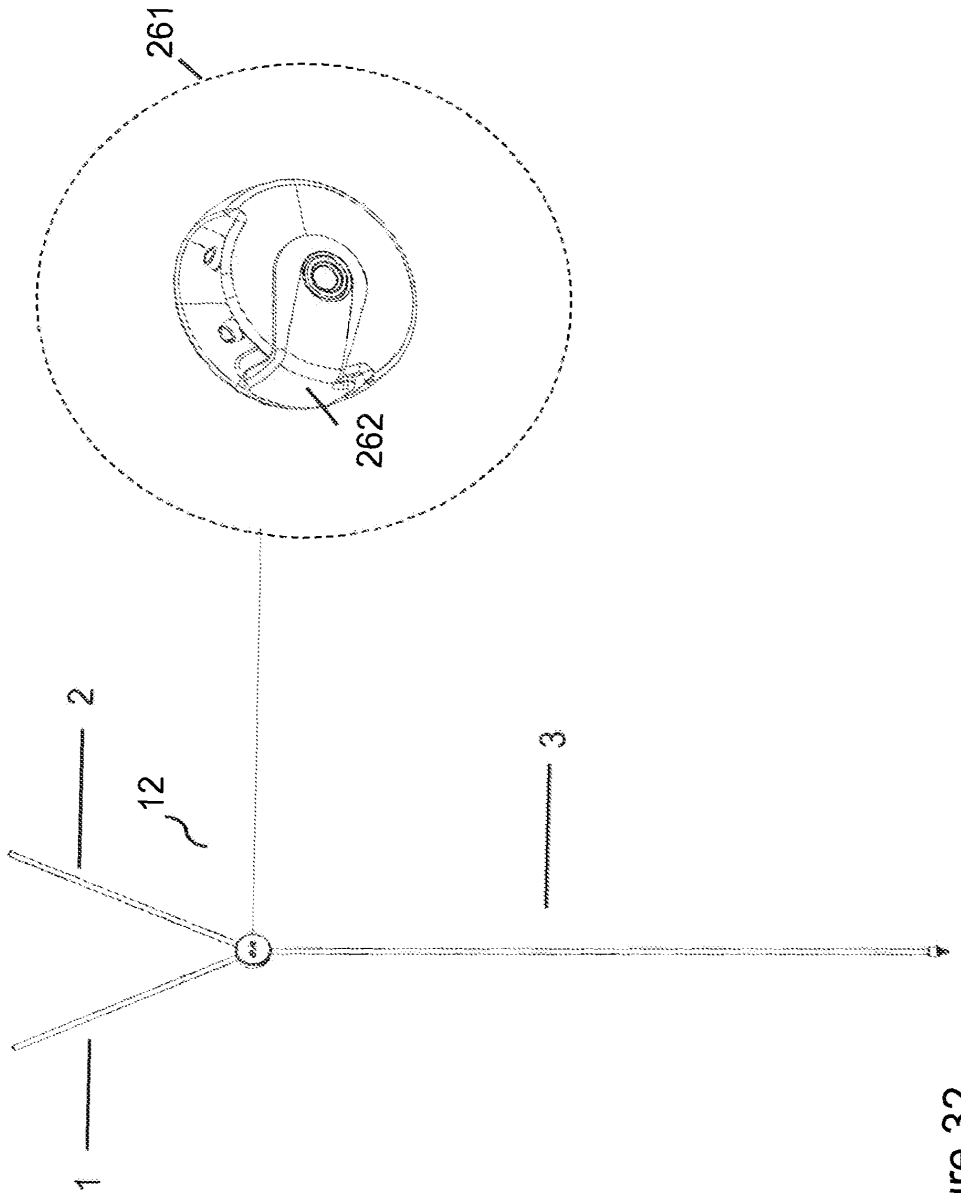


Figure 32

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Thibault		DE BECDELIEVRE	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	London	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden
City	London
State/Province	
Postal Code	EC1N 8LE
Country [i]	GB

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Oliver		BLANCHARD	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	London	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden
City	London
State/Province	
Postal Code	EC1N 8LE
Country [i]	GB

Inventor 3 Remove

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Georgia		THOMAS	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Bristol	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited		
Address 2	63-66 Hatton Garden		
City	London	State/Province	
Postal Code	EC1N 8LE	Country [i]	GB

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Daniel	John	THOMPSON	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Bristol	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited		
Address 2	63-66 Hatton Garden		
City	London	State/Province	
Postal Code	EC1N 8LE	Country [i]	GB

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Adam		ROLLO	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	London	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited		
Address 2	63-66 Hatton Garden		
City	London	State/Province	
Postal Code	EC1N 8LE	Country [i]	GB

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Inventor 6 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Paul		REID	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Bristol	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden

City	London	State/Province	
Postal Code	EC1N 8LE	**Country** [i]	GB

Inventor 7 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jonathan		O'TOOLE	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Bristol	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden

City	London	State/Province	
Postal Code	EC1N 8LE	**Country** [i]	GB

Inventor 8 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jack		BILTCLIFFE	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	London	Country of Residence [i]	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

City	London	State/Province	
Postal Code	EC1N 8LE	Country i	GB

Inventor 9 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Clare		LARKSPUR	

Residence Information (Select One) — US Residency — (•) Non US Residency — Active US Military Service

City	Bristol	Country of Residence i	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden

City	London	State/Province	
Postal Code	EC1N 8LE	Country i	GB

Inventor 10 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Claudia		BRUEN	

Residence Information (Select One) — US Residency — (•) Non US Residency — Active US Military Service

City	London	Country of Residence i	GB

Mailing Address of Inventor:

Address 1	c/o Chiaro Technology Limited
Address 2	63-66 Hatton Garden

City	London	State/Province	
Postal Code	EC1N 8LE	Country i	GB

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. — Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	26111		
Email Address		Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Application Information:

Title of the Invention	WEARABLE BREAST PUMP SYSTEM		
Attorney Docket Number	4944.0360002	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	34	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	26111		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	17/907347	2022-09-26
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
17/907347	a 371 of international	PCT/GB2021/050764	2021-03-26

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
2004395.6	GB	2020-03-26	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Chiaro Technology Limited		
Mailing Address Information For Applicant:			
Address 1	63-66 Hatton Garden		
Address 2			
City	London	**State/Province**	
Country	GB	Postal Code	EC1N 8LE
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. — Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Approved for use through 11/30/2020. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Anupma Sahay #78,704/			Date (YYYY-MM-DD)	2022-12-30
First Name	Anupma	Last Name	Sahay	Registration Number	78,704

Additional Signature may be generated within this form by selecting the Add button. Add

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4944.0360002
	Application Number	
Title of Invention	WEARABLE BREAST PUMP SYSTEM	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**12/30/2022 04:42:11 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	61372542	FILING DATE	-
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Anupma Sahay

Documents

TOTAL DOCUMENTS: 10

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2022-12-30-ADS-4944-0360002.PDF	11	Application Data Sheet	1227 KB
2022-12-30-Request-TrackOne-4944-0360002.pdf	2	Track One Request	142 KB
2022-12-30-EOT-Authorization-4944-0360002.pdf	1	Authorization for Extension of Time all replies	108 KB
2022-12-30-POA-82A-4944-0360002.PDF	1	Power of Attorney	307 KB
2022-12-30-POA-82B-4944-	1	Power of Attorney	199 KB

0360002.pdf				
2022-12-30-Utility-Application-4944-0360002.PDF		46	-	332 KB
2022-12-30-Utility-Application-4944-0360002-SPEC.pdf	(1-41)	41	Specification	292 KB
2022-12-30-Utility-Application-4944-0360002-CLM.pdf	(42-45)	4	Claims	17 KB
2022-12-30-Utility-Application-4944-0360002-ABST.pdf	(46-46)	1	Abstract	3 KB
2022-12-30-Drawings-4944-0360002.PDF		34	Drawings-only black and white line drawings	1555 KB
2022-12-30-Utility-Transmittal-4944-0360002.PDF		1	Transmittal of New Application	302 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2022-12-30-ADS-4944-0360002.PDF	6CD9CA1C38E06982E8AC16BEC8C8075EC4B348558BD22697F7D072F1A846512745A604211BB82201ADE53EFADBF057F3EA4906651681 4B918936D2CA5812FE9C
2022-12-30-Request-TrackOne-4944-0360002.pdf	79418EE7CC8E735D04442AB5B6FC63F63892D4E8282C8C140E201296C514BF5EA67146EB80B067E7BA4EF208A07B76D2A42B37F229ACCF507DE57C53F90ECF7A
2022-12-30-EOT-Authorization-	2C10B83D3BF0B801B3721D902620636FFB27A878C7EB33181E

4944-0360002.pdf	08567C991D86C69CAEF1EC01D56A67ABDAD8558D198FDD178C5FAF8A87B44834F2F4D64895721F
2022-12-30-POA-82A-4944-0360002.PDF	232578DFCF342B81F5E27E06C1F82386F8F286CE70B005ED5824103A5299CAF81A280445F22A2C891C45D6701D99E76BB4A635E48333DDA66106041625F5D6A8
2022-12-30-POA-82B-4944-0360002.pdf	C80B8684B298A292F1C00E9B0E15D5EF128FB3148957E43FE392484EC60DB22AF0FA6B55EFD828DC4FF643E4B823BE3AE4AD30FB8684062EABBD1E8C40EB9CF8
2022-12-30-Utility-Application-4944-0360002.PDF	58D4C53B0A75D96E330946CDEE74EA4F50CDF62CFA34425B5A0EE08BB76BC5A904F006C4B0401A694EDB7B04C2090E085B0DF0340BA249455B1DAE1602923C57
2022-12-30-Utility-Application-4944-0360002-SPEC.pdf	E23E81DC6616A7D474C05A1CE600AC310D718718FEB4051C3F4DE3C421AEF12518FC6439574DEFE475DDA60483A2E9DB18A9DDA40043866C2764C5DC56535FB6
2022-12-30-Utility-Application-4944-0360002-CLM.pdf	60827CF334959C1EBAD74B20E63CDAB0E6CCB906544B923F2D5C2A57B4461A4C3F796588F315CB93FF39B2096F994415B6A818738E63E436F298B31584BA9E96
2022-12-30-Utility-Application-4944-0360002-ABST.pdf	EEF2747CF3AECBB8E7DC80C647CB0C08519B54B90323107C517CACBBAA6D557A462B630EC2DFC8E5C62DDB5E58350B5895721059834C0F7CEF45887F8B6869FE
2022-12-30-Drawings-4944-0360002.PDF	B44ED59A3C3B4313C477062E6797B4D13846889620EBD2207DF4E74AAC2A97C9F53D99E60063C31CB0D1602DC68E68143A0B4CFD386006DDEB8960FAC61C6618
2022-12-30-Utility-Transmittal-4944-0360002.PDF	DCD7EBF2C85A626FC0139E19835D395083ACE7D0AC90851A419CFFCA80C66F69714BB1B0CE4837D7C4E0E89624C686C51FA31FEF6C2721BF93C646DCAB636F34

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d)

and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

26111

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

CHIARO TECHNOLOGY LIMITED

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	/Hannah Brunskill/	Date (Optional)	8 December 2021
Name	Hannah Brunskill		
Title	Head of Legal		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 11

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	2849881-A	09-02-1958	ANDERSON; Wilmer C.	
	US2	4390024-A	06-28-1983	WILLIAMS; Marguerite R.	
	US3	4535627-A	08-20-1985	PROST et al.	
	US4	5406063-A	04-11-1995	Jelen	
	US5	5474683-A	12-12-1995	BRYANT et al.	
	US6	5542921-A	08-06-1996	MEYERS et al.	
	US7	5941847-A	08-24-1999	HUBER et al.	
	US8	5973770-A	10-26-1999	CARTER et al.	
	US9	6045529-A	04-04-2000	NUESCH; Hansueli	
	US10	6090065-A	07-18-2000	GILES; John P.	
	US11	6227936-B1	05-08-2001	MENDOZA; Amelia	
	US12	6328709-B1	12-11-2001	HUNG et al.	
	US13	6358226-B1	03-19-2002	RYAN; Audrey M.	
	US14	6383163-B1	05-07-2002	KELLY et al.	
	US15	6440100-B1	08-27-2002	PRENTISS; John Gilbert et al.	
	US16	6461324-B1	10-08-2002	SCHLENSOG; Klaus	
	US17	2002/0193731-A1	12-19-2002	MYERS; Kenneth E. et al.	
	US18	6547756-B1	04-15-2003	GRETER et al.	
	US19	6579258-B1	06-17-2003	ATKIN et al.	
	US20	6663587-B2	12-16-2003	SILVER et al.	
	US21	2004/0056641-A1	03-25-2004	MYERS; Kenneth et al.	
	US22	2004/0074281-A1	04-22-2004	LOBDELL; Donn D. et al.	
	US23	2004/0087898-A1	05-06-2004	WENIGER; Gotthilf	
	US24	6749582-B2	06-15-2004	BRITTO et al.	
	US25	2004/0127845-A1	07-01-2004	RENZ; Charles J. et al.	
	US26	2004/0267215-A1	12-30-2004	CHARLEZ; Jarl et al.	
	US27	2005/0219302-A1	10-06-2005	VOGELEY; James	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 11

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US28	2005/0245860-A1	11-03-2005	Britto et al.	
	US29	7048519-B2	05-23-2006	FONG et al.	
	US30	2006/0122575-A1	06-08-2006	WAKABAYASHI; Akio	
	US31	2007/0051172-A1	03-08-2007	PERINET; Jean-Francois et al.	
	US32	2007/0051727-A1	03-08-2007	HOLLEY, Jr.; James W.	
	US33	7201735-B2	04-10-2007	ATKIN et al.	
	US34	2007/0135761-A1	06-14-2007	CHENG; Kai-Sheng et al.	
	US35	2007/0179439-A1	08-02-2007	VOGELIN; Stefan et al.	
	US36	D548831-S	08-14-2007	CHARLEZ; Jarl	
	US37	2007/0219486-A1	09-20-2007	MYERS; Kenneth E. et al.	
	US38	2007/0228059-A1	10-04-2007	KARSAN; Chettan	
	US39	2007/0236584-A1	10-11-2007	Frost-Ruebling et al.	
	US40	7312554-B2	12-25-2007	VOGELEY; James	
	US41	7314400-B2	01-01-2008	FILDAN et al.	
	US42	2008/0177224-A1	07-24-2008	KELLY; Patricia A. et al.	
	US43	2008/0262420-A1	10-23-2008	DAO; Stella et al.	
	US44	2008/0275386-A1	11-06-2008	MYERS; Kenneth E.	
	US45	2009/0281482-A1	11-12-2009	BAKER; Peter Christensen et al.	
	US46	2009/0281485-A1	11-12-2009	BAKER; Peter Christensen et al.	
	US47	7641629-B2	01-05-2010	YUEN; Yat Keung William	
	US48	7662018-A1	02-16-2010	THOMPSON PAMELA J, et al	
	US49	7666162-B2	02-23-2010	RENZ et al.	
	US50	7776008-B2	08-17-2010	RENZ et al.	
	US51	7833190-B1	11-16-2010	HALL; Petisamaria	
	US52	2010/0292636-A1	11-18-2010	RENZ; Charles J. et al.	
	US53	2011/0004154-A1	01-06-2011	VAN SCHIJNDEL; Nicolle Hanneke et al.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

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Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US54	2011/0009824-A1	01-13-2011	YODFAT; Ofer et al.	
	US55	2011/0196291-A1	08-11-2011	VISCHER; Peter et al.	
	US56	2011/0274566-A1	11-10-2011	AMIROUCHE; Farid et al.	
	US57	8057425-B1	11-15-2011	MYERS et al.	
	US58	2012/0021068-A1	01-26-2012	BARNESS; Itzhak et al.	
	US59	2012/0035951-A1	02-09-2012	GOETZ; Steven M. et al.	
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	US61	2012/0043065-A1	02-23-2012	RANNE; Pasi et al.	
	US62	2012/0072117-A1	03-22-2012	LODDOCH; Alexander et al.	
	US63	2012/0072118-A1	03-22-2012	MANN; Tobias	
	US64	2012/0095599-A1	04-19-2012	PAK; H. Ali et al.	
	US65	2012/0109083-A1	05-03-2012	Coulthard et al.	
	US66	8187227-B2	05-29-2012	LUZBETAK et al.	
	US67	2012/0143879-A1	06-07-2012	STOITSEV; Todor	
	US68	2012/0165729-A1	06-28-2012	CUDWORTH; Nicholas	
	US69	2012/0220753-A1	08-30-2012	GERA; Lajos et al.	
	US70	8262606-B2	09-11-2012	GRETER et al.	
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	US72	2012/0277636-A1	11-01-2012	BLONDHEIM; David Simeon et al.	
	US73	2013/0023821-A1	01-24-2013	KHALIL; Gamal et al.	
	US74	8376986-B2	02-19-2013	VAN; Schijndel et al.	
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	US82	2014/0275857-A1	09-18-2014	TOTH; Landy et al.	
	US83	2014/0288466-A1	09-25-2014	ALVAREZ; Jeffery B. et al.	
	US84	2014/0323962-A1	10-30-2014	KOOIJKER; Klaas et al.	
	US85	8876760-B2	11-04-2014	BOSMAN et al.	
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	US88	9033913-B2	05-19-2015	KHALIL et al.	
	US89	2015/0212036-A1	07-30-2015	JIN; Jian et al.	
	US90	2015/0212037-A1	07-30-2015	OKAZAKI; Satoshi et al.	
	US91	2015/0217036-A1	08-06-2015	POLLEN; Ashia M. et al.	
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	US93	2015/0283311-A1	10-08-2015	ALVAREZ; Jeffery B. et al.	
	US94	9173587-B2	11-03-2015	VAN; Schijndel et al.	
	US95	2016/0000980-A1	01-07-2016	ALVAREZ; Jeffery B. et al.	
	US96	2016/0058928-A1	03-03-2016	NOWROOZI; Bryan Neema et al.	
	US97	2016/0058929-A1	03-03-2016	MEDVEDEV; Alexander et al.	
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	US102	2016/0151551-A1	06-02-2016	FELBER; Armin	
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	US140	10398816-B2	09-03-2019	CHANG et al.	
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	US143	10,864,306-B2	12-15-2020	Fujisaki	
	US144	10881766-B2	01-05-2021	O'TOOLE et al.	
	US145	2021/0030934-A1	02-04-2021	ZHANG; Shu Ting	
	US146	10926011-B2	02-23-2021	O'TOOLE; Jonathan et al.	
	US147	2021/0170080-A1	06-10-2021	O'TOOLE; Jonathan et al.	
	US148	2021/0196873-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US149	2021/0196874-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US150	2021/0196875-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US151	2021/0196876-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US152	2021/0205511-A1	07-08-2021	O'TOOLE; Jonathan et al.	
	US153	2021/0205513-A1	07-08-2021	O'TOOLE; Jonathan et al.	
	US154	2021/0205514-A1	07-08-2021	O'TOOLE; Jonathan et al.	
	US155	2021/0205515-A1	07-08-2021	O'TOOLE; Jonathan et al.	
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	US157	2021/0205517-A1	07-08-2021	O'TOOLE; Jonathan et al.	
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	FP2	EP-0503280-A2	09-16-1992	PIERBURG GMBH [DE]		X
	FP3	WO-9420158-A1	09-15-1994	DEKA PRODUCTS LP [US]		
	FP4	DE-19750620-A1	06-02-1999	SIEMENS AG [DE]		X
	FP5	JP H 11-178917 A	07-06-1999	Hirose Electric Co., Ltd.		X
	FP6	JP 2000-350527 A	12-19-2000	Pigeon Corp.		X
	FP7	WO 2004/108184 A2	12-16-2004	Playtex Products, Inc.		
	FP8	WO-2005079441-A2	09-01-2005	CHILDRENS HOSP MEDICAL CENTER [US], et al.		
	FP9	EP-1586340-A2	10-19-2005	SEA PROFIT HONG KONG LTD [HK]		
	FP10	WO-2005114113-A2	12-01-2005	ACCU GAUGE LTD [GB], et al.		
	FP11	WO-2005114116-A1	12-01-2005	LANE JOHN DENNIS [GB], et al.		
	FP12	WO-2005114113-A3	03-02-2006	ACCU GAUGE LTD [GB], et al.		
	FP13	JP-2007501673-A	02-01-2007	PLAYTEX PRODUCTS INC.		X
	FP14	GB-2435617-B	03-05-2008	PLAYTEX PRODUCTS INC [US]		
	FP15	EP-1430918-B1	05-14-2008	MEDELA HOLDING AG [CH]		
	FP16	RU-2344380-C1	01-20-2009	G OBRAZOVATEL NOE UCHREZHDENIE [RU]		X
	FP17	CN-101549180-A	10-07-2009	PIGEON CORP [JP]		X
	FP18	WO-2009134271-A1	11-05-2009	UTC POWER CORP [US], et al.		
	FP19	GB-2473022-B	12-14-2011	DREW LORNA [GB]		
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	FP26	GB-2499248-B	04-02-2014	MORANA ELIZABETH [GB]		
	FP27	WO 2014/160614 A1	10-02-2014	Naia Health, Inc.		
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	FP29	JP 2014-532498 A	12-08-2014	Smith & Nephew PLC		X
	FP30	EP-1404393-B1	12-24-2014	MEDELA HOLDING AG [CH]		
	FP31	WO-2015081459-A1	06-11-2015	CHEN JUNBO [CN]		X
	FP32	WO-2015116749-A1	08-06-2015	CORNING INC [US]		
	FP33	WO-2015120321-A1	08-13-2015	NAIA HEALTH INC [US]		
	FP34	WO-2015150225-A1	10-08-2015	KONINKL PHILIPS NV [NL]		
	FP35	WO-2015174330-A1	11-19-2015	MURATA MANUFACTURING CO [JP]		X
	FP36	WO-2016002606-A1	01-07-2016	MURATA MANUFACTURING CO [JP]		X
	FP37	WO-2016006494-A1	01-14-2016	MURATA MANUFACTURING CO [JP]		X
	FP38	WO-2016006496-A1	01-14-2016	MURATA MANUFACTURING CO [JP]		
	FP39	WO-2016007560-A1	01-14-2016	NAYA HEALTH INC [US]		
	FP40	WO 2016/006458 A1	01-14-2016	Murata Manufacturing Co., Ltd.		X
	FP41	JP-2016010524-A	01-21-2016	MURATA MANUFACTURING CO.		X
	FP42	WO-2016010524-A1	01-21-2016	HEWLETT PACKARD DEVELOPMENT CO [US]		
	FP43	WO-2016014469-A1	01-28-2016	EXPLORAMED NC7 LLC [US]		
	FP44	WO-2016014488-A1	01-28-2016	EXPLORAMED NC7 LLC [US]		
	FP45	CN-105288759-A	02-03-2016	UNIV SHANGHAI.		X
	FP46	WO-2016024558-A1	02-18-2016	MURATA MANUFACTURING CO [JP]		X
	FP47	WO 2016/025405 A1	02-18-2016	Barral et al.		
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	FP50	WO-2016104673-A1	06-30-2016	MURATA MANUFACTURING CO [JP]		X
	FP51	EP-2077868-B1	07-27-2016	MEDELA HOLDING AG [CH]		
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	FP57	JP-2017509379-A	04-06-2017	NAIA HEALTH INC.		X
	FP58	WO-2017061349-A1	04-13-2017	MURATA MANUFACTURING CO [JP]		X
	FP59	WO-2017108555-A1	06-29-2017	KONINKLIJKE PHILIPS NV [NL]		
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	FP61	WO-2016007561-A1	01-14-2016	Naya Health, Inc		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	To Be Assigned
				Examiner Name	To Be Assigned
Sheet	10	of	11	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS		
Examiner Initials*	Cite No.[1]	Include name of the author(in CAPITAL LETTERS),title of the article(when appropriate), title of the item (book,magazine,journal,serial,symposium,catalog,etc.),date,page(s),volume-issue number(s),publisher, city and/or country where published.
	NPL1	4MD Medical, "Assembling Spctra Breast Pump Parts," YouTube [online], dated November13, 2016, URL: http://www.youtube.com/watch?v=ChV8xQfcBxU.
	NPL2	Extended European Search Report issued in European Application No. 22174446.9, mailed October 11, 2022; 26 pages.
	NPL3	GB Search Report for , dated 29 November 2017, issued in priority GB Application No.GB1709564.7.
	NPL4	GB Search Report, dated 15 November 2017, issued in priority GB Application No.GB1709561.3.
	NPL5	GB Search Report, dated 28 November 2017, issued in priority GB Application No.GB1709566.2.
	NPL6	International Search Report issued in PCT/GB2018/051659 dated December 4, 2018, 9 pages.
	NPL7	Japanese Search Report issued in Japanese Application No. 2020-519188, mailed June 24, 2022, 20 pages.
	NPL8	The Best Hands-Free Breast Pumps, posted at healthline.com, earliest date posted on 08/24/2020, [online], acquired on 10/30/2021, Available on internet. url:https://www.healthline.com/health/parenting/breast-feeding/best-hands-free-breast-pumps#Best-hands-free-breast-pumps (Year: 2020).
	NPL9	Whisper Wear Hands-Free Breast Pump, Model:WWPMP01,UserGuide,pps.1-20 ,Distributed with product atleast as early as 2007 (seehttps://web.archive.org/web/20070621162539/http://www.whisperwear.com/pump_single.html).
	NPL10	International Search Report issued in International Application No. PCT/GB2021/050764, mailed July 6, 2021, 5 pages

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)				***Complete if Known***	
				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	To Be Assigned
				Examiner Name	To Be Assigned
Sheet	11	of	11	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Anupma Sahay #78,704/	Date (YYYY-MM-DD)	2023-01-03
Name/Print	Anupma Sahay	Registration Number	78,704

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

19580892.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: *7980*
Applicant: CHIARO TECHNOLOGY LIMITED	Art Unit: *To Be Assigned*
Application No.: 18/148,864	Examiner: *To Be Assigned*
Filed: *December 30, 2022*	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Information Disclosure Statement

Mail Stop Amendment

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

Listed on accompanying IDS Forms PTO/SB/08a or its equivalent and PTO/SB/08b or its equivalent are documents that may be considered material to the patentability of this application as defined in 37 C.F.R. §1.56, and in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.97 and 1.98.

Applicant has listed dates on the attached IDS Forms based on information presently available to the undersigned. However, the listed dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

This Information Disclosure Statement is being filed under 37 C.F.R. § 1.97(b)within three months of the date of filing of a national application other than a continued prosecution application

(CPA), OR within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application, OR before the mailing date of a first Office Action on the merits OR before the mailing of a first Office Action after the filing of a request for continued examination under 37 C.F.R. § 1.114. No statement or fee is required.

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), no copies of U.S. patents and patent application publications cited as documents US1-US161 on the attached IDS Forms are submitted.

Copies of documents **FP1-FP61** and **NPL1-NPL10** were cited by or submitted to the Office in an IDS that complies with 37 C.F.R. § 1.98(a)-(c) in Application No. 17/907,347, filed September 26, 2022 (now pending), which is relied upon for an earlier filing date under 35 U.S.C. § 120. Thus, copies of these documents are not attached. 37 C.F.R. § 1.98(d).

It is expected that the examiner will review the prosecution and cited art in the parent Application No. 17/907,347, filed September 26, 2022 (pending), in accordance with MPEP 2001.06(b), and indicate in the next communication from the office that the art cited in the earlier prosecution history has been reviewed in connection with the present application.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Forms, and indicate in the official file wrapper of this patent application that the documents have been considered.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Anupma Sahay #78,704/

Anupma Sahay
Attorney for Applicant
Registration No. 78,704

Date: January 3, 2023

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

19580898.1

Atty. Dkt. No. 4944.0360002

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please identify below):

Remarks

The Office may charge any fee deficiency for any submission made with this transmittal to Deposit Account No. 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Anupma Sahay #78,704/		
Printed name	Anupma Sahay		
Date	January 3, 2023	Reg. No.	78,704

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**01/03/2023 04:34:18 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Jon Baitlon
PATENT CENTER #	61380570	FILING DATE	-
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Anupma Sahay

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2023-01-03-Transmittal-Form-4944-0360002.pdf	1	Miscellaneous Incoming Letter	166 KB
2023-01-03-IDS-Pleading-4944-0360002.pdf	2	Transmittal Letter	121 KB
2023-01-03-IDS-SB08-4944-0360002.pdf	11	Information Disclosure Statement (IDS) Form (SB08)	261 KB

Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-01-03-Transmittal-Form-4944-0360002.pdf	C94CD7EE83E8B468C97917D187135075DFC013CCC300189500A61F97B8C87E9D71EFE73DFDB50D32DA58F116BF9B9D85475AC40BF80D3BF2E04DDCC18FF922AF
2023-01-03-IDS-Pleading-4944-0360002.pdf	98B262828420BB47A378A5C3212907CD30870080CD888725057D0F8D3CE725C8D9232376B8ABA5D94444DAAC318FC214E8BB7BB9DC1276A91D69CBAB7707C561
2023-01-03-IDS-SB08-4944-0360002.pdf	7D2F985F26C8F8B3E678AA6ACA20CC923F20A2B4D2E6999DB683E7E8D6802362C4C2303CB67F4CDF612E530829A645675DC3746A3BB07808DE6649A02C441296

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



United States Patent and Trademark Office

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Document Code:WFEE

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Sale Accounting Date:02/01/2023

Sale Item Reference Number	Effective Date
18148864	12/30/2022

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I202321A36590965	4011	UTILITY FILING FEE (ELECTRONIC FILING)	$64.00	Salea

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
18/148,864	12/30/2022		728	4944.0360002	20	3

CONFIRMATION NO. 7980

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

FILING RECEIPT

OC00000053331753

Date Mailed: 02/02/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Thibault DE BECDELIEVRE, London, UNITED KINGDOM;
Oliver BLANCHARD, London, UNITED KINGDOM;
Georgia THOMAS, Bristol, UNITED KINGDOM;
Daniel John THOMPSON, Bristol, UNITED KINGDOM;
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Jack BILTCLIFFE, London, UNITED KINGDOM;
Clare LARKSPUR, Bristol, UNITED KINGDOM;
Claudia BRUEN, London, UNITED KINGDOM;

Applicant(s)

Chiaro Technology Limited, London, UNITED KINGDOM;

Power of Attorney: The patent practitioners associated with Customer Number 26111

Domestic Priority data as claimed by applicant

This application is a CON of 17/907,347 09/26/2022
which is a 371 of PCT/GB21/50764 03/26/2021

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 2004395.6 03/26/2020 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/25/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/148,864**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers.

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

WEARABLE BREAST PUMP SYSTEM

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 18/148,864

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	64		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	280		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	320		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	* 0	x =	0	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x =	0			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	664		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002

CONFIRMATION NO. 7980

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

FORMALITIES LETTER

OC000000053331756

Date Mailed: 02/02/2023

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to the above-identified nonprovisional application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- **Drawing Items**

  The drawings submitted on 12/30/2022 are not acceptable because:
  - Figure(s) 20-22 contain portions that are missing or blurry, and therefore are not electronically reproducible. See 37 CFR 1.84(l). Replacement drawing sheets in compliance with 37 CFR 1.84 and 1.121(d) containing figures that are of sufficient quality to be electronically reproduced are required.

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this Notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

Items Required To Avoid Processing Delays:

The deficiencies indicated below should be addressed promptly to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):

  Thibault DE BECDELIEVRE
  Oliver BLANCHARD
  Georgia THOMAS
  Daniel John THOMPSON
  Adam ROLLO
  Paul REID
  Jonathan O'TOOLE
  Jack BILTCLIFFE
  Clare LARKSPUR
  Claudia BRUEN

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor must be submitted no later than the date on which the issue fee is paid in response to a notice requiring such fee. See 37 CFR 1.53(f).

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be addressed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

REPLY VIA ELECTRONIC FILING

A reply may be submitted via electronic filing only by registered users of the appropriate USPTO patent electronic filing system and must include:

- A separate document having the document description, "**Applicant response to Pre-Exam Formalities Notice**"; and
- the item(s) for which a reply period is set forth above.

For more information about electronic filing, contact the Patent Electronic Business Center (EBC) 1-866-217-9197 or visit https://www.uspto.gov/ebc

NOTE: If the reply is not being submitted electronically, a copy of this notice must be included.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/asahle/

DocCode - SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 18148864 Document Date: 02/08/2023

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: March 1, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: Chiaro Technology Limited	Art Unit: *To Be Assigned*
Application No.: 18/148,864	Examiner: *To Be Assigned*
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Reply to Notice to File Corrected Application Papers

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Mail Stop Amendment

Commissioner:

In reply to the Notice to File Corrected Application Papers dated February 2, 2023, Applicant submits the following Amendments and Remarks.

If extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims or forwarding to appeal) may be charged to Deposit Account No. 19-0036.

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	WEARABLE BREAST PUMP SYSTEM

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 17/907,347 filed on September 26, 2022.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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LEGAL NAME OF INVENTOR

Inventor: Thibault DE BECDELIEVRE Date (Optional): Oct 19, 2022

Signature: /Thibault de Becdelievre (Oct 19, 2022 11:57 GMT+1)/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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LEGAL NAME OF INVENTOR

Inventor: Oliver BLANCHARD Date (Optional): Dec 19, 2022

Signature: /Ollie Blanchard/ /

Ollie Blanchard (Dec 19, 2022 09:58 GMT)

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LEGAL NAME OF INVENTOR

Inventor: Georgia THOMAS Date (Optional): Dec 17, 2022

Signature: /Thomas/

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LEGAL NAME OF INVENTOR

Inventor: Daniel John THOMPSON Date (Optional): Jan 23, 2023

Signature: /Daniel Thompson/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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Attorney Docket No. 4944.0360001
PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Adam ROLLO Date (Optional): Oct 11, 2022

Signature: /Adam Rollo/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Paul REID Date (Optional): Dec 19, 2022

Signature: /Paul Reid/

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LEGAL NAME OF INVENTOR

Inventor: Jonathan O'TOOLE Date (Optional): Jan 24, 2023

Signature: /Jonathan O Toole/ /

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The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Jack BILTCLIFFE Date (Optional): Jan 23, 2023

Signature: /Jack Biltcliffe (Jan 23, 2023 13:39 GMT)/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/01 (06-12)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	WEARABLE BREAST PUMP SYSTEM

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 17/907,347 filed on September 26, 2022.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: Clare LARKSPUR Date (Optional): Oct 16, 2022

Signature: /Clare Larkspur (Oct 16, 2022 16:37 GMT-4)/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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LEGAL NAME OF INVENTOR

Inventor: Claudia BRUEN Date (Optional): Jan 23, 2023

Signature: /Claudia Bruen (Jan 23, 2023 13:52 GMT)/

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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22/34

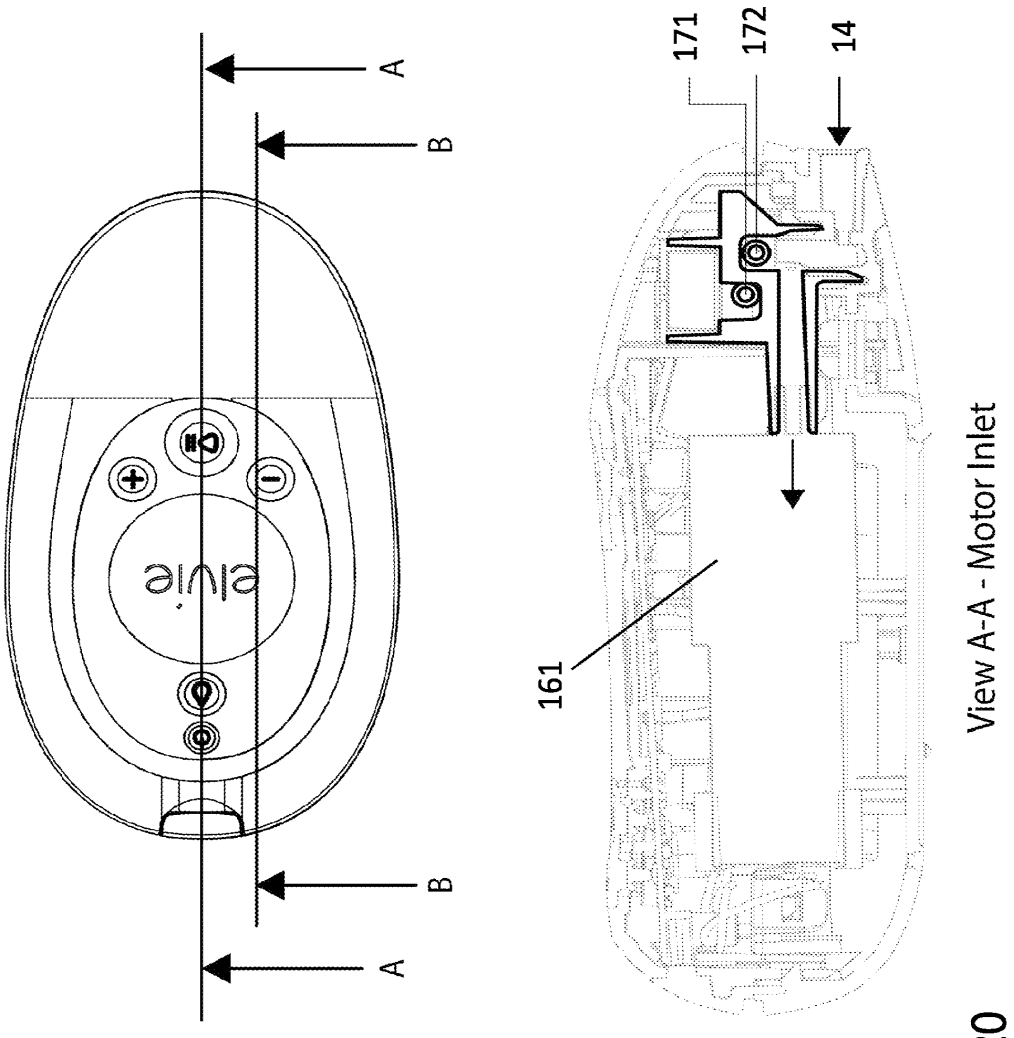
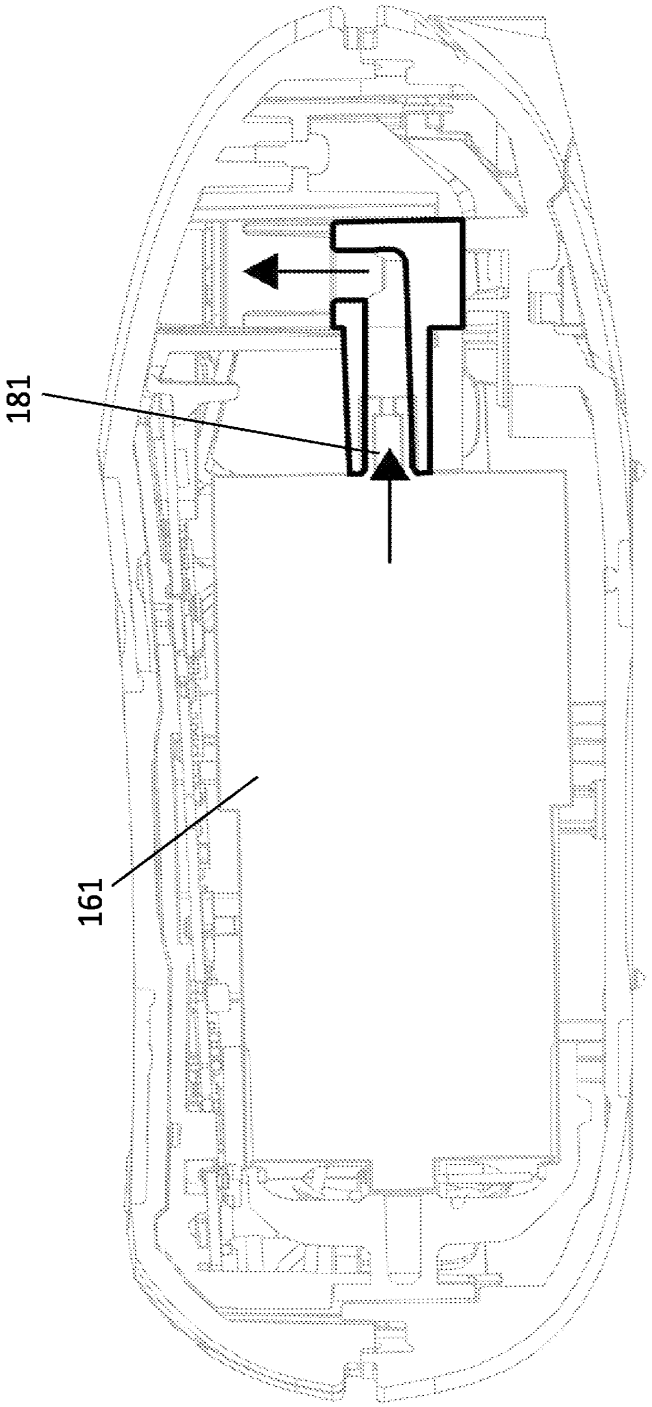


FIGURE 20



View B-B - Motor exhaust

FIGURE 21

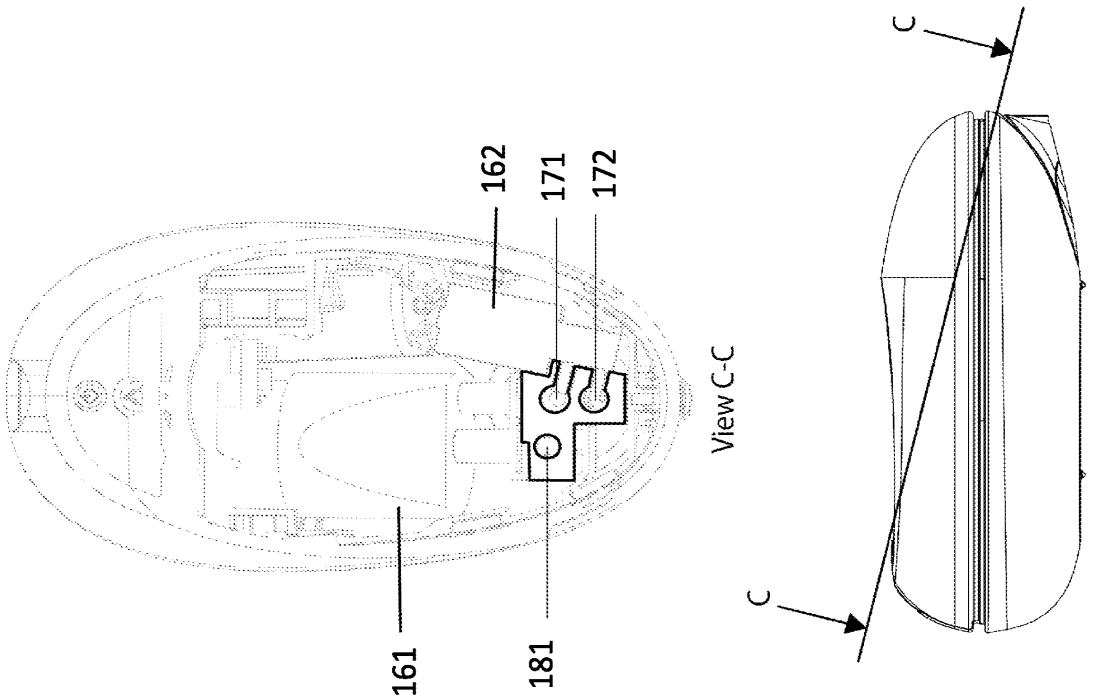


FIGURE 22

Electronic Acknowledgement Receipt	
EFS ID:	47503043
Application Number:	18148864
International Application Number:	
Confirmation Number:	7980
Title of Invention:	WEARABLE BREAST PUMP SYSTEM
First Named Inventor/Applicant Name:	Thibault DE BECDELIEVRE
Customer Number:	26111
Filer:	Yangbeini Wang/Renee Bennett
Filer Authorized By:	Yangbeini Wang
Attorney Docket Number:	4944.0360002
Receipt Date:	08-FEB-2023
Filing Date:	30-DEC-2022
Time Stamp:	17:07:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	2023-02-08-Transmittal-Form-4944-0360002.PDF	255203 b9dfe7a4dea1660fe44d256cc2df489f5d9a0ebe	no	1

Warnings:

Information:					
2		2023-02-08-Reply-Notice-Corrected-Papers-4944-0360002.pdf	137679 9ad09a77e514e4c5c80747de2bb2098809661f08	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Applicant Response to Pre-Exam Formalities Notice		1	1	
	Drawings-other than black and white line drawings		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	3	
Warnings:					
Information:					
3	Oath or Declaration filed	2023-02-08-Declarations-4944-0360002.PDF	785049 c7bd1bfc7cadfffa1f2248be099bdeb8b2150105	no	10
Warnings:					
Information:					
4	Drawings-only black and white line drawings	2023-02-08-Drawings-Replacement-4944-0360002.pdf	1110457 c5823e3d18c9b3da235a2d2eaa08ab3be35866ef	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	2288388		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	12/30/2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☑ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

  Reply to Notice to File Corrected Application Papers; Executed Declarations

Remarks

The Office may charge any fee deficiency for any submission made with this transmittal to Deposit Account No. 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Richard D. Coller III/		
Printed name	Richard D. Coller III		
Date	February 8, 2023	Reg. No.	60,390

CERTIFICATE OF TRANSMISSION/MAILING

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Signature			
Typed or printed name		Date	

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Amendments to the Drawings

Please replace FIGS. 20–22 with Replacement FIGS. 20–22, which are provided on the accompanying replacement sheets 1–3. No new matter is added.

Remarks

Replacement FIGS. 20–22 are submitted in higher resolution, thereby addresses the deficiencies identified in the Notice to File Corrected Application Papers dated February 2, 2023. No new matter is added.

Applicant respectfully requests that the Office reconsider and withdraw the objection to FIGS. 20–22.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Richard D. Coller III
Attorney for Applicant
Registration No. 60,390

Date: February 8, 2023

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

19753794.1

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
18/148,864	12/30/2022		728	4944.0360002	20	3

CONFIRMATION NO. 7980

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

UPDATED FILING RECEIPT

OC00000053750249

Date Mailed: 02/14/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Thibault DE BECDELIEVRE, London, UNITED KINGDOM;
Oliver BLANCHARD, London, UNITED KINGDOM;
Georgia THOMAS, Bristol, UNITED KINGDOM;
Daniel John THOMPSON, Bristol, UNITED KINGDOM;
Adam ROLLO, London, UNITED KINGDOM;
Paul REID, Bristol, UNITED KINGDOM;
Jonathan O'TOOLE, Bristol, UNITED KINGDOM;
Jack BILTCLIFFE, London, UNITED KINGDOM;
Clare LARKSPUR, Bristol, UNITED KINGDOM;
Claudia BRUEN, London, UNITED KINGDOM;

Applicant(s)

Chiaro Technology Limited, London, UNITED KINGDOM;

Power of Attorney: The patent practitioners associated with Customer Number 26111

Domestic Priority data as claimed by applicant

This application is a CON of 17/907,347 09/26/2022
which is a 371 of PCT/GB21/50764 03/26/2021

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 2004395.6 03/26/2020 No Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/25/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/148,864**

Projected Publication Date: 05/25/2023

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

WEARABLE BREAST PUMP SYSTEM

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 18/148,864

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	64		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	280		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	320		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	* 0	x =	0	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x =	0			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	664		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

Courtesy Reminder for
Application Serial No: 18/148,864

Attorney Docket No: 4944.0360002
Customer Number: 26111
Date of Electronic Notification: 02/02/2023

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
e-office@sternekessler.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 03/08/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER
CENTRAL, DOCKET

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
03/08/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.	
	Examiner CHERYL P GIBSON BAYLOR	**Art Unit** OPET	**AIA (FITF) Status** Yes

1. THE REQUEST FILED 30 December 2022 IS **GRANTED** .

   The above-identified application has met the requirements for prioritized examination
   - A. ☑ for an original nonprovisional application (Track I).
   - B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:
   - A. filing a **petition for extension of time** to extend the time period for filing a reply;
   - B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;
   - C. filing a **request for continued examination** ;
   - D. filing a notice of appeal;
   - E. filing a request for suspension of action;
   - F. mailing of a notice of allowance;
   - G. mailing of a final Office action;
   - H. completion of examination as defined in 37 CFR 41.102; or
   - I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	

U.S. Patent and Trademark Office
PTO-2298 (Rev. 02-2012)

Substitute for form 1449/PTO

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Sheet 1 of 3

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	2002/0062103 A1	05-23-2002	Larsson et al.	
	US2	2008/0009815 A1	01-10-2008	Grabenkort et al.	
	US3	2008/0299517 A1	12-04-2008	Delaney, II	
	US4	2015/0314053 A1	11-05-2015	Furrer et al.	
	US5	2021/0205512 A1	07-08-2021	O'Toole et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449/PTO				Complete if Known	
SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	2	of	3	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

Substitute for form 1449/PTO **SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT**				***Complete if Known***	
				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	3	of	3	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Richard D. Coller III/	Date (YYYY-MM-DD)	2023-04-20
Name/Print	Richard D. Coller III	Registration Number	60,390

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: CHIARO TECHNOLOGY LIMITED	Art Unit: 3783
Application No.: 18/148,864	Examiner: FREDERICKSON, COURTNEY B
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Supplemental Information Disclosure Statement

Mail Stop Amendment

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

Listed on accompanying IDS Forms PTO/SB/08a or its equivalent and PTO/SB/08b or its equivalent are documents that may be considered material to the patentability of this application as defined in 37 C.F.R. §1.56, and in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.97 and 1.98.

Applicant has listed dates on the attached IDS Forms based on information presently available to the undersigned. However, the listed dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

This Information Disclosure Statement is being filed under 37 C.F.R. § 1.97(b) and is being filed within three months of the date of filing of a national application other than a continued

prosecution application (CPA), OR within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application, OR before the mailing date of a first Office Action on the merits OR before the mailing of a first Office Action after the filing of a request for continued examination under 37 C.F.R. § 1.114. No statement or fee is required.

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), no copies of the U.S. patent application publications cited on the attached IDS Forms are submitted.

It is expected that the examiner will review the prosecution and cited art in the parent Application No. 17/907,347, filed September 26, 2022, in accordance with MPEP 2001.06(b), and indicate in the next communication from the office that the art cited in the earlier prosecution history has been reviewed in connection with the present application.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Forms, and indicate in the official file wrapper of this patent application that the documents have been considered.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.



Richard D. Coller III
Attorney for Applicant
Registration No. 60,390

Date: April 20, 2023

1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600

20128357.1

Atty. Dkt. No. 4944.0360002

UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**04/20/2023 04:00:23 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Jon Baitlon
PATENT CENTER #	61955653	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Richard Coller

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2023-04-20-Transmittal-Form-sIDS-4944-0360002.pdf	1	Miscellaneous Incoming Letter	158 KB
2023-04-20-sIDS-Pleading-4944-0360002.pdf	2	Transmittal Letter	110 KB
2023-04-20-sIDS-Form-SB08-4944-0360002.pdf	3	Information Disclosure Statement (IDS) Form (SB08)	147 KB

Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-04-20-Transmittal-Form-sIDS-4944-0360002.pdf	F4DE02124A4C3A188C8F37510E9FEF162D113F7A7AF7C1B870FFF576377F403E830D5BAB9F3A93B67C00230228552458549294C3F19B2C6F0FB49A202AB29B81
2023-04-20-sIDS-Pleading-4944-0360002.pdf	455D7025A1F8D39CACA54FB8FAA3D0DCB189F8972D7DD89AA3EFD36CA9468D255222AC0A93AA02D49CADF2E6AD1BFC59CA137DA5658E3C51FE5112B1348E9381
2023-04-20-sIDS-Form-SB08-4944-0360002.pdf	138BFDC68C74BB831FF21DE2859CFECD73739E50B9F3A16E400C545A3C1B369EC1FE1BFCEE3AA7EA10856C45A66E0319C9FB737088582402AA147F7F6DB33BAC

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please identify below):

Remarks

The Office may charge any fee deficiency for any submission made with this transmittal to Deposit Account 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Richard D. Coller III/		
Printed name	Richard D. Coller III		
Date	April 20, 2023	Reg. No.	60,390

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 05/10/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER
FREDRICKSON, COURTNEY B

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
05/10/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Office Action Summary	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.	
	Examiner COURTNEY FREDRICKSON	**Art Unit** 3783	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 12December2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 1-20 is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 08February2023 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

1.☑ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Information Disclosure Statement

The information disclosure statement (IDS) submitted is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

Claims 7, 12, and 13 are objected to because of the following informalities:

Regarding claims 7 and 13, it is recommended to amend the claim to recite "a mother" or "a user" in line 2 to provide antecedent basis for the claim terminology.

Regarding claim 12, it is recommended to amend the claim "the front end" in line 2 since the front end is already introduced in claim 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Regarding claim 7, the claim is drawn to "an outer shell configured to support an air port" in line 5. In other words, the air port is a functional aspect of the outer shell due to the "configured to" language. Later, the claim recites that the air port is disposed through an opaque portion of the hub. Since the air port is functional, it is unclear if the claim intends to positively recite the air port or if the claim is merely drawn to further functional aspects of the functionally claimed air port. For examination purposes, the air port is purely functional so that the outer shell is configured to support an air port which is configured to be disposed through an opaque portion of the hub.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis (i.e., changing from AIA to pre-AIA) for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

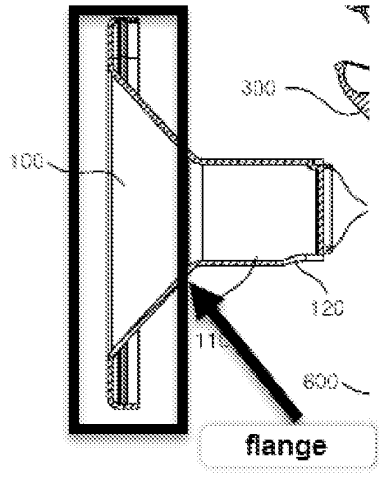
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim(s) 1-4 is/are rejected under 35 U.S.C. 103 as being unpatentable over Park (US 20180104396) in view of Garbez (US 20180008758).

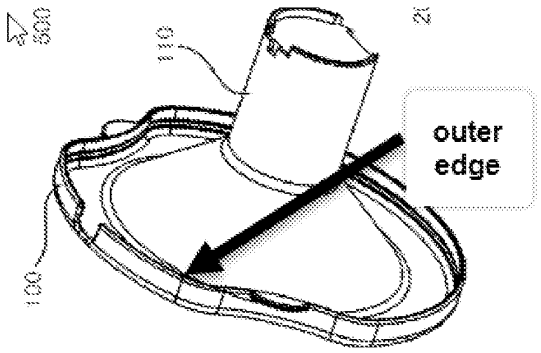
Regarding claim 1, Park discloses a wearable milk collection hub comprising:

a breast shield (close contact housing 100 in fig. 3) comprising:

a breast flange (see below);



a nipple tunnel extending from the breast flange (protruding part 110 in fig. 3), the nipple tunnel comprising a closed end (fig. 5) and a milk port (discharging hole 120 in fig. 5), the milk port being intermediate to the breast flange and the closed end (fig. 5); and an outer edge (see below);



a diaphragm configured to deform to create negative air pressure in the nipple tunnel (flow separation membrane 500 in fig. 5), the diaphragm being at least partially arranged over the closed end of the nipple tunnel (the examiner notes that Merriam-Webster defines “over” as “above”; fig. 7 shows that the diaphragm is placed onto connector 300 so that it would be above the closed end in a vertical direction when looking at the device in an upright position); and an outer shell configured to receive the outer edge of the breast shield such that the outer shell is configured to be removably attachable to the breast shield (storing housing 700 in fig. 6; paragraph 42), the outer shell further configured to receive expressed milk via the milk port (paragraph 42).

However, Park does not teach or disclose the outer shell comprising an outer groove configured to receive the outer edge of the breast shield.

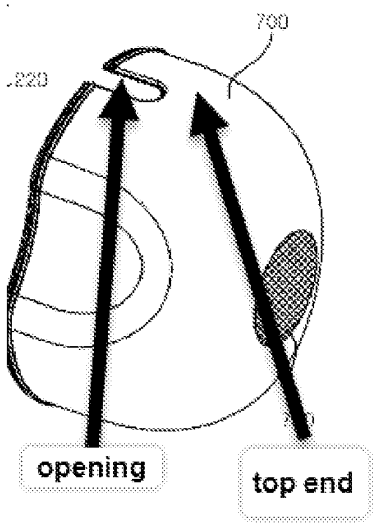
Garbez is directed towards a substantially similar device (fig. 1) which comprises an outer shell (housing 32 in fig. 2) and a breast shield (adaptor 12 in fig. 2). Garbez further teaches that the shield comprises a groove (groove 38 in fig. 3) which is configured to receive an outer edge of the shell (bead 36 in fig. 3). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the shield to comprise a groove which is configured to

receive an outer edge of the shell, as taught by Garbez, for the purpose of providing a snap fit removable connection between the elements (paragraph 26).

Modified Park teaches that the shield has a groove to snap-fit with an outer edge of the shell. The examiner notes that a shell with an outer groove to snap fit with an outer edge of the shield would operate equally as well as modified Park. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modified the outer surface of the shell to have a groove with can receive an outer edge of the shield, since the modification would provide for an equivalent means for providing a snap-fit, reversible coupling between the two elements and would not impact the mode of operation of the device, and further since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Gazda*, 219 F.2d 449, 104 USPQ 400 (CCPA 1955).

Regarding claim 2, in the modified hub of Park, Park discloses the outer shell is configured to be removably attachable to the breast shield (paragraph 42) such that the outer shell is configured to contact the breast shield at a rear end of the outer shell and the breast shield is configured to contact the expressed milk at a front end of the breast shield (fig. 1).

Regarding claim 3, in the modified hub of Park, Park discloses the outer shell comprises a top end (see below) comprising a pouring opening configured to release the expressed milk (see below; the opening below is fully configured to release the milk through the opening as there is nothing about the structure of the opening below which would prevent such function).

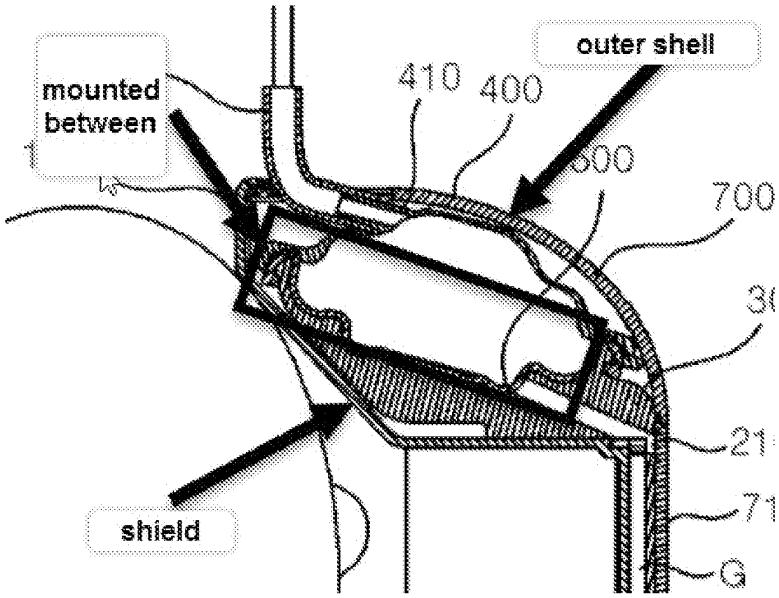


Regarding claim 4, in the modified hub of Park, Park discloses the outer shell comprises a base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface (sealing packing 710 in fig. 5 is shown to be flat).

Regarding claim 5, in the modified hub of Park, Park discloses the breast shield comprises a diaphragm housing part (funnel connector 300 in fig. 5) comprising an air hole configured to transfer negative air pressure to the nipple tunnel (flow passage 310 in fig. 5).

Claim(s) 6 is/are rejected under 35 U.S.C. 103 as being unpatentable over Park in view of Garbez, as applied to claim 1 above, and further in view of Rigert (US 20180021491).

Regarding claim 6, modified Park teaches all of the claimed limitations set forth in claim 1, as discussed above. Park further discloses that the diaphragm is mounted between the breast shield and the outer shell (see below). However, Park does not explicitly teach or disclose the diaphragm being removably mounted.



Rigert teaches a breast pump device comprising a diaphragm (diaphragm 4 in fig. 2) which is removably mounted to a diaphragm housing (paragraph 56). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the diaphragm of Park to be removably mounted, as taught by Rigert, since Rigert teaches that this functionality allows the diaphragm to be cleaned or replaced when needed (paragraph 56).

Claim(s) 7 is/are rejected under 35 U.S.C. 103 as being unpatentable over Park in view of Garbez, as applied to claim 1 above, and further in view of Myers (US 20080275386).

Regarding claim 7, in the modified device of Park, Park discloses the outer shell is configured to support an air port configured to provide an air connection to a control unit via a tube, the air port being disposed through an opaque portion of the wearable milk collection hub (the outer shell of Park is capable of supporting an air port having the claimed function). However, the breast shield and the outer shell are substantially

transparent, providing, to the mother placing the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment.

Myers is directed towards a breast pump (fig. 1) which comprises a breast shield ("silicon breast cup" in paragraph 65) and an outer shell (housing 16 in fig. 2). Myers further teaches that the shield and the outer shell are substantially transparent , providing, to the mother placing the device onto her breast a view of the nipple to facilitate correct nipple alignment (paragraph 65 discloses the cup is transparent and the "entire breast pump enclosure" can be rendered transparent). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the shield and the outer shell to be transparent, as taught by Myers, for the purpose of aiding in proper placement of the device on the breast (paragraph 65).

Claim(s) 8-12 and 14 is/are rejected under 35 U.S.C. 103 as being unpatentable over Hwang (US 20210093761) in view of Rigert (US 20180021491) and in further view of O'Toole (US 20180361040).

Regarding claim 8, Hwang discloses a wearable milk collection hub configured to connect to an external negative pressure generating control unit comprising:

a breast shield (contact housing 100 and cap connector 200 in fig. 6 form the breast shield) comprising:

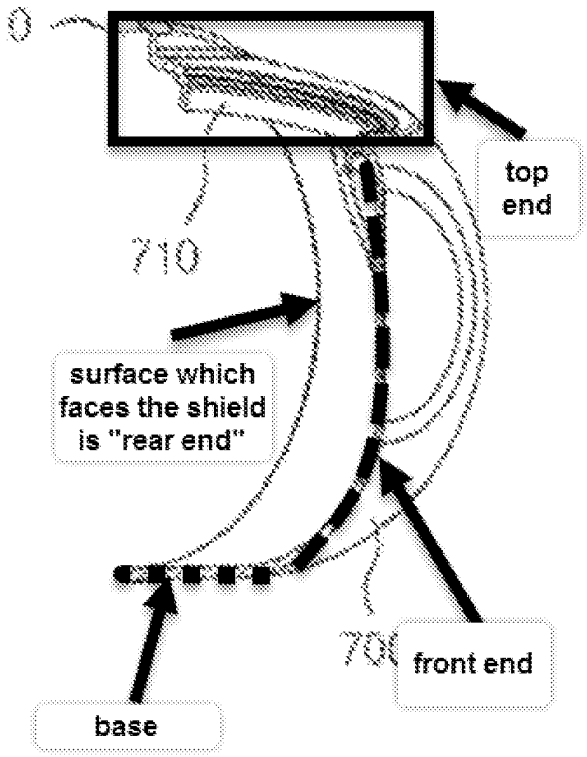
a breast flange (fig. 3);

a nipple tunnel extending from the breast flange (protruding part 110 in fig. 3), the nipple tunnel comprising an end remote from the breast flange (fig. 3) and a milk port intermediate to the breast flange and the end (milk outlet tube 210 in fig. 2); and

a diaphragm housing part (funnel connector 300 in fig. 2);

a diaphragm configured to be mounted to the diaphragm housing part (membrane 500 in fig. 2), and to deform based on negative air pressure generated by the control unit to create negative air pressure in the nipple tunnel (paragraph 40); and

an outer shell (storage housing 700 in fig. 2) comprising a rear end configured to removably attach the outer shell to the breast shield such that the breast shield and the outer shell form a vessel to receive expressed milk via the milk port (see below), a front end opposing the rear end (see below), the front end comprising a curvature (see below, a portion of the designated front end has a curvature), a base intermediate to the rear end and the front end (see below), and a top end opposing the base (see below), the top end comprising a pouring opening configured to release the expressed milk (milk outlet hole 720 in fig. 2).



However, Hwang does not explicitly teach or disclose the diaphragm being removably mounted and the base comprising a flat portion figured to allow the hub to rest of a flat surface.

Rigert teaches a breast pump device comprising a diaphragm (diaphragm 4 in fig. 2) which is removably mounted to a diaphragm housing (paragraph 56). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the diaphragm of Hwang to be removably mounted, as taught by Rigert, since Rigert teaches that this functionality allows the diaphragm to be cleaned or replaced when needed (paragraph 56).

O'Toole teaches a collection hub (fig. 1) which comprises a base which has a flat portion configured to allow the hub to rest of a flat surface (paragraphs 912 and 913). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the base of Hwang to be flat, as taught by O'Toole for the purpose of allowing the device to rest stably on a surface (paragraph 913).

Regarding claim 9, in the modified device of Hwang, Hwang discloses a structure comprising the diaphragm is configured to be at least partially arranged over the closed end of the nipple tunnel (the examiner notes that Merriam-Webster defines "over" as "above"; fig. 3 shows that the diaphragm is placed onto connector 300 so that it would be above the closed end in a vertical direction when looking at the device in an upright position).

Regarding claim 10, in the modified device of Hwang, Hwang discloses an air port configured to provide an air connection to the control unit via a tube (air pathway 410 in fig. 4 is configured to connect to a tube as there is nothing about the structure of the pathway which would prevent such connection).

Regarding claim 11, in the modified device of Hwang, Hwang discloses a movable cap positioned over the air port (stopper 430 in fig. 8; paragraph 33 discloses the stopper opening and closing).

Regarding claim 12, in the modified device of Hwang, Hwang discloses the movable cap is disposed on a front end of the outer shell (fig. 8).

Regarding claim 14, in the modified device of Hwang, Hwang discloses the rear end of the outer shell is configured to receive an outer edge of the breast shield (fig. 8

shows the outer edge of the shell receives the outer edge of the breast shield) such that an air-tight seal is formed between the breast shield and the outer shell (paragraph 47).

Claim(s) 13 is/are rejected under 35 U.S.C. 103 as being unpatentable over Hwang in view of Rigert in view of O'Toole, as applied to claim 8 above, and further in view of Myers (US 20080275386).

Regarding claim 13, modified Hwang teaches all of the claimed limitations set forth in claim 8, as discussed above. Hwang further teaches that the wearable milk collection hub is shaped to be worn inside a bra (paragraph 58).

However, modified Hwang does not teach or disclose the breast shield and the outer shell are substantially transparent, providing, to the mother placing the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment.

Myers is directed towards a breast pump (fig. 1) which comprises a breast shield ("silicon breast cup" in paragraph 65) and an outer shell (housing 16 in fig. 2). Myers further teaches that the shield and the outer shell are substantially transparent , providing, to the mother placing the device onto her breast a view of the nipple to facilitate correct nipple alignment (paragraph 65 discloses the cup is transparent and the "entire breast pump enclosure" can be rendered transparent). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the shield and the outer shell to be transparent, as taught by Myers, for the purpose of aiding in proper placement of the device on the breast (paragraph 65).

Claim(s) 15 is/are rejected under 35 U.S.C. 103 as being unpatentable over Hwang in view of Rigert in view of O'Toole, as applied to claim 8 above, and further in view of Chang (US 20170173232).

Regarding claim 15, modified Hwang teaches all of the claimed limitations set forth in claim 8, as discussed above, but does not teach or disclose the breast shield is semi-rigid.

Chang is directed towards a breast shield which can be rigid, semi-rigid, or compliant (paragraph 236). Accordingly, Chang teaches a finite number of potential levels of rigidness of the breast shield. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to try each of these known levels. The results would have been predictable one of ordinary skill in the art would have pursued the known potential solutions taught by Chang with a reasonable expectation of success.

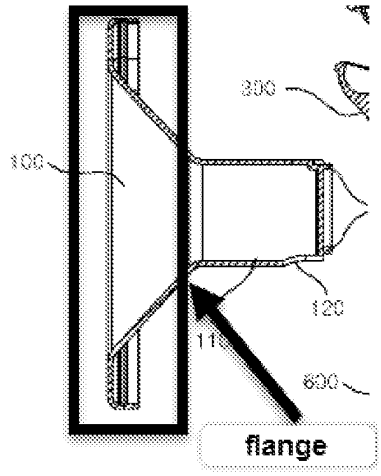
Claim(s) 16-19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Park in view of Rigert and in further view of Grabenkort (US 20080009815).

Regarding claim 16, Park discloses a breast pump system (fig. 7) comprising:

a wearable milk collection hub (fig. 5) configured to connect to a control unit via an air line (fig. 7 shows the hub connecting to a pump via air tube 420 in fig. 7), the wearable milk collection hub comprising:

a breast shield (contact housing 100 and cap connector form a breast shield when attached to each other in fig. 5) comprising:

a breast flange (see below);



a nipple tunnel extending from the breast flange (protruding part 110 in fig. 5), the nipple tunnel comprising a closed end (fig. 5) and a milk port intermediate to the breast flange and the closed end (discharge hole 120 in fig. 5); and

a diaphragm housing part (connector 200 in fig. 5);

a diaphragm configured to be mounted to the diaphragm housing part (membrane 500 in fig. 5), and to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel (paragraph 39); and

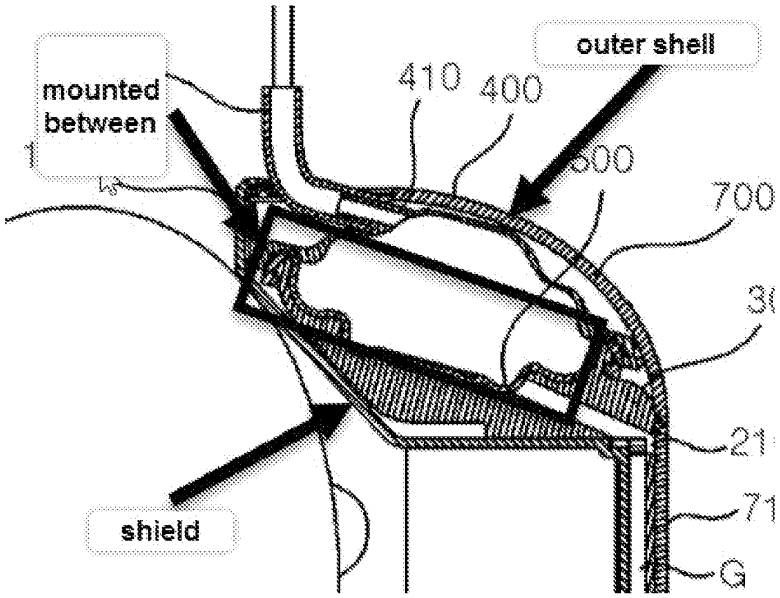
an outer shell (housing 700 in fig. 7) comprising a rear end configured to removably attach to the breast shield (fig. 7), an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk via the milk port (paragraph 43).

Park further teaches that the system comprises a generic pump (pump 800 in fig. 6) but does not teach or disclose a control unit comprising: a battery, and a pump configured to be powered by the battery and to generate negative air pressure. Park further does not teach that the diaphragm is removably mounted.

Rigert teaches a breast pump device comprising a diaphragm (diaphragm 4 in fig. 2) which is removably mounted to a diaphragm housing (paragraph 56). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the diaphragm of Park to be removably mounted, as taught by Rigert, since Rigert teaches that this functionality allows the diaphragm to be cleaned or replaced when needed (paragraph 56).

Grabenkort is directed towards a breast pump having a control unit (breast pump 42 in fig. 2) which comprises a battery (battery pack 81 in fig. 6) and a pump configured to be powered by the battery and to generate negative air pressure ("closed loop vacuum mechanism" in paragraph 60). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the system of Park to include the control unit of Grabenkort since Grabenkort teaches that this arrangement provides a vacuum control feature which would enable a user to tailor the vacuum level to the desired level (paragraph 10).

Regarding claim 17, in the modified device of Park, Park discloses the diaphragm housing part is disposed between the breast shield and the outer shell such that the diaphragm is configured to be removably mounted between the breast shield and the outer shell (see below).



Regarding claim 18, in the modified device of Park, Park discloses the breast shield comprises an outer edge configured to be received by the rear end of the outer shell (fig. 7).

Regarding claim 19, in the modified device of Park, Park discloses the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield (fig. 7).

Claim(s) 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Park in view of Rigert and in further view of Grabenkort, as applied to claim 16 above, and further in view of Analytis (US 20190209748).

Regarding claim 20, modified Park teaches all of the claimed limitations set forth in claim 16, as discussed above. Grabenkort further discloses the control unit comprises one or more buttons configured to control the wearable milk collection hub (switches 32a/b in fig. 2); at least one of a visual indicator or a haptic indicator configured to indicate the activated pumping profile or pattern (LCD 44c in fig. 2 is a

visual indicator); at least one of a visual indicator or a haptic indicator configured to indicate a status of the battery (paragraph 58 discloses a visual indicator in the form of a LCD); and a power charging circuit (paragraph 60 discloses a "power supply circuit board").

However, modified Park does not teach or disclose a wireless data communications system configured to be powered by the battery and a USB charging socket connected to the power charging circuit.

Analytis teaches a control unit (pump system 200 in fig. 2) which comprises a wireless data communications system configured to be powered by a battery (paragraphs 24 and 25; claim 14) and a USB charging socket connected to a power charging circuit (paragraph 21). Therefore, it would have been obvious to one of ordinary skill before the effective filing date of the claimed invention to have modified the control unit of modified Park to include the wireless data communications system and the USB charging socket of Analytis for the purpose of enabling the pump to be controlled via a mobile device and since Analytis teaches that USB charging sockets are known to enable the battery to be recharged (paragraph 26).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COURTNEY FREDRICKSON whose telephone number is (571)270-7481. The examiner can normally be reached Monday-Friday (9 AM - 5 PM EST).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NATHAN PRICE can be reached on 571-270-5421. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/COURTNEY B FREDRICKSON/
Examiner, Art Unit 3783

Notice of References Cited	Application/Control No. 18/148,864	Applicant(s)/Patent Under Reexamination DE BECDELIEVRE et al.	
	Examiner COURTNEY FREDRICKSON	Art Unit 3783	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20210093761-A1	04-2021	Hwang; Hyo Soon	A61M39/22	1/1
*	B	US-20190209748-A1	07-2019	Analytis; Santhi	A61M1/06	1/1
*	C	US-20180361040-A1	12-2018	O'TOOLE; Jonathan	G16H40/63	1/1
*	D	US-20180104396-A1	04-2018	PARK; Cho Hee	A61M1/066	1/1
*	E	US-20180021491-A1	01-2018	Rigert; Mario	A61M1/062	604/74
*	F	US-20180008758-A1	01-2018	Garbez; Dan	A61M1/066	1/1
*	G	US-20170173232-A1	06-2017	Chang; John Y.	A61M1/06	1/1
*	H	US-20080275386-A1	11-2008	Myers; Kenneth E.	A61M1/067	604/74
*	I	US-20080009815-A1	01-2008	Grabenkort; Richard W.	A61M1/81	604/74
	J					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
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	R					
	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	Art Unit
	COURTNEY FREDRICKSON	3783

CPC - Searched*		
Symbol	Date	Examiner
a61m1/06-0697	05/05/2023	cbf

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
see SEARCH history	05/05/2023	cbf
searched inventor in SEARCH and PALM	05/05/2023	cbf

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/COURTNEY B FREDRICKSON/ Examiner, Art Unit 3783	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2023								
	1	✓								
	2	✓								
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	17	✓								
	18	✓								
	19	✓								
	20	✓								

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Application No: 18/148,864

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /COURTNEY B FREDRICKSON/ (Examiner's Signature) [ ] (Initials)

Title: WEARABLE BREAST PUMP SYSTEM

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
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RULE			

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CONTINUING DATA

This application is a CON of 17907347 09/26/2022

17907347 is a 371 of PCT/GB21/50764 03/26/2021

FOREIGN APPLICATIONS

UNITED KINGDOM GB2004395.6 03/26/2020

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SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Sheet 1 of 3

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	2002/0062103 A1	05-23-2002	Larsson et al.	
	US2	2008/0009815 A1	01-10-2008	Grabenkort et al.	
	US3	2008/0299517 A1	12-04-2008	Delaney, II	
	US4	2015/0314053 A1	11-05-2015	Furrer et al.	
	US5	2021/0205512 A1	07-08-2021	O'Toole et al.	

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Examiner Initials*	Cite No.[1]	Foreign Patent Document / Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.B.F./

Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO				Complete if Known	
SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	2	of	3	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]

Examiner Signature	/COURTNEY B FREDRICKSON/	Date Considered	05/05/2023

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				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	3	of	3	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Richard D. Coller III/	Date (YYYY-MM-DD)	2023-04-20
Name/Print	Richard D. Coller III	Registration Number	60,390

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	34	((US-20020193731-A1 OR US-20030191433-A1 OR US-20140121593-A1 OR US-20150328380-A1 OR US-20160325031-A1 OR US-20170182231-A1 OR US-20170216505-A1 OR US-20180008758-A1 OR US-20180361040-A1 OR US-20210093761-A1 OR US-20130023821-A1 OR US-20080208116-A1 OR US-20080275386-A1 OR US-20150217033-A1 OR US-20160220745-A1 OR US-20160296682-A1 OR US-20170072119-A1 OR US-20170080135-A1 OR US-20180021491-A1 OR US-20180154055-A1 OR US-20200139027-A1 OR US-20180104396-A1).did. AND PGPB.dbnm.) OR ((WO-2021084283-A1 OR DE-19652232-A1 OR WO-2019194418-A1).did. AND FPRS.dbnm.) OR ((WO-2021145820-A1 OR KR-102296715-B1 OR CN-110623320-A OR CN-112472891-A OR WO-2021191637-A1 OR EP-2687246-A1 OR CN-111658859-A OR CN-113975503-A).did. AND FTDB.dbnm.) OR ((US-11235093-B1).did. AND USPT.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/04/13 02:33 PM
L2	661	((("DE") near3 ("BECDELIEVRE") near3 ("Thibault")) OR (("BLANCHARD") near3 ("Oliver")) OR	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/13 02:54 PM

		(("THOMAS") near3 ("Georgia")) OR (("THOMPSON") near3 ("Daniel")) OR (("ROLLO") near3 ("Adam")) OR (("REID") near3 ("Paul")) OR (("O'TOOLE") near3 ("Jonathan")) OR (("BILTCLIFFE") near3 ("Jack")) OR (("LARKSPUR") near3 ("Clare")) OR (("BRUEN") near3 ("Claudia"))).INV.					
L3	146	("0000002" OR "10039871" OR "10398816" OR "1062500582" OR "10864306" OR "10881766" OR "10926011" OR "20020193731" OR "20040056641" OR "20040074281" OR "20040087898" OR "20040127845" OR "20040267215" OR "20050219302" OR "20050245860" OR "20060122575" OR "20070051172" OR "20070051727" OR "20070135761" OR "20070179439" OR "20070219486" OR "20070228059" OR "20070236584" OR "20080177224" OR "20080262420" OR "20080275386" OR "20090281482" OR "20090281485" OR "20100292636" OR "20110004154" OR "20110009824" OR "20110196291" OR "20110274566" OR "20120021068" OR "20120035951" OR "20120043065" OR "20120072117" OR "20120072118" OR "20120095599" OR "20120109083" OR "20120143879" OR "20120165729" OR "20120220753" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/13 03:22 PM

		"20120277636" OR "20130023821" OR "20140031744" OR "20140052056" OR "20140142501" OR "20140263611" OR "20140275857" OR "20140288466" OR "20140323962" OR "20140378895" OR "20150212036" OR "20150212037" OR "20150217036" OR "20150217037" OR "20150283311" OR "20160000980" OR "20160058928" OR "20160058929" OR "20160082165" OR "20160082166" OR "20160135998" OR "20160151551" OR "20160158424" OR "20160166745" OR "20160206794" OR "20160220743" OR "20160220745" OR "20160228625" OR "20160256617" OR "20160271305" OR "20160287767" OR "20160296681" OR "20160296682" OR "20160310650" OR "20160325031" OR "20170021068" OR "20170035951" OR "20170043065" OR "20170072117" OR "20170072118" OR "20170095599" OR "20170112983" OR "20170143879" OR "20170173233" OR "20170216505" OR "20170220753" OR "20170292509" OR "20180008758" OR "20180021490" OR "20180028733" OR "20180104396" OR "20180110900" OR "20180110906" OR "20180333523" OR "20180361040" OR "20210030934" OR "20210170080" OR "20210196873" OR					

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		"D809646" OR "D832995" OR "D888225").pn.					
L4	9406	a61m1/06-0697.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:45 PM
L5	30	4 AND wireless$4 AND (usb "universal serial bus") AND (button key switch input) AND ((haptic alarm led light diode) WITH (battery))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:46 PM
L6	708	4 AND ((diaphragm membrane) WITH (remov$4 detach$4))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:47 PM
L7	53	3 AND transparent	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 04:14 PM
L8	16	3 AND "air tight"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 04:19 PM
L9	18	"20080009815"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:00 PM
L10	55	4 AND wireless$4 AND ((charg$4 recharg$4) WITH (usb "universal serial"))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU,	OR	ON	ON	2023/05/04 05:12 PM

			SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L11	2797	4 AND (diaphragm membrane)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:18 PM
L12	92	4 AND (shield contact flange cup) WITH (semi-rigid)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:33 PM
L13	26	a61m1/06-0697.cpc. AND (shield cup flange contact) WITH "air tight" WITH (shell housing)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:57 PM
L14	787	4 AND (flat WITH (base surface))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 06:13 PM
L15	155	4 AND opaque	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 06:37 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 11

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	2849881-A	09-02-1958	ANDERSON; Wilmer C.	
	US2	4390024-A	06-28-1983	WILLIAMS; Marguerite R.	
	US3	4535627-A	08-20-1985	PROST et al.	
	US4	5406063-A	04-11-1995	Jelen	
	US5	5474683-A	12-12-1995	BRYANT et al.	
	US6	5542921-A	08-06-1996	MEYERS et al.	
	US7	5941847-A	08-24-1999	HUBER et al.	
	US8	5973770-A	10-26-1999	CARTER et al.	
	US9	6045529-A	04-04-2000	NUESCH; Hansueli	
	US10	6090065-A	07-18-2000	GILES; John P.	
	US11	6227936-B1	05-08-2001	MENDOZA; Amelia	
	US12	6328709-B1	12-11-2001	HUNG et al.	
	US13	6358226-B1	03-19-2002	RYAN; Audrey M.	
	US14	6383163-B1	05-07-2002	KELLY et al.	
	US15	6440100-B1	08-27-2002	PRENTISS; John Gilbert et al.	
	US16	6461324-B1	10-08-2002	SCHLENSOG; Klaus	
	US17	2002/0193731-A1	12-19-2002	MYERS; Kenneth E. et al.	
	US18	6547756-B1	04-15-2003	GRETER et al.	
	US19	6579258-B1	06-17-2003	ATKIN et al.	
	US20	6663587-B2	12-16-2003	SILVER et al.	
	US21	2004/0056641-A1	03-25-2004	MYERS; Kenneth et al.	
	US22	2004/0074281-A1	04-22-2004	LOBDELL; Donn D. et al.	
	US23	2004/0087898-A1	05-06-2004	WENIGER; Gotthilf	
	US24	6749582-B2	06-15-2004	BRITTO et al.	
	US25	2004/0127845-A1	07-01-2004	RENZ; Charles J. et al.	
	US26	2004/0267215-A1	12-30-2004	CHARLEZ; Jarl et al.	
	US27	2005/0219302-A1	10-06-2005	VOGELEY; James	

Examiner Signature		Date Considered	

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Sheet	2	of	11	Attorney Docket Number	4944.0360002

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	US28	2005/0245860-A1	11-03-2005	Britto et al.	
	US29	7048519-B2	05-23-2006	FONG et al.	
	US30	2006/0122575-A1	06-08-2006	WAKABAYASHI; Akio	
	US31	2007/0051172-A1	03-08-2007	PERINET; Jean-Francois et al.	
	US32	2007/0051727-A1	03-08-2007	HOLLEY, Jr.; James W.	
	US33	7201735-B2	04-10-2007	ATKIN et al.	
	US34	2007/0135761-A1	06-14-2007	CHENG; Kai-Sheng et al.	
	US35	2007/0179439-A1	08-02-2007	VOGELIN; Stefan et al.	
	US36	D548831-S	08-14-2007	CHARLEZ; Jarl	
	US37	2007/0219486-A1	09-20-2007	MYERS; Kenneth E. et al.	
	US38	2007/0228059-A1	10-04-2007	KARSAN; Chettan	
	US39	2007/0236584-A1	10-11-2007	Frost-Ruebling et al.	
	US40	7312554-B2	12-25-2007	VOGELEY; James	
	US41	7314400-B2	01-01-2008	FILDAN et al.	
	US42	2008/0177224-A1	07-24-2008	KELLY; Patricia A. et al.	
	US43	2008/0262420-A1	10-23-2008	DAO; Stella et al.	
	US44	2008/0275386-A1	11-06-2008	MYERS; Kenneth E.	
	US45	2009/0281482-A1	11-12-2009	BAKER; Peter Christensen et al.	
	US46	2009/0281485-A1	11-12-2009	BAKER; Peter Christensen et al.	
	US47	7641629-B2	01-05-2010	YUEN; Yat Keung William	
	US48	7662018-A1	02-16-2010	THOMPSON PAMELA J, et al	
	US49	7666162-B2	02-23-2010	RENZ et al.	
	US50	7776008-B2	08-17-2010	RENZ et al.	
	US51	7833190-B1	11-16-2010	HALL; Petisamaria	
	US52	2010/0292636-A1	11-18-2010	RENZ; Charles J. et al.	
	US53	2011/0004154-A1	01-06-2011	VAN SCHIJNDEL; Nicolle Hanneke et al.	

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	US54	2011/0009824-A1	01-13-2011	YODFAT; Ofer et al.	
	US55	2011/0196291-A1	08-11-2011	VISCHER; Peter et al.	
	US56	2011/0274566-A1	11-10-2011	AMIROUCHE; Farid et al.	
	US57	8057425-B1	11-15-2011	MYERS et al.	
	US58	2012/0021068-A1	01-26-2012	BARNESS; Itzhak et al.	
	US59	2012/0035951-A1	02-09-2012	GOETZ; Steven M. et al.	
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	US62	2012/0072117-A1	03-22-2012	LODDOCH; Alexander et al.	
	US63	2012/0072118-A1	03-22-2012	MANN; Tobias	
	US64	2012/0095599-A1	04-19-2012	PAK; H. Ali et al.	
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	US68	2012/0165729-A1	06-28-2012	CUDWORTH; Nicholas	
	US69	2012/0220753-A1	08-30-2012	GERA; Lajos et al.	
	US70	8262606-B2	09-11-2012	GRETER et al.	
	US71	8282596-B2	10-09-2012	GRETER et al.	
	US72	2012/0277636-A1	11-01-2012	BLONDHEIM; David Simeon et al.	
	US73	2013/0023821-A1	01-24-2013	KHALIL; Gamal et al.	
	US74	8376986-B2	02-19-2013	VAN; Schijndel et al.	
	US75	8608685-B2	12-17-2013	TASHIRO et al.	
	US76	2014/0031744-A1	01-30-2014	CHEN; Chean-Shui	
	US77	2014/0052056-A1	02-20-2014	GARBEZ; Dan et al.	
	US78	8702646-B2	04-22-2014	GARBEZ et al.	
	US79	2014/0142501-A1	05-22-2014	Clark et al.	
	US80	8801495-B1	08-12-2014	GUINDON; Desirae A.	

Examiner Signature		Date Considered	

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Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	To Be Assigned
Examiner Name	To Be Assigned
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US81	2014/0263611-A1	09-18-2014	BAUER; Ryan	
	US82	2014/0275857-A1	09-18-2014	TOTH; Landy et al.	
	US83	2014/0288466-A1	09-25-2014	ALVAREZ; Jeffery B. et al.	
	US84	2014/0323962-A1	10-30-2014	KOOIJKER; Klaas et al.	
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	US93	2015/0283311-A1	10-08-2015	ALVAREZ; Jeffery B. et al.	
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	US95	2016/0000980-A1	01-07-2016	ALVAREZ; Jeffery B. et al.	
	US96	2016/0058928-A1	03-03-2016	NOWROOZI; Bryan Neema et al.	
	US97	2016/0058929-A1	03-03-2016	MEDVEDEV; Alexander et al.	
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	US99	2016/0082166-A1	03-24-2016	GUTHRIE; Gabrielle V. et al.	
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	US105	2016/0206794-A1	07-21-2016	MAKOWER; Joshua et al.	
	US106	2016/0220743-A1	08-04-2016	GUTHRIE; Gabrielle V. et al.	
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	US109	2016/0256617-A1	09-08-2016	HANSEN; Jan Erik Vest	
	US110	2016/0271305-A1	09-22-2016	KURIHARA; Kiyoshi et al.	
	US111	2016/0287767-A1	10-06-2016	SIMMONS; Bryan D. et al.	
	US112	2016/0296681-A1	10-13-2016	GASKIN; Nathaniel et al.	
	US113	2016/0296682-A1	10-13-2016	PHILLIPS; Andrew Luke et al.	
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	US120	2017/0072117-A1	03-16-2017	KURIHARA; Kiyoshi et al.	
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	US147	2021/0170080-A1	06-10-2021	O'TOOLE; Jonathan et al.	
	US148	2021/0196873-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US149	2021/0196874-A1	07-01-2021	O'TOOLE; Jonathan et al.	
	US150	2021/0196875-A1	07-01-2021	O'TOOLE; Jonathan et al.	
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				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	To Be Assigned
				Examiner Name	To Be Assigned
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Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
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	FP2	EP-0503280-A2	09-16-1992	PIERBURG GMBH [DE]		X
	FP3	WO-9420158-A1	09-15-1994	DEKA PRODUCTS LP [US]		
	FP4	DE-19750620-A1	06-02-1999	SIEMENS AG [DE]		X
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	FP6	JP 2000-350527 A	12-19-2000	Pigeon Corp.		X
	FP7	WO 2004/108184 A2	12-16-2004	Playtex Products, Inc.		
	FP8	WO-2005079441-A2	09-01-2005	CHILDRENS HOSP MEDICAL CENTER [US], et al.		
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	FP12	WO-2005114113-A3	03-02-2006	ACCU GAUGE LTD [GB], et al.		
	FP13	JP-2007501673-A	02-01-2007	PLAYTEX PRODUCTS INC.		X
	FP14	GB-2435617-B	03-05-2008	PLAYTEX PRODUCTS INC [US]		
	FP15	EP-1430918-B1	05-14-2008	MEDELA HOLDING AG [CH]		
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	FP17	CN-101549180-A	10-07-2009	PIGEON CORP [JP]		X
	FP18	WO-2009134271-A1	11-05-2009	UTC POWER CORP [US], et al.		
	FP19	GB-2473022-B	12-14-2011	DREW LORNA [GB]		
	FP20	RU-2441367-C2	02-10-2012	OOO NPP AVTOMASH VLADIMIR [RU]		X
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	FP26	GB-2499248-B	04-02-2014	MORANA ELIZABETH [GB]		
	FP27	WO 2014/160614 A1	10-02-2014	Naia Health, Inc.		
	FP28	JP-2014529312-A	11-06-2014	MEDELA HOLDING AG.		X
	FP29	JP 2014-532498 A	12-08-2014	Smith & Nephew PLC		X
	FP30	EP-1404393-B1	12-24-2014	MEDELA HOLDING AG [CH]		
	FP31	WO-2015081459-A1	06-11-2015	CHEN JUNBO [CN]		X
	FP32	WO-2015116749-A1	08-06-2015	CORNING INC [US]		
	FP33	WO-2015120321-A1	08-13-2015	NAIA HEALTH INC [US]		
	FP34	WO-2015150225-A1	10-08-2015	KONINKL PHILIPS NV [NL]		
	FP35	WO-2015174330-A1	11-19-2015	MURATA MANUFACTURING CO [JP]		X
	FP36	WO-2016002606-A1	01-07-2016	MURATA MANUFACTURING CO [JP]		X
	FP37	WO-2016006494-A1	01-14-2016	MURATA MANUFACTURING CO [JP]		X
	FP38	WO-2016006496-A1	01-14-2016	MURATA MANUFACTURING CO [JP]		
	FP39	WO-2016007560-A1	01-14-2016	NAYA HEALTH INC [US]		
	FP40	WO 2016/006458 A1	01-14-2016	Murata Manufacturing Co., Ltd.		X
	FP41	JP-2016010524-A	01-21-2016	MURATA MANUFACTURING CO.		X
	FP42	WO-2016010524-A1	01-21-2016	HEWLETT PACKARD DEVELOPMENT CO [US]		
	FP43	WO-2016014469-A1	01-28-2016	EXPLORAMED NC7 LLC [US]		
	FP44	WO-2016014488-A1	01-28-2016	EXPLORAMED NC7 LLC [US]		
	FP45	CN-105288759-A	02-03-2016	UNIV SHANGHAI.		X
	FP46	WO-2016024558-A1	02-18-2016	MURATA MANUFACTURING CO [JP]		X
	FP47	WO 2016/025405 A1	02-18-2016	Barral et al.		
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	FP49	JP-2016514516-A	05-23-2016	NAIA HEALTH INC.		X
	FP50	WO-2016104673-A1	06-30-2016	MURATA MANUFACTURING CO [JP]		X
	FP51	EP-2077868-B1	07-27-2016	MEDELA HOLDING AG [CH]		
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	FP53	JP 2016-526396 A	09-05-2016	Koninklijke Philips NV		X
	FP54	WO-2016164853-A1	10-13-2016	NAYA HEALTH INC [US]		
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	FP57	JP-2017509379-A	04-06-2017	NAIA HEALTH INC.		X
	FP58	WO-2017061349-A1	04-13-2017	MURATA MANUFACTURING CO [JP]		X
	FP59	WO-2017108555-A1	06-29-2017	KONINKLIJKE PHILIPS NV [NL]		
	FP60	WO-2017139480-A1	08-17-2017	EXPLORAMED NC7 INC [US]		
	FP61	WO-2016007561-A1	01-14-2016	Naya Health, Inc		

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NON-PATENT LITERATURE DOCUMENTS		
Examiner Initials*	Cite No.[1]	Include name of the author(in CAPITAL LETTERS),title of the article(when appropriate), title of the item (book,magazine,journal,serial,symposium,catalog,etc.),date,page(s),volume-issue number(s),publisher, city and/or country where published.
	NPL1	4MD Medical, "Assembling Spctra Breast Pump Parts," YouTube [online], dated November13, 2016, URL: http://www.youtube.com/watch?v=ChV8xQfcBxU.
	NPL2	Extended European Search Report issued in European Application No. 22174446.9, mailed October 11, 2022; 26 pages.
	NPL3	GB Search Report for , dated 29 November 2017, issued in priority GB Application No.GB1709564.7.
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	NPL5	GB Search Report, dated 28 November 2017, issued in priority GB Application No.GB1709566.2.
	NPL6	International Search Report issued in PCT/GB2018/051659 dated December 4, 2018, 9 pages.
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	NPL10	International Search Report issued in International Application No. PCT/GB2021/050764, mailed July 6, 2021, 5 pages

Examiner Signature	/COURTNEY B FREDRICKSON/	Date Considered	05/05/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.B.F./

Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** (Use as many sheets as necessary)				***Complete if Known***	
				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	To Be Assigned
				Examiner Name	To Be Assigned
Sheet	11	of	11	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Anupma Sahay #78,704/	Date (YYYY-MM-DD)	2023-01-03
Name/Print	Anupma Sahay	Registration Number	78,704

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

19580892.1

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Substitute for form 1449/PTO

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Sheet 1 of 3

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	2003/0069536 A1	04-10-2003	Greter et al.	
	US2	2007/0054651 A1	03-08-2007	Farmer et al.	
	US3	2014/0227112 A1	08-14-2014	Felber	
	US4	2019/0365966 A1	12-05-2019	Bächler et al.	
	US5	2020/0016307 A1	01-16-2020	Edelman et al.	
	US6	2020/0300237 A1	09-24-2020	Marbet et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	FP1	EP 3482782 A1	05-15-2019	MEDELA HOLDING AG		

Examiner Signature		Date Considered	

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Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO **SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT**				***Complete if Known***	
				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	2	of	3	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]

Examiner Signature		Date Considered	

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				Application Number	18/148,864
				Filing Date	December 30, 2022
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				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	3	of	3	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Yangbeini Wang #800,005/	Date (YYYY-MM-DD)	2023-05-15
Name/Print	Yangbeini Wang	Registration Number	800,005

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	05/15/2023 04:57:20 PM ET	4944.0360002

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Jon Baitlon
PATENT CENTER #	62090227	AUTHORIZED BY	Yangbeini Wang
CUSTOMER #	26111	FILING DATE	12/30/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1008	E20235EG58599706	Jon Baitlon

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	104.00	1	104.00
			TOTAL AMOUNT:	$104.00

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

ENCLOSURES (*Check all that apply*)

- ☐ Fee Transmittal Form
- ☑ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

Copy of FP1.

Remarks

The Office may charge any fee deficiency for any submission made with this transmittal to Deposit Account 19-0036.

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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Yangbeini Wang #800,005/		
Printed name	Yangbeini Wang		
Date	May 15, 2023	Reg. No.	800,005

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Typed or printed name		Date	

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: CHIARO TECHNOLOGY LIMITED	Art Unit: 3783
Application No.: 18/148,864	Examiner: FREDERICKSON, COURTNEY B
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Supplemental Information Disclosure Statement

Mail Stop Amendment

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

Listed on accompanying IDS Forms PTO/SB/08a or its equivalent and PTO/SB/08b or its equivalent are documents that may be considered material to the patentability of this application as defined in 37 C.F.R. §1.56, and in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.97 and 1.98.

Applicant has listed dates on the attached IDS Forms based on information presently available to the undersigned. However, the listed dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

This Information Disclosure Statement is being under 37 C.F.R. § 1.97(c) and is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office

Action on the merits, but before the mailing date of a Final Rejection, or Notice of Allowance, or an action that otherwise closes prosecution in the application. The required fee is provided through online credit card payment authorization in the amount of **$104.00** in payment of the fee under 37 C.F.R. § 1.17(p).

A concise explanation of the relevance of the non-English language document(s) appears below in accordance with 37 C.F.R. § 1.98(a)(3).

Document **US6** (2020/0300237 A1) is submitted herewith as the English-language counterpart of document **FP1** (EP 3482782 A1).

Copy of document **FP1** is submitted. However, in accordance with 37 C.F.R. § 1.98(a)(2)(ii), no copies of the U.S. patents and patent application publications cited on the attached IDS Forms are submitted.

It is expected that the examiner will review the prosecution and cited art in the parent Application No. 17/907,347, filed September 26, 2022, in accordance with MPEP 2001.06(b), and indicate in the next communication from the office that the art cited in the earlier prosecution history has been reviewed in connection with the present application.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Forms, and indicate in the official file wrapper of this patent application that the documents have been considered.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Yangbeini Wang #800,005/

Yangbeini Wang
Attorney for Applicant
Registration No. 800,005

Date: May 15, 2023

1100 New York Avenue, N.W.
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20260583.1

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**05/15/2023 04:57:20 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

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PATENT CENTER #	62090227	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangbeini Wang

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2023-05-15-Transmittal-Form-sIDS-4944-0360002.pdf	1	Miscellaneous Incoming Letter	161 KB
2023-05-15-sIDS-Pleading-4944-0360002.pdf	3	Transmittal Letter	100 KB
2023-05-15-sIDS-Form-SB08-4944-0360002.pdf	3	Information Disclosure Statement (IDS) Form (SB08)	147 KB
Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
FOR_1_EP3482782A1.pdf	21	Foreign Reference	442 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-05-15-Transmittal-Form-sIDS-4944-0360002.pdf	0BBC2985884E92DFE112D78161D1369ADC2549131A8B8E7089DAB0E211722FC9C410DEEAFC8095F7637B48F5ADEB87FE53EB43926431FBFB3EF683664A8A325A
2023-05-15-sIDS-Pleading-4944-0360002.pdf	54F48F670ABF64A411F573A28680BBC94E5F62F71C0574C388405C7DDE1AF372DCF40F9C3B617049D8081E55D99E66B4DDE079998C70879CCF5BC64F6F0AAA19
2023-05-15-sIDS-Form-SB08-4944-0360002.pdf	9FDCB22838505BD4472AB684C6671CE396D1C38579092599D8B6484C70DD38ED1AF324BF63216CDC50C04034A511A7A9A867985A3EBD6B2572D208501817B5D7
FOR_1_EP3482782A1.pdf	0A4794FB75138AF6B1F20955E40340F7D8470ADA20062553DF4C0F08FF07D8C66A0E17A8A211AB8592F5D46EFC71AE7573646AD8E14ABA1BF7CA3E1FD42142A9

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New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 482 782 A1

(12) EUROPÄISCHE PATENTANMELDUNG

(43) Veröffentlichungstag:
15.05.2019 Patentblatt 2019/20

(51) Int Cl.:
A61M 1/00 *(2006.01)*

(21) Anmeldenummer: **17201540.6**

(22) Anmeldetag: **14.11.2017**

(84) Benannte Vertragsstaaten:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Benannte Erstreckungsstaaten:
BA ME
Benannte Validierungsstaaten:
MA MD

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(54) MEDIZINISCHE SAUGPUMPE

(57) Eine motorbetriebene medizinische Saugpumpe weist ein Pumpaggregat zur Erzeugung eines Unterdrucks, einen Pumpaggregatträger (3) zur Halterung des Pumpaggregats (7) und eine Aufnahme (35) zur Aufnahme eines Energiespeichers (7) auf. Das im Pumpaggregatträger (3) angeordnete Pumpaggregat (7) definiert eine erste Längsachse (L_1) und die Aufnahme (35) definiert eine zweite Längsachse (L_2). Der Pumpaggregatträger (3) bildet die Aufnahme (35). Die zweite Längsachse (L_2) verläuft in einem Winkel zur ersten Längsachse (L_1). Diese Saugpumpe ist klein und kompakt und weist eine gute Schalldämpfung auf.

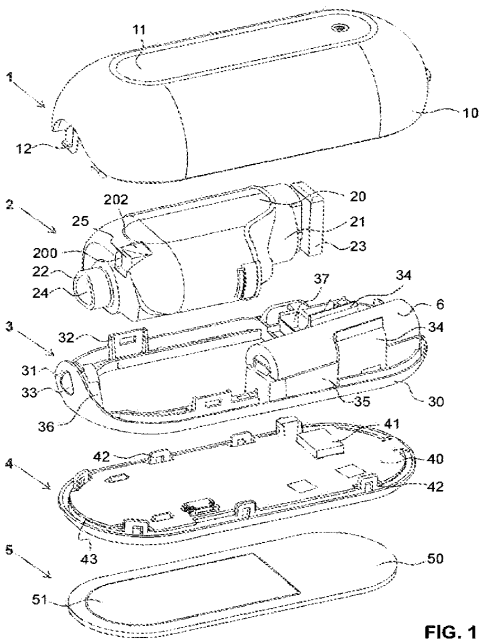


FIG. 1

EP 3 482 782 A1

Printed by Jouve, 75001 PARIS (FR)

Beschreibung

TECHNISCHES GEBIET

[0001] Die vorliegende Erfindung betrifft eine medizinische Saugpumpe, insbesondere eine motorbetriebene medizinische Saugpumpe. Derartige Saugpumpen sind insbesondere Brustpumpen zum Abpumpen von menschlicher Muttermilch oder Drainagepumpen zum Absaugen von Körperflüssigkeiten, wie beispielsweise für die Thoraxdrainage oder für die Wunddrainage.

STAND DER TECHNIK

[0002] Medizinische Saugpumpen, auch Vakuumpumpen genannt, sind für die verschiedensten Anwendungen bekannt. Beispielsweise werden sie als Brustpumpen zum Abpumpen von menschlicher Muttermilch oder als Drainagepumpen zum Absaugen von Körperflüssigkeiten verwendet. Derartige Saugpumpen weisen als Pumpaggregat Kolbenpumpen oder Membranpumpen auf. Die Verwendung einer Pumpmembran hat den Vorteil, dass die Saugpumpe als Ganzes relativ klein und leicht und im Gebrauch tragbar ausgebildet werden kann. Ein sehr kleines und trotzdem die hohen Anforderungen an eine Brustpumpe erfüllendes motorbetriebenes Pumpaggregat ist aus WO 2006/032156 A1 bekannt. Tragbare Saugpumpen weisen üblicherweise auch einen Energiespeicher zum Betreiben eines Motors des Pumpaggregats auf. Die Grösse des Energiespeichers und des Pumpaggregat bestimmen somit im Wesentlichen die Grösse des Pumpengehäuses.

[0003] Eine weitere Anforderung an derartige Saugpumpen ist die Schalldämpfung. Das Pumpaggregat ist oft relativ laut und rhythmisch wiederkehrende Geräusche stören den Benützer. Es ist deshalb bekannt, das Pumpaggregat in eine schalldämmende bzw. schalldämpfende Umgebung einzubetten. In diesem Text wird Schalldämmung und Schalldämpfung gleichwertig behandelt und jeweils als Schalldämpfung bezeichnet.

[0004] WO 2017/157691 A1 offenbart eine medizinische Saugpumpe mit einer elastischen Lagerung des Pumpaggregats innerhalb eines Pumpengehäuses.

[0005] In WO 2015/109934 A1 ist das Pumpaggregat in einem geschlossenen inneren Gehäuse angeordnet und eine Batterie ist parallel zum inneren Gehäuse in einem äusseren Pumpengehäuse angeordnet.

[0006] In WO 2017/140562 A1 ist das Pumpaggregat mittels Federn in einem äusseren Pumpengehäuse befestigt.

DARSTELLUNG DER ERFINDUNG

[0007] Es ist deshalb eine Aufgabe der Erfindung, eine medizinische Saugpumpe zu schaffen, welche möglichst kompakt, jedoch robust ausgebildet ist.

[0008] Diese Aufgabe löst eine motorbetriebene medizinische Saugpumpe mit den Merkmalen des Patentanspruchs 1.

[0009] Die erfindungsgemässe motorbetriebene medizinische Saugpumpe weist ein Pumpaggregat zur Erzeugung eines Unterdrucks, einen Pumpaggregatträger zur Halterung des Pumpaggregats und eine Aufnahme zur Aufnahme eines Energiespeichers auf, wobei das im Pumpaggregatträger angeordnete Pumpaggregat eine erste Längsachse definiert und die Aufnahme eine zweite Längsachse definiert. Erfindungsgemäss bildet der Pumpaggregatträger die Aufnahme und die zweite Längsachse verläuft in einem Winkel zur ersten Längsachse.

[0010] Da der Pumpaggregatträger die Aufnahme für den Energiespeicher bildet und dank der winkligen Anordnung von Pumpaggregat und Energiespeicher sind praktisch keine Leerräume vorhanden und die Grösse der Saugpumpe insgesamt ist minimiert. Da Pumpaggregat und Energiespeicher von demselben Pumpaggregatträger gehalten sind, ist die Vorrichtung insgesamt relativ steif ausgebildet. Dies erhöht nicht nur die Robustheit der Vorrichtung sondern dies minimiert auch Schwingungen beim Betrieb des Pumpaggregats und reduziert somit die Geräuschbildung bzw. -weiterleitung.

[0011] In bevorzugten Ausführungsformen ist der Pumpaggregatträger im Wesentlichen als Rahmen ausgebildet. Der Rahmen kann eine beliebige Form aufweisen. Vorzugsweise weist er jedoch eine im Wesentlichen längliche abgerundete Grundform, insbesondere eine elliptische oder ovale Grundform, auf. Die Ausbildung als Rahmen ermöglicht eine Leichtbauweise und erhöht zudem die Steifigkeit. Zudem ist ein Minimum an Material notwendig, was die Herstellungskosten entsprechend minimiert. Der Rahmen ist vorzugsweise einstückig ausgebildet. Vorzugsweise ist er im Spritzgussverfahren aus Kunststoff hergestellt.

[0012] Vorzugsweise umfasst die Saugpumpe ein erstes Pumpgengehäuseteil und ein zweites Pumpengehäuseteil, wobei der Pumpaggregatträger zwischen dem ersten und dem zweiten Pumpengehäuseteil gehalten ist. Dadurch wird er in seiner Lage fixiert und seine Steifigkeit wird erhöht.

[0013] In bevorzugten Ausführungsformen bildet der Pumpaggregatträger einen Teil des Pumpengehäuses. Er bildet vorzugsweise ein von aussen sichtbares Verbindungsteil zwischen dem ersten und dem zweiten Pumpengehäuseteil. Dies erleichtert den Zusammenbau der einzelnen Bauteile und eine weitere Lagerung des Pumpaggregatträgers inner-

halb des Pumpengehäuses lässt sich dadurch vermeiden.

[0014] Vorzugsweise ist der gesamte Pumpaggregatträger einstückig ausgebildet.

[0015] In bevorzugten Ausführungsformen sind mindestens zwei elastische Lager zur Lagerung des Pumpaggregats im Pumpaggregatträger vorhanden. Dadurch lässt sich die Übertragung von Vibrationen und Körperschall vom Pumpaggregat auf den Pumpaggregatträger und somit auf das Pumpengehäuse minimieren bzw. vermeiden. Zudem ist das Pumpaggregat dadurch definiert gehalten und trotzdem flexibel aufgehängt, so dass die Geräuschentwicklung reduziert und/oder gedämpft wird. Vorzugsweise ist eine Zweipunktlagerung vorhanden. Es ist jedoch auch möglich, eine Drei- oder Mehrpunktlagerung einzusetzen. Die Lager sind vorzugsweise aus einem Elastomer gebildet.

[0016] Vorzugsweise bildet mindestens ein erstes dieser Lager einen Vakuumanschluss. Mindestens ein zweites dieser Lager, welches vorzugsweise das Gegenlager zum ersten Lager bildet, ist vorzugsweise an einem motorseitigen Ende des Pumpaggregats und in Verlängerung einer Motorachse des Pumpaggregats, d.h. in der Flucht der Motorachse, angeordnet.

[0017] Vorzugsweise sind genau zwei Lager vorhanden, welche entlang der ersten Längsachse an gegenüberliegenden Enden des Pumpaggregats angeordnet sind. Vorzugsweise sind diese zwei Lager bezüglich der ersten Längsachse versetzt zueinander angeordnet. Die Verwendung von genau zwei elastischen Lagern und/oder die genannte Anordnung der Lager minimiert die Grösse der Saugpumpe insgesamt und führt zudem dazu, dass sich Vibrationen und Körperschall nicht oder nur begrenzt ausbreiten können.

[0018] Die Schalldämpfung ist optimiert, wenn das Pumpaggregat in einem Schalldämpfungsgehäuse angeordnet ist und das Schalldämpfungsgehäuse im Pumpaggregatträger gehalten ist.

[0019] Vorzugsweise ist eine Lufteinlassöffnung vorhanden, welche von einem Schalldämpfungselement überdeckt ist. Vorzugsweise ist die Lufteinlassöffnung im Schalldämpfungsgehäuse angeordnet, welches Zischgeräusche beim Einsaugen der Umgebungsluft minimiert. Das Schalldämpfungselement besteht vorzugsweise aus Schaumstoff oder aus einem anderen geeigneten porösen oder luftdurchlässigen Material. Das Pumpengehäuse ist vorzugsweise auf bekannte Art und Weise undicht ausgebildet, so dass über mehrere Stellen ein Luftaustausch vom Innenraum des Pumpgengehäuses in die Umgebung und umgekehrt stattfinden kann.

[0020] Vorzugsweise weist das Schalldämpfungsgehäuse ein Etui mit einer Aufnahmeöffnung zur Aufnahme des Pumpaggregats und einen das Etui verschliessenden Deckel auf, wobei der Deckel gebogen ausgebildet ist. Dies erleichtert den Zusammenbau der Vorrichtung und ermöglicht eine möglichst platzsparende Ausbildung des Schalldämpfungsgehäuses. Das Etui ist vorzugsweise aus einem steifen oder halbsteifen Material, insbesondere aus einem Kunststoff, und der Deckel ist vorzugsweise aus einem weichen Material gefertigt.

[0021] Vorzugsweise ist das Schalldämpfungsgehäuse mittels der mindestens zwei elastischen Lager im Pumpaggregatträger gelagert. Vorzugsweise lagern die mindestens zwei elastischen Lager einerseits das Schalldämpfungsgehäuse im Pumpengehäuse und andererseits das Pumpaggregat innerhalb des Schalldämpfungsgehäuses. D.h. dieselben Lager weisen Doppelfunktionen auf, vorzugsweise weist jedes Lager auf zwei gegenüberliegenden Seiten entsprechende Flächen oder Ausbildungen auf. Dadurch reduziert sich die Anzahl der benötigten Lager. Die Lagerung ist genau definiert und optimiert. Zudem benötigt sie wenig Platz und ein Minimum an Bauteilen. Die Schalldämpfung ist verbessert, der Zusammenbau erleichtert und die Herstellungskosten minimiert.

[0022] Vorzugsweise ist das erste Lager ein Lagermodul in Form eines elastischen Einsatzelements, welches im Schalldämpfungsgehäuse gehalten ist und dieses durchsetzt. Das gesamte Einsatzelement ist vorzugsweise weich und einstückig hergestellt, beispielsweise aus Silikon oder TPE (thermoplastisches Elastomer). Das Einsatzelement dient als zweiseitiges Lager und verschliesst zudem das Schalldämpfungsgehäuse.

[0023] Vorzugsweise ist das zweite Lager ein Deckel oder ein Lagermodul in Form eines Teils eines Deckels des Schalldämpfungsgehäuses, wobei der gesamte Deckel elastisch ausgebildet ist. Vorzugsweise besteht er aus einem weichen Material, wie z.B. Silikon oder TPE. Durch Wahl der Form des Deckels lässt sich die Steifigkeit der Lagerstelle definieren. Der Deckel an sich kann das zweite Lager bilden oder zumindest Teile dieses Lagers bilden.

[0024] Einzelne Elemente lassen sich auch ohne die winklige Anordnung von Pumpaggregat und Energiespeicher bzw. ohne die Anordnung dieser zwei Bauteile auf einem gemeinsamen Pumpaggregatträger zu anderen erfindungsgemässen Saugpumpen zusammensetzen. Beispiele hierfür sind nachfolgend angegeben, welche als separate Erfindungen ebenfalls beansprucht sind. Die oben genannten bevorzugten Ausführungsformen, insbesondere die Merkmale der abhängigen Patentansprüche, lassen sich auch entsprechend mit diesen Beispielen ohne Verwendung aller Merkmale des Patentanspruchs 1 kombinieren.

[0025] In einer bevorzugten, ebenfalls als Erfindung beanspruchten Ausführungsform weist eine medizinische Saugpumpe ein Pumpengehäuse, ein im Pumpengehäuse angeordnetes Pumpaggregat zur Erzeugung eines Unterdrucks und mindestens ein erstes elastisches Lager und ein zweites elastisches Lager zur Lagerung des Pumpaggregats im Pumpengehäuse auf. Das erste elastische Lager befindet sich an einem ersten Ende des Pumpaggregats und das zweite elastische Lager befindet sich an einem zweiten, dem ersten Ende gegenüberliegenden Ende des Pumpaggregats. Dabei bildet das erste elastische Lager einen Vakuumanschluss. Diese Anordnung ist äusserst platzsparend und vermindert in optimaler Weise Vibrationen.

[0026] In einer anderen, ebenfalls als Erfindung beanspruchten Ausführungsform weist eine medizinische Saugpumpe ein Pumpaggregat, ein Schalldämpfungsgehäuse zur Aufnahme des Pumpaggregats und ein Pumpengehäuse zur Aufnahme des Schalldämpfungsgehäuses auf. Das Schalldämpfungsgehäuse weist ein Etui zur Aufnahme des Pumpaggregats und einen das Etui verschliessenden Deckel auf. Der Deckel ist elastisch ausgebildet und er weist ein elastisches Lager zur Lagerung des Schalldämpfungsgehäuses im Pumpengehäuse auf. Diese Ausbildung ermöglicht einen einfachen Zusammenbau der Vorrichtung, da das Pumpaggregat lediglich in das Etui eingeschoben werden muss. Der elastische, insbesondere weiche Deckel verhindert auf optimale Weise Vibrationen und die Verbreitung von Körperschall.

[0027] In bevorzugten Ausführungsformen sind diese zwei Varianten miteinander kombiniert. D.h. das erste Lager bildet den Vakuumanschluss und das zweite Lager den Deckel.

[0028] In einer weiteren bevorzugten Ausführungsform, welche ebenfalls als separate Erfindung beansprucht wird, weist eine medizinische Saugpumpe ein Pumpaggregat, ein Schalldämpfungsgehäuse zur Aufnahme des Pumpaggregats und ein Pumpengehäuse zur Aufnahme des Schalldämpfungsgehäuses auf. Mindestens ein erstes und ein zweites elastisches Lager sind vorhanden, wobei mindestens eines dieser zwei elastischen Lager einerseits das Schalldämpfungsgehäuse im Pumpengehäuse lagert und andererseits das Pumpaggregat innerhalb des Schalldämpfungsgehäuses lagert. Vorzugsweise lagern beide elastischen Lager sowohl das Schalldämpfungsgehäuse bezüglich des Pumpengehäuses wie auch das Pumpaggregat bezüglich des Schalldämpfungsgehäuses. Das heisst, vorzugsweise sind beide elastischen Lager als Module ausgebildet, welche auf zwei gegenüberliegenden Seiten Lagerstellen bilden. Wie oben bereits erwähnt, ist hier die Lagerung sowie die Schalldämpfung optimiert und eine äusserst kompakte Bauweise ermöglicht. Diese Ausführungsform lässt sich beispielsweise erreichen, indem der Deckel und/oder der Vakuumanschluss als Lager ausgebildet sind und jeweils an den entsprechenden Stellen oder gesamthaft weich bzw. flexibel ausgebildet sind.

[0029] Weitere Ausführungsformen sind in den abhängigen Ansprüchen angegeben.

KURZE BESCHREIBUNG DER ZEICHNUNGEN

[0030] Bevorzugte Ausführungsformen der Erfindung werden im Folgenden anhand der Zeichnungen beschrieben, die lediglich zur Erläuterung dienen und nicht einschränkend auszulegen sind. In den Zeichnungen zeigen:

Figur 1 eine Explosionsdarstellung einer erfindungsgemässen Saugpumpe in einer ersten Ausführungsform;

Figur 2 einen ersten Querschnitt durch die Saugpumpe gemäss Figur 1;

Figur 3 einen zweiten Querschnitt durch die Saugpumpe gemäss Figur 1;

Figur 4 eine Explosionsdarstellung eines Schalldämpfungsgehäuses mit einem Pumpaggregat der Saugpumpe gemäss Figur 1;

Figur 5 eine perspektivische Darstellung eines Teils der Saugpumpe gemäss Figur 1 ohne Schalldämpfungselement;

Figur 6 eine perspektivische Darstellung eines Teils der Saugpumpe gemäss Figur 1 mit Schalldämpfungselement;

Figur 7 eine perspektivische Darstellung eines ersten Lagermoduls der Saugpumpe gemäss Figur 1;

Figur 8 eine Ansicht des ersten Lagermoduls gemäss Figur 7 von oben;

Figur 9a einen Querschnitt durch eine Anschlussöffnung des ersten Lagermoduls gemäss Figur 7 in einer ersten Variante;

Figur 9b einen Querschnitt durch eine Anschlussöffnung des ersten Lagermoduls gemäss Figur 7 in einer zweiten Variante;

Figur 9c einen Querschnitt durch eine Anschlussöffnung des ersten Lagermoduls gemäss Figur 7 in einer dritten Variante;

Figur 10 eine perspektivische Darstellung eines zweiten Lagermoduls der Saugpumpe gemäss Figur 1;

Figur 11 eine Ansicht des zweiten Lagermoduls gemäss Figur 10 von oben;

Figur 12a einen Querschnitt durch eine Anschlussöffnung des zweiten Lagermoduls gemäss Figur 11 in einer ersten Variante;

Figur 12b einen Querschnitt durch eine Anschlussöffnung des zweiten Lagermoduls gemäss Figur 11 in einer zweiten Variante;

Figur 12c einen Querschnitt durch eine Anschlussöffnung des zweiten Lagermoduls gemäss Figur 11 in einer dritten Variante und

Figur 12d einen Querschnitt durch eine Anschlussöffnung des zweiten Lagermoduls gemäss Figur 11 in einer vierten Variante.

BESCHREIBUNG BEVORZUGTER AUSFÜHRUNGSFORMEN

[0031] In Figur 1 ist ein bevorzugtes Ausführungsbeispiel einer erfindungsgemässen Saugpumpe dargestellt. Es handelt sich um eine Brustpumpe zum Abpumpen von menschlicher Muttermilch.

[0032] Die Saugpumpe weist ein erstes Pumpengehäuseteil 1, ein Schalldämpfungsgehäuse 2, einen Pumpaggregatträger 3, ein zweites Pumpengehäuseteil 4 sowie eine Abdeckung 5 auf. Im zusammengesetzten Zustand der Saugpumpe befindet sich das Schalldämpfungsgehäuse 2 innerhalb eines Pumpengehäuses, welches im Wesentlichen durch das erste Pumpengehäuseteil 1, das zweite Pumpengehäuseteil 4 und den dazwischen angeordneten und zwischen diesen zwei Teilen 1, 4 eingeklemmten Pumpaggregatträger 3 gebildet ist. Der Pumpaggregatträger 3 ist somit vorzugsweise von aussen als umlaufender Streifen erkennbar.

[0033] Das erste Pumpengehäuseteil 1 bildet den Boden der Saugpumpe. Es weist einen schalenförmigen Grundkörper 10 auf, dessen Unterseite, welche hier nach oben gerichtet ist, nahezu flach ausgebildet ist und eine Auflagefläche 11 bildet. Im Längsschnitt ist der Grundkörper 10 oval ausgebildet. Am Umfang des Grundkörpers 10 verteilt sind erste Verbindungselemente 12, vorzugsweise Schnappelemente oder andere bekannte Verbindungsmittel, angeordnet.

[0034] Das zweite Pumpengehäuseteil 4 weist eine im Wesentlichen ovale Grundplatte 40 und eine umlaufende Rinne 43 zur Aufnahme des Pumpaggregatträgers 3 auf. Auf der Grundplatte 40 sind die in Saugpumpen üblichen elektronischen Bauteile angeordnet. Sie sind hier lediglich schematisch dargestellt. Eine Steuer- und Elektronikeinheit ist mit dem Bezugszeichen 41 versehen. Über dem Umfang des zweiten Pumpengehäuseteils 4 verteilt sind zweite Verbindungselemente 42 angeordnet, die in den Rahmen 30 eingreifen.

[0035] Die Abdeckung 5 bildet zusammen mit dem zweiten Pumpengehäuseteil 4 das obere Teil des Pumpengehäuses, auch wenn diese Bauteile in dieser Darstellung unten angeordnet sind. Die Abdeckung 5 lässt sich auf dem zweiten Pumpengehäuseteil 4 befestigen. Sie weist vorzugsweise eine planparallele steife und ovale Deckplatte 50 mit einem Anzeige- und Betätigungsfenster 51 auf. Mittels des Anzeige- und Betätigungsfensters 51 lassen sich beispielsweise Benutzereingaben eingeben und die Funktionsweise der Saugpumpe optisch darstellen.

[0036] Der Pumpaggregatträger 3 ist vorzugsweise steif oder halbsteif ausgebildet. Vorzugsweise ist er aus einem Kunststoff gefertigt und vorzugsweise ist er einstückig. Er weist einen ovalen Rahmen 30 auf. An einer schmalen Stirnseite geht der Rahmen 30 in eine erhöhte Stirnwand 31 über, welche eine Durchgangsöffnung 33 aufweist. Die Rückseite der Stirnwand 31 ist mit einer ersten Lageraufnahme 36 versehen, welche die Durchgangsöffnung 33 umgibt. Verteilt über dem Umfang des Rahmens 30 sind dritte Verbindungselemente 32 vorhanden, die in das erste Pumpengehäuseteil 1 eingreifen, um das Pumpengehäuse zusammenzuhalten.

[0037] An dem der Durchgangsöffnung 33 gegenüberliegenden Ende des Rahmens 30 ist eine Energiespeicheraufnahme 35 angeordnet. Sie ist entsprechend der Form eines Energiespeichers 6 geformt. Der Energiespeicher 6 ist in diesem Beispiel eine zylinderförmige, wieder aufladbare Batterie. Andere Formen und Arten von Energiespeichern lassen sich auch verwenden. Die Energiespeicheraufnahme 35 ist als ein in der Figur 1 nach oben offener Kasten ausgebildet, wobei auf zwei gegenüberliegenden Seiten je ein Klammerelement 34 nach oben ragt. All diese Elemente sind vorzugsweise einstückig gemeinsam mit dem Rahmen 30 ausgebildet.

[0038] Benachbart zur Energiespeicheraufnahme 35 ist eine zweite Lageraufnahme 37 ausgebildet. Auch diese ist in diesem Beispiel als rechteckförmiger, nach oben offen ausgebildeter Kasten einstückig am Rahmen 30 angeformt. Das hintere, der Durchgangsöffnung 33 entgegengesetzte Ende des Rahmens 30 ist als Stromanschluss 38 ausgebildet. Dies ist in den Figuren 2 und 3 gut erkennbar.

[0039] Das Schalldämpfungsgehäuse 2 weist ein Etui 20 zur Aufnahme eines Pumpaggregats 7 auf. Das Etui 20 ist vorzugsweise steif oder halbsteif ausgebildet, insbesondere besteht es aus Kunststoff. Vorzugsweise weist es eine zur Pumpgehäuseform passende ovale abgerundete Form auf, wobei das Etui 20 im Bereich seiner Öffnung abgeschrägt ist. Die Abschrägung ist vorzugsweise geschwungen, so dass das Etui stufenförmig und auf einer Seite länger ausgebildet

ist als auf der anderen Seite. Dies ist in Figur 1 gut erkennbar.

[0040] Dieser stufenförmige Rand ist mittels eines Deckels 21 geschlossen. Der Deckel 21 weist einen entsprechend geschwungen ausgebildeten, d.h. gebogenen Verschlusskörper 210 auf. Dieser geht vorzugsweise einstückig in einen annähernd zylinderförmigen Übergangsbereich 211 über. Der Durchmesser dieses Übergangsbereichs 211 entspricht vorzugsweise annähernd dem Durchmesser des längeren Bereichs des Etuis 20. Dem Übergangsbereich 211 folgt ein Verbindungsstift 212, an welchem sich ein zweites Lagermodul 23 anschliesst. Dies ist in den Figuren 2 und 3 gut erkennbar. Ein erstes Lagermodul 22 befindet sich am gegenüberliegenden Ende des Etuis 20 und wird weiter unten im Text ausführlicher beschrieben.

[0041] Das zweite Lagermodul 23 kann auf den Verbindungsstift 212 aufgesteckt sein. Vorzugsweise ist es jedoch einstückig mit diesem und dem gesamten restlichen Deckel 21 ausgebildet. Vorzugsweise ist der Deckel 21 mit dem zweiten Lager 23 elastisch ausgebildet. Insbesondere ist er weich. Vorzugsweise ist er aus einem Elastomer oder aus Silikon gefertigt.

[0042] Das Etui 20 weist im Bereich des ersten Lagermoduls 22 eine Ausnehmung 200 auf, welche im oberen Bereich ein Fenster 202 aufweist. In dieser Ausnehmung 200 ist ein Schalldämpfungselement 25, hier ein Schaumstoffwürfel, angeordnet.

[0043] In Figur 2 ist die Anordnung des Schalldämpfungsgehäuses 2 sowie des Energiespeichers 6 innerhalb des Rahmens 30 des Pumpaggregatträgers 3 gut erkennbar. Das Schalldämpfungsgehäuse 2, genauer das Etui 20, ist mittels des ersten Lagermoduls 22 in der ersten Lageraufnahme 36 gelagert. Das zweite Lagermodul 23 befindet sich in der zweiten Lageraufnahme 37 des Pumpaggregatträgers 3, so dass das Schalldämpfungsgehäuse 2 auch an diesem gegenüberliegenden Ende im Pumpaggregatträger 3 gelagert ist. Somit ist eine Zweipunktlagerung vorhanden.

[0044] Eine Durchgangsöffnung des ersten Lagermoduls 22, welche hier einen Vakuumanschluss 24 bildet, fluchtet mit der Durchgangsöffnung 33 des Pumpaggregatträgers 3, wie dies in Figur 3 gut erkennbar ist. Diese Durchgangsöffnung 33 bildet somit eine Aufnahme für einen Stecker eines Saugschlauchs, welcher zu einer Brusthaube zum Anlegen an die Mutterbrust führt. Stecker, Saugschlauch und Brusthaube sind hier nicht dargestellt. Sie sind jedoch aus dem Stand der Technik hinlänglich bekannt.

[0045] Wie in Figur 2 erkennbar ist, definiert das Etui 20 eine erste Längsachse L_1, welche mit der Längsmittelachse des Vakuumanschlusses 24 fluchtet. Der Energiespeicher 6 definiert einen zweite Längsachse L_2, welche in einem Winkel zu dieser ersten Längsachse L_1 verläuft. Das zweite Lagermodul 23 definiert mit seiner Längsmittelachse eine dritte Längsachse L_3, welche parallel versetzt zur ersten Längsachse L_1 verläuft.

[0046] Wie in den Figuren 2 und 3 gut erkennbar ist, ist der Platz innerhalb des Pumpaggregatträgers durch die Abschrägung des Etuis 20 sowie durch die schräge Anordnung des Energiespeichers 6 optimal genutzt und Leerräume sind weitgehend vermieden. Das Pumpengehäuse kann insgesamt sehr klein und kompakt ausgebildet werden. Es ist schallgedämpft und trotzdem steif und robust.

[0047] Die Anordnung des Pumpaggregats 7 innerhalb des Schalldämpfungsgehäuses 2 ist in Figur 3 dargestellt. Eine passende Explosionsdarstellung dazu findet sich in Figur 4.

[0048] Vorzugsweise entspricht das Pumpaggregat 7 im Wesentlichen dem in WO 2006/032156 A1 beschriebenen Pumpaggregat. Es lassen sich jedoch auch andere Formen und Ausgestaltungen in der erfindungsgemässen Vorrichtung verwenden. Vorzugsweise umfasst das Pumpaggregat jedoch einen Elektromotor sowie eine Pumpeinheit, insbesondere eine Membranpumpe, vorzugsweise eine Pumpkammer mit einer Pumpmembran.

[0049] Der Elektromotor ist in den Figuren mit dem Bezugszeichen 70 versehen, die Pumpeinheit mit dem Bezugszeichen 71. Die dritte Längsachse L_3 des zweiten Lagermoduls 23 bildet die Flucht einer nicht dargestellten Motorachse des Elektromotors 70. Der Elektromotor 70 ist somit benachbart zum zweiten Lagermodul 23 angeordnet.

[0050] Die Pumpeinheit 71 weist eine Entlüftungsöffnung 710, eine Vakuumöffnung 711 sowie eine Belüftungsöffnung 712 auf. Dies ist in Figur 3 gut erkennbar.

[0051] Die Belüftungsöffnung 712 schliesst sich im zusammengebauten Zustand der Vorrichtung an eine Lufteinlassöffnung 201 an, welche sich in der Ausnehmung des Schalldämpfungsgehäuses 2 befindet. Diese Lufteinlassöffnung 201 ist in Figur 5 gut erkennbar. Sie ist vom Schalldämpfungselement 25 überdeckt, wie dies in Figur 6 dargestellt ist. Ein Fenster 202 ist aus spritzgusstechnischen Gründen im Etui 20 vorhanden.

[0052] Die Entlüftungsöffnung 710 führt in das Innere des Schalldämpfungsgehäuses 2, genauer des Etuis 20. Luft, welche über diese Entlüftungsöffnung 710 aus der Pumpeinheit 71 entweicht, verlässt das Schalldämpfungsgehäuse 2 über undichte Stellen wie beispielsweise über ein Aufnahmeelement 26 einer Steckverbindung mit einem Einsteckelement 213 des Deckels 21.

[0053] Die Vakuumöffnung 711 fluchtet mit einem Verbindungskanal 222 des ersten Lagermoduls 22, wie dies in Figur 4 erkennbar ist. Der Verbindungskanal 222 weist im Innern des ersten Lagermoduls 22 einen abgewinkelten, d.h. nicht geradlinigen Verlauf auf und endet im Vakuumanschluss 24, genauer in der darin vorhandenen Anschlussöffnung 225. Diese Anschlussöffnung 225 ist in Figur 7 gut erkennbar.

[0054] Das Pumpaggregat 7 ist mittels des ersten Lagermoduls 22 vakuumseitig im Schalldämpfungsgehäuse 2 gelagert und mittels des zweiten Lagermoduls 23, genauer des Deckels 21, motorseitig im Schalldämpfungsgehäuse 2

gelagert. Der Deckel 21 ist hierfür lediglich auf dem Etui 20 aufzustecken und mit den bereits erwähnten Einsteckelementen 213 in die entsprechenden Aufnahmeelemente 26 einzustecken.

[0055] Das erste Lagermodul 22 ist nicht wie in Figur 4 dargestellt dem Etui 20 vorgelagert, sondern es befindet sich innerhalb des Etuis 20. Es lässt sich hierfür einfach über die gebogene Öffnung einschieben und durch eine stirnseitige Durchgangsöffnung 27 des Etuis 20 teilweise durchschieben. Ein Anschlusskörper 221 ragt aus der Öffnung heraus, ein Hals 226 ist freigestellt und ein Grundkörper 220 dichtet gegenüber dem Innenraum des Etuis 20 an dessen Innenseite. Diese Teile sind in den Figuren 7 und 8 gut erkennbar. Zur Befestigung des Grundkörpers 220 im Etui 20 dient vorzugsweise ein Klemmelement 223 in der Form einer federnden Zunge. Diese Zunge 223 dichtet ebenfalls gegenüber dem Innenraum des Etuis 20.

[0056] Der Grundkörper 220 weist einen Belüftungskanal 224 auf, welcher die Verbindung zwischen der Belüftungsöffnung 712 der Pumpeinheit 71 und der Lufteinlassöffnung 201 des Etuis 20 schafft.

[0057] Das gesamte erste Lagermodul 22 ist einstückig und vorzugsweise elastisch, insbesondere weich ausgebildet. Es bildet somit an zwei gegenüberliegenden Seiten Lagerstellen aus: auf einer ersten Seite zwischen dem Schalldämpfungsgehäuse 2 und dem Pumpaggregatträger 3 und somit dem Pumpengehäuse und auf einer gegenüberliegenden Seite zwischen dem Schalldämpfungsgehäuse 2 und dem Pumpaggregat 7, genauer der Pumpeinheit 71.

[0058] Auch der Deckel mit dem zweiten Lagermodul 23 ist einstückig und vorzugsweise elastisch, insbesondere weich ausgebildet. Auch dieses bildet somit an zwei gegenüberliegenden Seiten Lagerstellen aus: auf einer ersten Seite zwischen dem Schalldämpfungsgehäuse 2 und dem Pumpaggregatträger 3 und somit dem Pumpengehäuse und auf einer gegenüberliegenden Seite zwischen dem Schalldämpfungsgehäuse 2 und dem Pumpaggregat 7, genauer dem Elektromotor 70. Da der Pumpaggregatträger 3 Teil des äusseren Pumpengehäuses ist, erübrigt sich eine weitere Lagerung.

[0059] Die Schalldämpfung bzw. die Vibrationsdämpfung lässt sich weiterhin optimieren, indem die Anschlussöffnung 225 entsprechend gewählt wird. Bewährt haben sich Formen, wie sie in den Figuren 9a bis 9c dargestellt sind. Es ist der Hals 226 des ersten Lagermoduls 22 im Querschnitt gezeigt sowie die sich darin befindliche Anschlussöffnung 225. Die Querschnitte des Halses 226 sowie die Formen der Anschlussöffnung 225 lassen sich beliebig miteinander kombinieren. In Figur 9a ist der Hals 226 kreuzförmig und die Anschlussöffnung 225 ist rund. In Figur 9b sind der Hals 226 und die Anschlussöffnung 225 oval und in Figur 9c sind sie rund. Die Kombination gemäss Figur 9b ist am meisten bevorzugt.

[0060] In den Figuren 10 bis 12d ist der Deckel 21 mit dem zweiten Lagermodul 23 dargestellt. Er weist wie bereits beschrieben den gebogenen Verschlusskörper 210, den Übergangsbereich 211, den Verbindungsstift 212 und das zweite Lagermodul 23 auf. Das zweite Lagermodul 23 weist vorzugsweise einen quaderförmigen Rahmen mit darin verlaufenden Verbindungsstreben auf. Dadurch ist er elastisch und passt sich seiner zugehörigen zweiten Lageraufnahme 37 optimal an.

[0061] Im Übergangsbereich 211 sind vorzugsweise Kabeldurchführungen 214 in Form von Durchgangsöffnungen vorhanden, um den Elektromotor 70 über die Grundplatte 40 mit der Steuer- und Elektronikeinheit 41 zu verbinden. Am gebogenen Verschlusskörper 210 sind die Einsteckelemente 213 angeformt.

[0062] Die Schalldämpfung und die Lagerung lassen sich durch die Formgebung des Verbindungsstifts 212 zusätzlich optimieren. In den Figuren 12a bis 12 sind bevorzugte Varianten dargestellt. Vorzugsweise ist der Verbindungsstift 212 vollflächig, also massiv ausgebildet. Vorzugsweise ist er relativ steif.

[0063] In Figur 12a ist sein Querschnitt kreuzförmig, in Figur 12b rund, in Figur 12c rechteckig und in Figur 12d oval. Vorzugsweise ist er kreuzförmig.

[0064] Die erfindungsgemässe Saugpumpe ist klein und kompakt und weist eine gute Schalldämpfung auf.

BEZUGSZEICHENLISTE

[0065]

1	erstes Pumpengehäuseteil	30	Rahmen
10	schalenförmiger Grundkörper	31	Stirnwand
11	Auflagefläche	32	drittes Verbindungselement
12	erstes Verbindungselement	33	Durchgangsöffnung
		34	Klammerelement
2	Schalldämpfungsgehäuse	35	Energiespeicheraufnahme
20	Etui	36	erste Lageraufnahme
200	Ausnehmung	37	zweite Lageraufnahme
201	Lufteinlassöffnung	38	Stromanschluss
202	Fenster		

(fortgesetzt)

21	Deckel	4	zweites Pumpengehäuseteil
210	gebogener Verschlusskörper	40	Grundplatte
211	Übergangsbereich	41	Steuer- und Elektronikeinheit
212	Verbindungsstift	42	zweites Verbindungselement
213	Einsteckelement	43	Rinne
214	Kabeldurchführungen		
22	erstes Lagermodul	5	Abdeckung
220	Grundkörper	50	Deckplatte
221	Anschlusskörper	51	Anzeige- und Betätigungsfenster
222	Verbindungskanal		
223	Klemmelement		
224	Belüftungskanal	6	Energiespeicher
225	Anschlussöffnung		
226	Hals	7	Pumpaggregat
23	zweites Lagermodul	70	Elektromotor
24	Vakuumanschluss	71	Pumpeinheit
25	Schalldämpfungselement	710	Entlüftungsöffnung
26	Aufnahmeelement	711	Vakuumöffnung
27	Durchgangsöffnung	712	Belüftungsöffnung
3	Pumpaggregatträger	L_1	erste Längsachse
L_2	zweite Längsachse		
L_3	dritte Längsachse		

Patentansprüche

1. Motorbetriebene medizinische Saugpumpe mit einem Pumpaggregat zur Erzeugung eines Unterdrucks, mit einem Pumpaggregatträger (3) zur Halterung des Pumpaggregats (7) und mit einer Aufnahme (35) zur Aufnahme eines Energiespeichers (7), wobei das im Pumpaggregatträger (3) angeordnete Pumpaggregat (7) eine erste Längsachse (L_1) definiert und die Aufnahme (35) eine zweite Längsachse (L_2) definiert, **dadurch gekennzeichnet, dass** der Pumpaggregatträger (3) die Aufnahme (35) bildet und dass die zweite Längsachse (L_2) in einem Winkel zur ersten Längsachse (L_1) verläuft.

2. Motorbetriebene medizinische Saugpumpe nach Anspruch 1, wobei der Pumpaggregatträger (3) im Wesentlichen als Rahmen (30) ausgebildet ist und eine im Wesentlichen längliche abgerundete Grundform, insbesondere einen elliptische oder ovale Grundform, aufweist.

3. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 1 oder 2, wobei sie ein Pumpengehäuse mit einem ersten Pumpengehäuseteil (1) und einem zweiten Pumpengehäuseteil (4) umfasst und wobei der Pumpaggregatträger (3) zwischen dem ersten und dem zweiten Pumpengehäuseteil (1, 4) gehalten ist.

4. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 1 bis 3, wobei eine Lufteinlassöffnung (201) vorhanden ist, welche von einem Schalldämpfungselement (25) überdeckt ist.

5. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 1 bis 4, wobei mindestens zwei elastische Lager (22, 23) vorhanden sind zur Lagerung des Pumpaggregats (7) im Pumpaggregatträger (3).

6. Motorbetriebene medizinische Saugpumpe nach Anspruch 5, wobei mindestens ein erstes dieser Lager (22) einen Vakuumanschluss (24) bildet und mindestens ein zweites dieser Lager (23) an einem motorseitigen Ende des Pumpaggregats (7) und in Verlängerung einer Motorachse des Pumpaggregats (7) angeordnet ist.

7. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 5 oder 6, wobei genau zwei Lager (22, 23) vorhanden sind, welche entlang der ersten Längsachse (L_1) an gegenüberliegenden Enden des Pumpaggregats

angeordnet sind.

8. Motorbetriebene medizinische Saugpumpe nach Anspruch 7, wobei die zwei Lager (22, 23) bezüglich der ersten Längsachse (L_1) versetzt zueinander angeordnet sind.

9. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 1 bis 8, wobei das Pumpaggregat (7) in einem Schalldämpfungsgehäuse (2) angeordnet ist und das Schalldämpfungsgehäuse (2) im Pumpaggregatträger (3) gehalten ist.

10. Motorbetriebene medizinische Saugpumpe nach Anspruch 9, wobei das Schalldämpfungsgehäuse (2) ein Etui (20) mit einer Aufnahmeöffnung zur Aufnahme des Pumpaggregats (7) und einen das Etui (20) verschliessenden Deckel (21) aufweist, wobei der Deckel (21) gebogen ausgebildet ist.

11. Motorbetriebene medizinische Saugpumpe nach den Ansprüchen 5 und 9, wobei das Schalldämpfungsgehäuse (2) mittels der mindestens zwei elastischen Lager (22, 23) im Pumpaggregatträger (3) gelagert ist.

12. Motorbetriebene medizinische Saugpumpe nach Anspruch 11, wobei die mindestens zwei elastischen Lager (22, 23) einerseits das Schalldämpfungsgehäuse (2) im Pumpengehäuse (1, 3, 4) lagern und andererseits das Pumpaggregat (7) innerhalb des Schalldämpfungsgehäuses (2) lagern.

13. Motorbetriebene medizinische Saugpumpe nach Anspruch 12, wobei das erste Lager (22) ein elastisches Einsatzelement ist, welches im Schalldämpfungsgehäuse (2) gehalten ist und dieses durchsetzt.

14. Motorbetriebene medizinische Saugpumpe nach einem der Ansprüche 12 oder 13, wobei das zweite Lager (23) Teil eines Deckels (21) des Schalldämpfungsgehäuses (2) ist, wobei der gesamte Deckel (21) elastisch ausgebildet ist.

15. Medizinische Saugpumpe mit einem Pumpengehäuse (1, 3, 4), mit einem im Pumpengehäuse (1, 3, 4) angeordneten Pumpaggregat (7) zur Erzeugung eines Unterdrucks und mit mindestens einem ersten elastischen Lager (22) und einem zweiten elastischen Lager (23) zur Lagerung des Pumpaggregats (7) im Pumpengehäuse (1, 3, 4), wobei das erste elastische Lager (22) sich an einem ersten Ende des Pumpaggregats (7) befindet und das zweite elastische Lager (23) sich an einem zweiten, dem ersten Ende gegenüberliegenden Ende des Pumpaggregats (7) befindet, **dadurch gekennzeichnet, dass** das erste elastische Lager (22) einen Vakuumanschluss (24) bildet.

16. Medizinische Saugpumpe mit einem Pumpaggregat (7), einem Schalldämpfungsgehäuse (2) zur Aufnahme des Pumpaggregats (7) und mit einem Pumpengehäuse (1, 3, 4) zur Aufnahme des Schalldämpfungsgehäuses (2), **dadurch gekennzeichnet, dass** das Schalldämpfungsgehäuse (2) ein Etui (20) zur Aufnahme des Pumpaggregats (7) und einen das Etui (20) verschliessenden Deckel (21) aufweist, wobei der Deckel (21) elastisch ausgebildet ist und ein elastisches Lager (23) zur Lagerung des Schalldämpfungsgehäuses (2) im Pumpengehäuse (1, 3, 4) aufweist.

17. Medizinische Saugpumpe mit einem Pumpaggregat (7), einem Schalldämpfungsgehäuse (2) zur Aufnahme des Pumpaggregats (7) und mit einem Pumpengehäuse (1, 3, 4) zur Aufnahme des Schalldämpfungsgehäuses (2), **dadurch gekennzeichnet, dass** mindestens ein erstes und ein zweites elastisches Lager (22, 23) vorhanden sind, wobei mindestens eines dieser zwei elastischen Lager (22, 23) einerseits das Schalldämpfungsgehäuse (2) im Pumpengehäuse (1, 3, 4) lagert und andererseits das Pumpaggregat (7) innerhalb des Schalldämpfungsgehäuses (2) lagert.

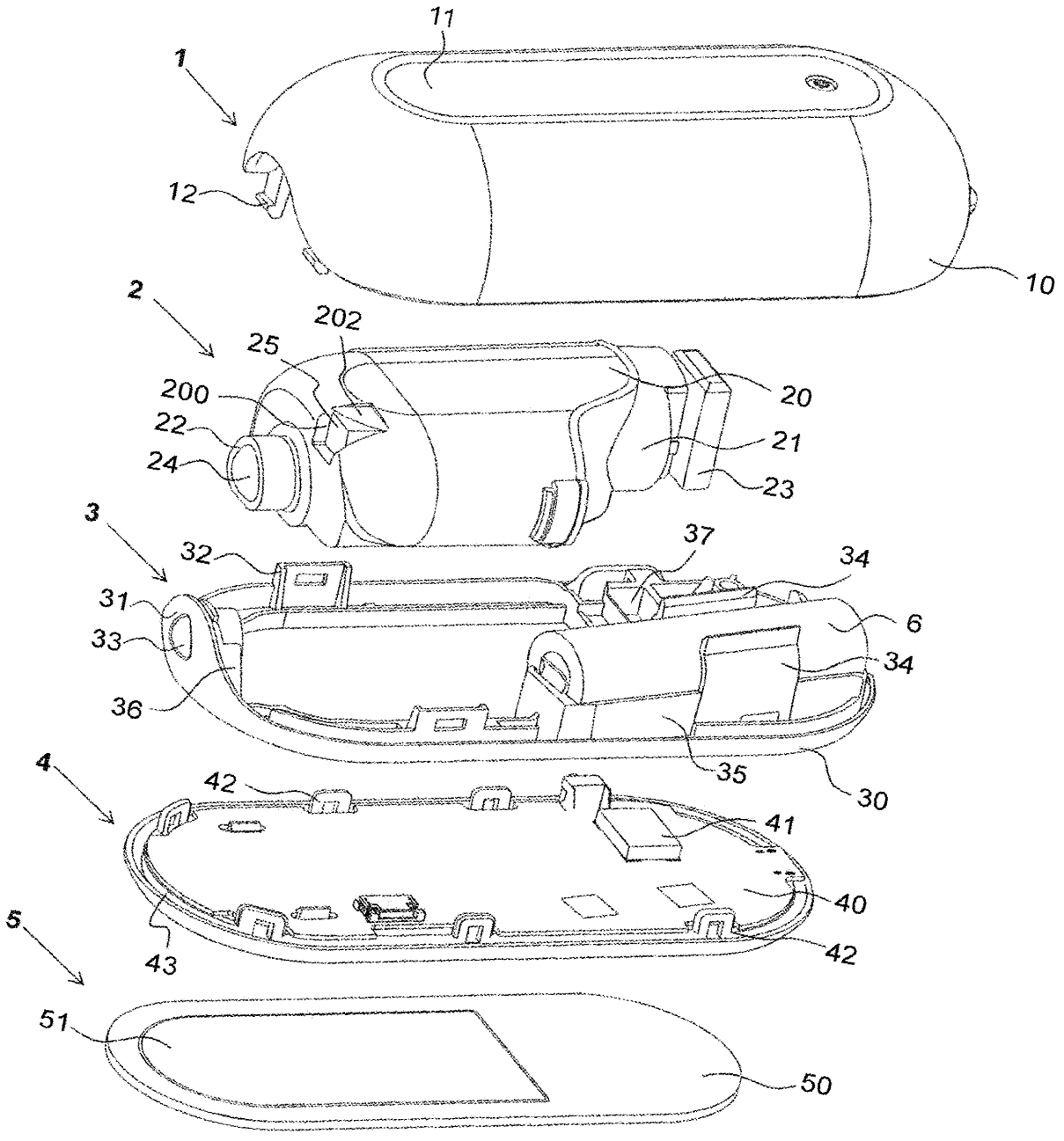

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FIG. 1

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FIG. 2

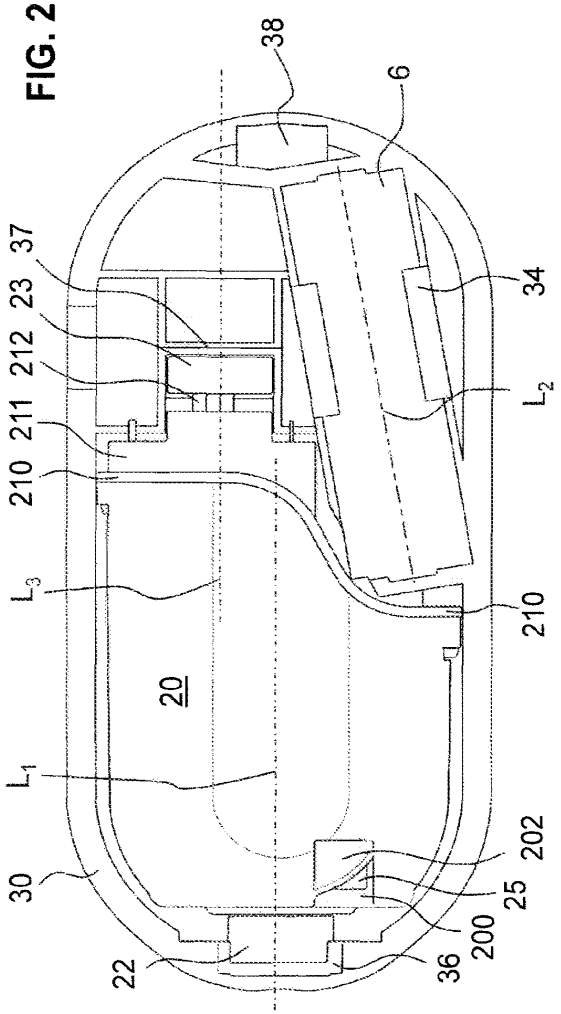
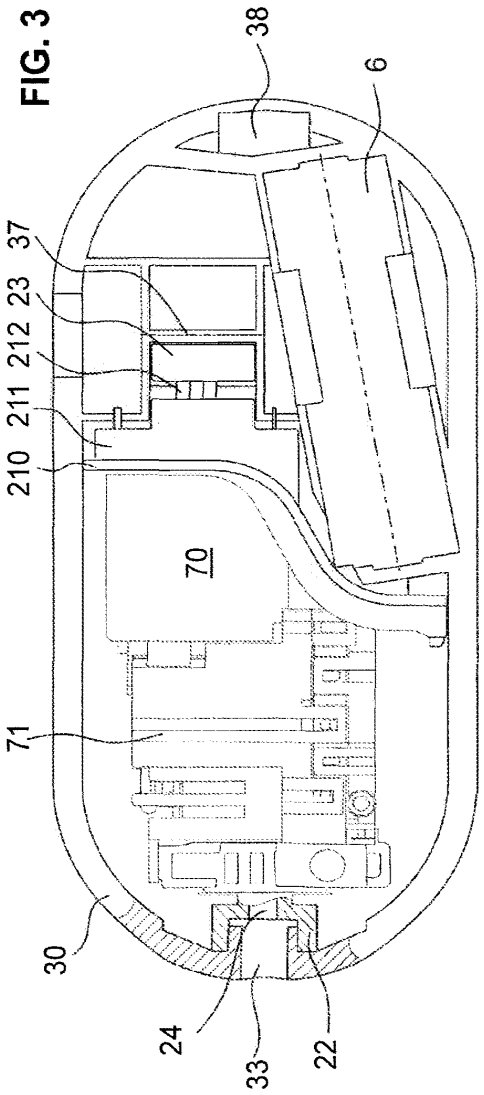

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FIG. 3


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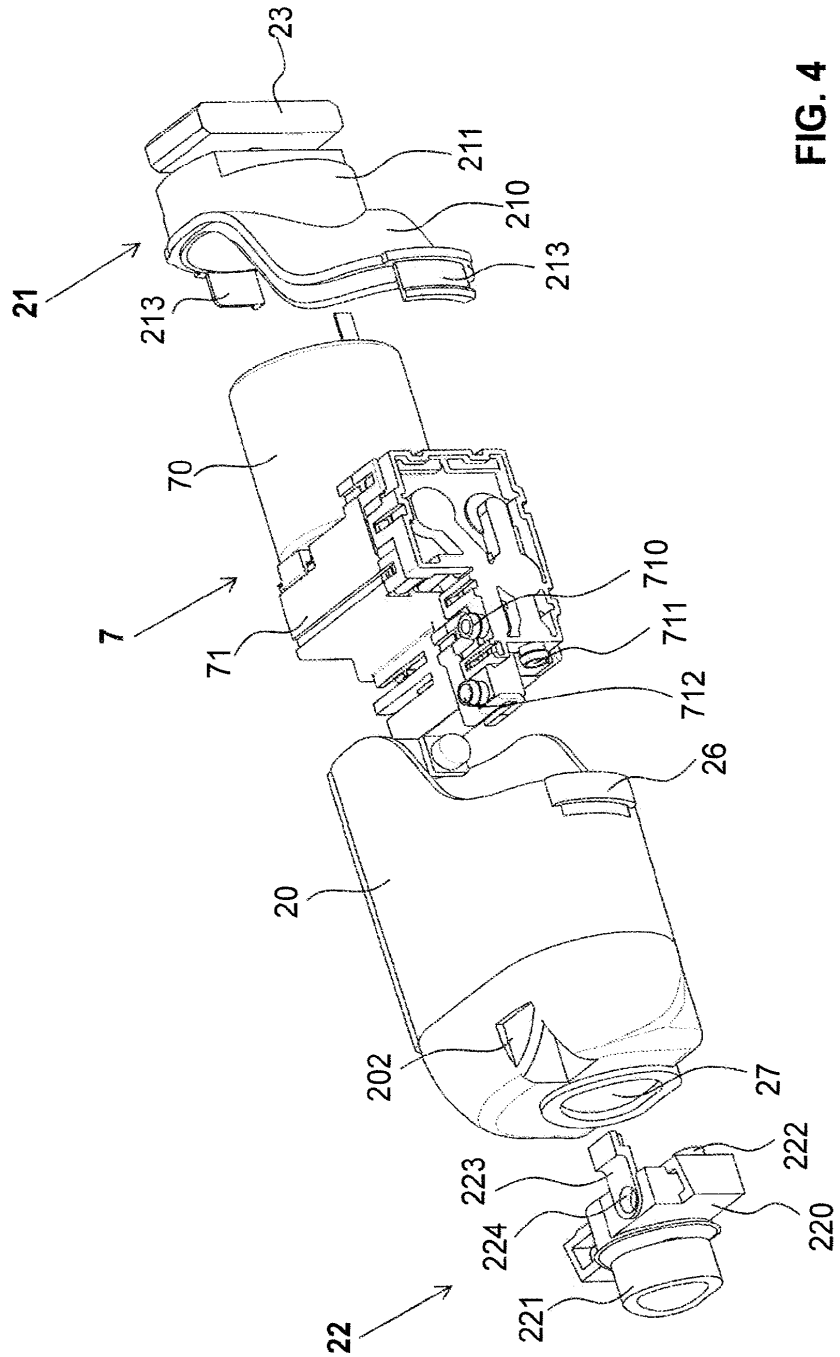

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FIG. 4

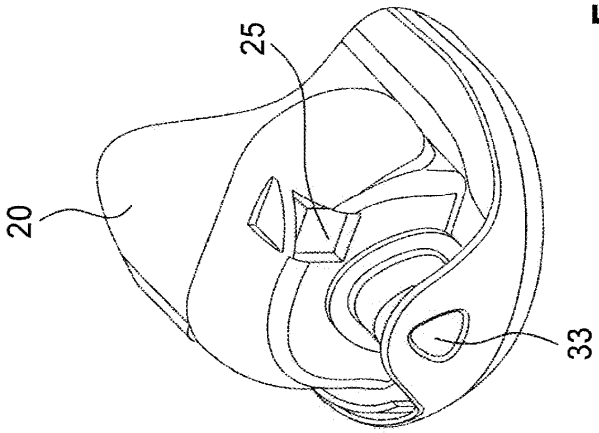


FIG. 6

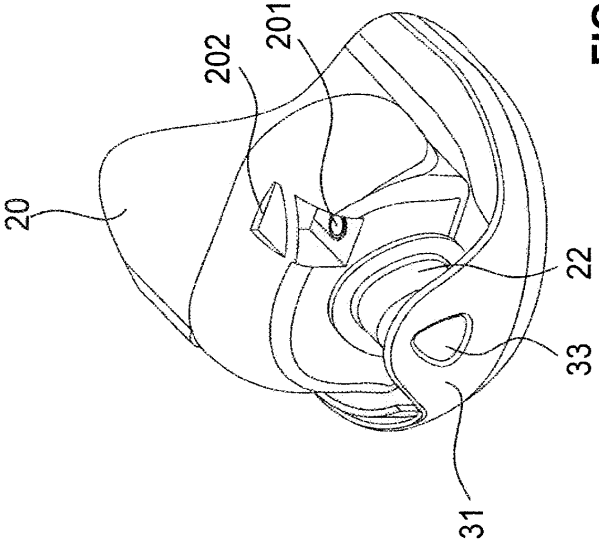


FIG. 5

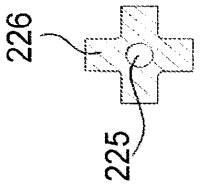


FIG. 9a

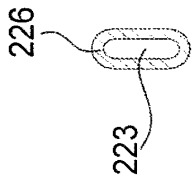


FIG. 9b

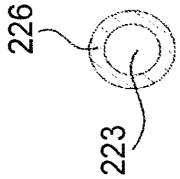


FIG. 9c

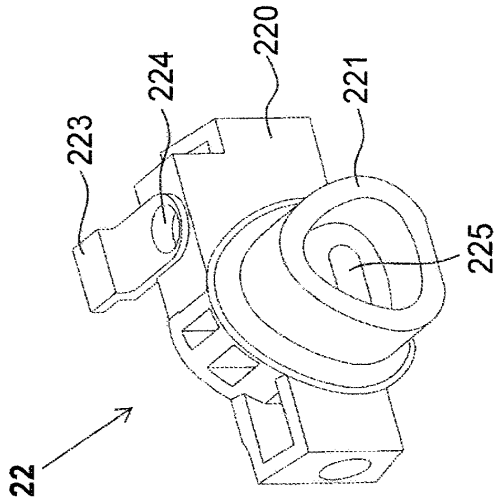


FIG. 7

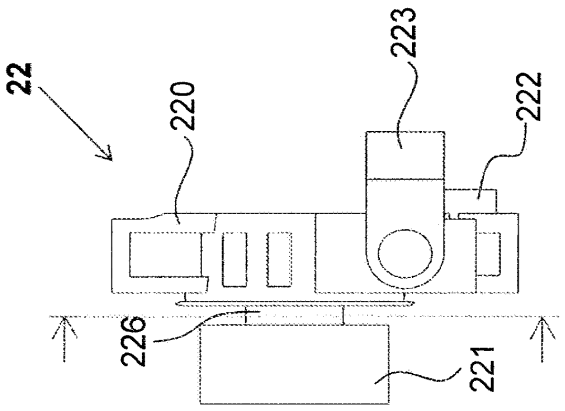


FIG. 8



FIG. 12a



FIG. 12b



FIG. 12c



FIG. 12d

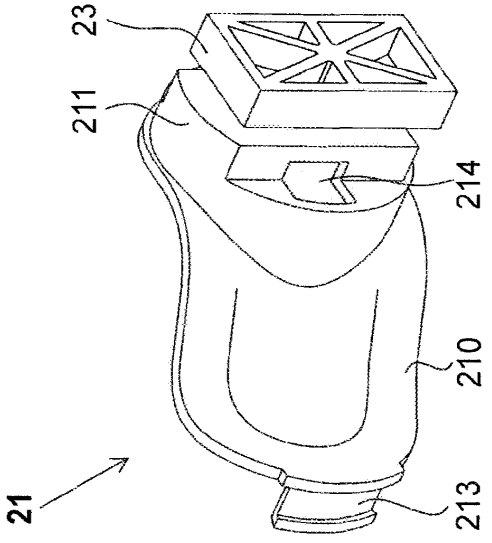


FIG. 10

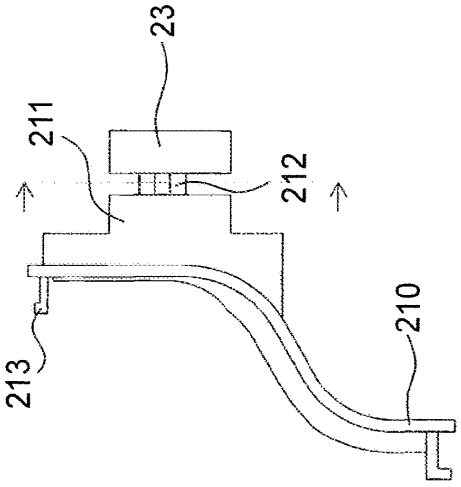


FIG. 11

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EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 17 20 1540

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
X	WO 2017/139437 A1 (EXPLORAMED NC7 INC [US]) 17. August 2017 (2017-08-17) * Absätze [0080] - [0083]; Abbildungen 2,6A *	1-14	INV. A61M1/00
X	US 2015/025482 A1 (BEGIN MILES [US] ET AL) 22. Januar 2015 (2015-01-22) * Absätze [0044] - [0049]; Abbildung 2E *	1-14	
X	WO 2009/047524 A2 (TALLEY GROUP LTD [GB]; BYBORDI FARHAD [US]) 16. April 2009 (2009-04-16) * Seite 9, Zeilen 3-29; Abbildung 2B *	1-14	
X	WO 2016/103031 A1 (SMITH & NEPHEW [GB]) 30. Juni 2016 (2016-06-30) * Absätze [0155], [0211]; Abbildungen 13-14, 20 *	15	
			RECHERCHIERTE SACHGEBIETE (IPC) A61M

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
Den Haag	18. Juni 2018	Westsson, David

KATEGORIE DER GENANNTEN DOKUMENTE

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Siehe Ergänzungsblatt B

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☐ Keine der weiteren Recherchengebühren wurde innerhalb der gesetzten Frist entrichtet. Der vorliegende europäische Recherchenbericht wurde für die Teile der Anmeldung erstellt, die sich auf die zuerst in den Patentansprüchen erwähnte Erfindung beziehen, nämlich Patentansprüche:

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EP 17 20 1540

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1. Ansprüche: 1-14

Motorbetriebene medizinische Saugpumpe mit einem Pumpaggregat zur Erzeugung eines Unterdrucks, mit einem Pumpaggregatträger zur Halterung des Pumpaggregats und mit einer Aufnahme zur Aufnahme eines Energiespeichers, wobei das im Pumpaggregatträger angeordnete Pumpaggregat eine erste Längsachse (L) definiert und die Aufnahme eine zweite Längsachse (L2) definiert,dadurch gekennzeichnet, dassder Pumpaggregatträger die Aufnahme bildet und dass die zweite Längsachse (L2) in einem Winkel zur ersten Längsachse (L]) verläuft.

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2. Anspruch: 15

Medizinische Saugpumpe mit einem Pumpengehäuse, mit einem im Pumpengehäuse angeordneten Pumpaggregat zur Erzeugung eines Unterdrucks und mit mindestens einem ersten elastischen Lager und einem zweiten elastischen Lager zur Lagerung des Pumpaggregats im Pumpengehäuse, wobei das erste elastische Lager sich an einem ersten Ende des Pumpaggregats befindet und das zweite elastische Lager sich an einem zweiten, dem ersten Ende gegenüberliegenden Ende des Pumpaggregats befindet,dadurch gekennzeichnet, dassdas erste elastische Lager einen Vakuumanschluss bildet.

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3. Anspruch: 15

Medizinische Saugpumpe mit einem Pumpengehäuse, mit einem im Pumpengehäuse angeordneten Pumpaggregat zur Erzeugung eines Unterdrucks und mit mindestens einem ersten elastischen Lager und einem zweiten elastischen Lager zur Lagerung des Pumpaggregats im Pumpengehäuse, wobei das erste elastische Lager sich an einem ersten Ende des Pumpaggregats befindet und das zweite elastische Lager sich an einem zweiten, dem ersten Ende gegenüberliegenden Ende des Pumpaggregats befindet,dadurch gekennzeichnet, dassdas erste elastische Lager einen Vakuumanschluss bildet.

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4. Anspruch: 16

Medizinische Saugpumpe mit einem Pumpaggregat, einem Schalldämpfungsgehäuse zur Aufnahme des Pumpaggregats und mit einem Pumpengehäuse zur Aufnahme des Schalldämpfungsgehäuses,dadurch gekennzeichnet, dassdas Schalldämpfungsgehäuse ein Etui zur Aufnahme des Pumpaggregats und einen das Etui verschliessenden Deckel aufweist, wobei der Deckel elastisch ausgebildet ist und ein

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MANGELNDE EINHEITLICHKEIT DER ERFINDUNG
ERGÄNZUNGSBLATT B

Nummer der Anmeldung
EP 17 20 1540

Nach Auffassung der Recherchenabteilung entspricht die vorliegende europäische Patentanmeldung nicht den Anforderungen an die Einheitlichkeit der Erfindung und enthält mehrere Erfindungen oder Gruppen von Erfindungen, nämlich:

elastisches Lager zur Lagerung des Schalldämpfungsgehäuses im Pumpengehäuse aufweist.

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5. Anspruch: 17

Medizinische Saugpumpe mit einem Pumpaggregat, einem Schalldämpfungsgehäuse zur Aufnahme des Pumpaggregats und mit einem Pumpengehäuse zur Aufnahme des Schalldämpfungsgehäuses,dadurch gekennzeichnet, dassmindestens ein erstes und ein zweites elastisches Lager vorhanden sind, wobei mindestens eines dieser zwei elastischen Lager einerseits das Schalldämpfungsgehäuse im Pumpengehäuse lagert und andererseits das Pumpaggregat innerhalb des Schalldämpfungsgehäuses lagert.

ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 17 20 1540

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

18-06-2018

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
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		US 2017348469 A1	07-12-2017
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		WO 2016103032 A1	30-06-2016
		WO 2016103033 A2	30-06-2016
		WO 2016103035 A2	30-06-2016

EPO FORM P0461

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

Diese Liste der vom Anmelder aufgeführten Dokumente wurde ausschließlich zur Information des Lesers aufgenommen und ist nicht Bestandteil des europäischen Patentdokumentes. Sie wurde mit größter Sorgfalt zusammengestellt; das EPA übernimmt jedoch keinerlei Haftung für etwaige Fehler oder Auslassungen.

In der Beschreibung aufgeführte Patentdokumente

- WO 2006032156 A1 **[0002] [0048]**
- WO 2017157691 A1 **[0004]**
- WO 2015109934 A1 **[0005]**
- WO 2017140562 A1 **[0006]**

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002

CONFIRMATION NO. 7980

26111
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

PUBLICATION NOTICE

OC00000137962008

Date Mailed: 05/25/2023

Title:WEARABLE BREAST PUMP SYSTEM
Publication No.US-2023-0158215-A1
Publication Date:05/25/2023

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211,et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

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In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic business center at www.upsto.gov using the public side of the Patent Application Information and Retrieval(PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**06/27/2023 10:45:32 AM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Jon Baitlon
PATENT CENTER #	62341725	AUTHORIZED BY	Yangbeini Wang
CUSTOMER #	26111	FILING DATE	12/30/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1008	E20236QA46325913	Jon Baitlon

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	104.00	1	104.00
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If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**06/27/2023 10:45:32 AM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

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PATENT CENTER #	62341725	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangbeini Wang

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2023-06-27-Transmittal-Form-sIDS-4944-0360002.pdf	1	Miscellaneous Incoming Letter	161 KB
2023-06-27-sIDS-Pleading-4944-0360002.pdf	2	Transmittal Letter	117 KB
2023-06-27-sIDS-Form-SB08-4944-0360002.pdf	3	Information Disclosure Statement (IDS) Form (SB08)	149 KB
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NPL_1_Amended-Complaint.pdf	24	Non Patent Literature	304 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-06-27-Transmittal-Form-sIDS-4944-0360002.pdf	27B409105D04E739E6A40835542C1A70245442E6D0053FF7FF B320BE4611C8A3C1B1F51D73941FE0B31FD174140CDDD4851 87352CA1BEDEBAC4F2EEEFC9F3E5A
2023-06-27-sIDS-Pleading-4944-0360002.pdf	0A50836E3333B98913AFBDE22E4152EAC99CB7537511B38A22 94774F4F563DC8CC78B44E80DAABF8B28EEDF9085030729D4 88BB8B6985388A2DA6DDA219CF0C6
2023-06-27-sIDS-Form-SB08-4944-0360002.pdf	6E4A6D2EA801A6A496C82BD83902949C153444481B1A703919 B24E4F2CFA37329DC950840291146767229468 58A10A304B26 D4864EA75F4D9467252F59007FFF
NPL_1_Amended-Complaint.pdf	0689BD6CB3C7261D12519D347B8C0BA90106F9A82F5EDFF2C FCA991A41F5DD6062586413A5BB4A3635FD59FFEF8835335C B14B154E8924BE9E35D7074B78F5D7

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: CHIARO TECHNOLOGY LIMITED	Art Unit: 3783
Application No.: 18/148,864	Examiner: *FREDERICKSON, COURTNEY B*
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Supplemental Information Disclosure Statement

Mail Stop Amendment

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Commissioner:

Listed on accompanying IDS Forms PTO/SB/08a or its equivalent and PTO/SB/08b or its equivalent are documents that may be considered material to the patentability of this application as defined in 37 C.F.R. §1.56, and in compliance with the duty of disclosure requirements of 37 C.F.R. §§ 1.97 and 1.98.

Applicant has listed dates on the attached IDS Forms based on information presently available to the undersigned. However, the listed dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This statement should not be construed as a representation that a search has been made, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith.

This Information Disclosure Statement is being filed under 37 C.F.R. § 1.97(c) and is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office

Action on the merits, but before the mailing date of a Final Rejection, or Notice of Allowance, or an action that otherwise closes prosecution in the application. The required fee is provided through online credit card payment authorization in the amount of **$104.00** in payment of the fee under 37 C.F.R. § 1.17(p).

Copy of **NPL1** is submitted. However, in accordance with 37 C.F.R. § 1.98(a)(2)(ii), no copies of the U.S. patents and patent application publications cited on the attached IDS Forms are submitted.

It is expected that the examiner will review the prosecution and cited art in the parent Application No. 17/907,347, filed September 26, 2022, in accordance with MPEP 2001.06(b), and indicate in the next communication from the office that the art cited in the earlier prosecution history has been reviewed in connection with the present application.

It is respectfully requested that the Examiner initial and return a copy of the enclosed IDS Forms, and indicate in the official file wrapper of this patent application that the documents have been considered.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Yangbeini Wang #800,005/

Yangbeini Wang
Attorney for Applicant
Registration No. 800,005

Date: June 27, 2023

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(202) 371-2600

20352617.1

Atty. Dkt. No. 4944.0360002

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

ENCLOSURES (*Check all that apply*)

- ☐ Fee Transmittal Form
- ☑ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
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- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

Copy of NPL1 is submitted.

Remarks

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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Yangbeini Wang #800,005/		
Printed name	Yangbeini Wang		
Date	June 27, 2023	Reg. No.	800,005

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Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Sheet 1 of 3

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	US20040024351A1	02-05-2004	GRETER	
	US2	US20050228342A1	10-13-2005	YUEN	
	US3	US20150157775A1	06-11-2015	HU	
	US4	US20230111110A1	04-13-2023	DE BECDELIEVRE et al.	
	US5	US20230143842A1	05-11-2023	O'TOOLE et al.	
	US6	US20230158215A1	05-25-2023	O'TOOLE et al.	
	US7	US4,673,388A	06-16-1987	SCHLENSOG et al.	
	US8	US9498565B2	11-22-2016	NOWROOZI et al.	
	US9	US11260151B2	03-01-2022	O'TOOLE et al.	
	US10	US11311654B2	04-26-2022	O'TOOLE et al.	
	US11	US11324866B2	05-10-2022	O'TOOLE et al.	
	US12	US11357894B2	06-14-2022	O'TOOLE et al.	
	US13	US11357893B2	06-14-2022	O'TOOLE et al.	
	US14	US11376352B2	07-05-2022	O'TOOLE et al.	
	US15	US11413380B2	08-16-2022	O'TOOLE et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

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Substitute for form 1449/PTO				Complete if Known	
SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	18/148,864
				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	2	of	3	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	NPL1	Amended Complaint in Shenzhen Root Technology Co., Ltd. v. Chiaro Technology, Ltd., WDWA-2-23-cv-00631, filed June 2, 2023; 24 pages.	

Examiner Signature		Date Considered	

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Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO				Complete if Known	
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				Filing Date	December 30, 2022
				First Named Inventor	Thibault DE BECDELIEVRE
				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	3	of	3	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Yangbeini Wang #800,005 /	Date (YYYY-MM-DD)	2023-06-27
Name/Print	Yangbeini Wang	Registration Number	800,005

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 08/08/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
08/08/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Applicant-Initiated Interview Summary	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.		
	Examiner COURTNEY FREDRICKSON	**Art Unit** 3783	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
COURTNEY FREDRICKSON	Primary Examiner	Telephonic
Yangbeini Wang	Attorney	
Rich Coller	Attorney	

Date of Interview: 02 August 2023

Issues Discussed:

Proposed Amendment(s)

The examiner indicated that the proposed amendment to claim 1 is sufficient to overcome the current rejection. The examiner expressed concern over the use of the "extends over" language in the proposed amendment to claim 8. It was discussed amending the language to indicate that the diaphragm is configured to block the milk port, which would be sufficient to overcome the current rejection. In regards to claim 16, the examiner did not believe that the currently proposed language was supported by the specification as there does not appear to be explicit support for the outer shell to form a seal WITH the diaphragm. Instead, it appears that the cap, which form a part of an outer portion of the device, forms a seal with the diaphragm (paragraph 55 of the published application). The examiner noted that claiming this feature would be sufficient to overcome the current rejection.

☑ Attachment

/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

For Discussion Purposes Only

Proposed Agenda for Telephonic Examiner Interview
On August 2, 2023 at 11:30 AM EST
U.S. Patent Application No. 18/148,864
Examiner Fredrickson

Applicant's Representatives: Rich Coller (Reg. No. 60,390); Yangbeini Wang (Reg. No. 800,005)
USPTO: Examiner Fredrickson

Dear Examiner Fredrickson,

We propose the following agenda for the interview scheduled on August 2 at 11:30 AM Eastern time:

1. Discussion of potential amendments to overcome the 103 rejection of claim 1 over Park (WO2016186452) in view of Garbez (US2018/0008758).

    1.1. at least a part of the diaphragm is arranged over the closed end of the nipple tunnel and concentric with the nipple tunnel.

    - Support can be found at least in ¶¶ [0067] and [0077]-[0079] of the Specification and FIGS. 6 and 8.

    - In Park, the alleged diaphragm (separation membrane 500) is arranged "above the closed end," and it is not concentric with the alleged nipple tunnel (protruding part 110).

2. Discussion of potential amendments to overcome the 103 rejection of claim 8 over Hwang (US2021/0093761) in view of Rigert (2018/0021491) and O'Toole (US2018/0361040).

    2.1. wherein the diaphragm extends over the milk port when mounted to the diaphragm housing part.

    - Support can be found at least in ¶ [0078] of the Specification and FIG. 8.

    - In Hwang, the alleged diaphragm (separation membrane 500) does not extend over the alleged milk port (milk outlet tube 210).

3. Discussion of potential amendments to overcome the 103 rejection of claim 16 over Park in view of Rigert and Grabenkort (US2008/0009815).

   3.1. an outer shell comprising a rear end configured to removably attach to the breast shield and to form a seal with the diaphragm.

   - ❖ Support can be found at least in ¶ [0073] of the Specification.
   - ❖ In Park, the alleged outer shell (housing 700) does not form a seal with the alleged diaphragm (separation membrane 500). Instead, separation membrane 500 is enclosed by a cover 400 separate from housing 700.

   Please feel free contact me if you have any questions or comments:

Rich Coller, Reg. No. 60,390
(202) 772-8764
rcoller@sternekessler.com

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 18/148,864	Filing Date 12/30/2022	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $ 192 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	08/10/2023	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 28	Minus	** 20	= 8		x $40 =	320
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $ 192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	320

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ZURIASHWORK ZENEBE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**08/10/2023 04:30:53 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	62596808	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangbeini Wang

Documents

TOTAL DOCUMENTS: 4

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2023-08-10-Transmittal-Form-4944-0360002.PDF		1	Transmittal Letter	164 KB
2023-08-10-Amendment-Reply-111-4944-0360002.PDF		14	-	394 KB
2023-08-10-Amendment-Reply-111-4944-0360002-A....pdf	(1-1)	1	Amendment/Request for Reconsideration-After Non-Final Rejection	116 KB
2023-08-10-Amendment-Reply-111-4944-0360002-CLM.pdf	(2-7)	6	Claims	84 KB

2023-08-10-Amendment-Reply-111-4944-0360002-REM.pdf	(8-14)	7	Applicant Arguments/Remarks Made in an Amendment	338 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-08-10-Transmittal-Form-4944-0360002.PDF	CEC8C787CCD62CAEA6BA8283AD80790E87427078E0F8236D5F601032971C69FAC74F0F2C115950987B366924580F460C18E800FC7025F98E16D1F7CB5AA830E1
2023-08-10-Amendment-Reply-111-4944-0360002.PDF	4FF7B1CB656B5A3CC1B0600D5B0B4DCF26E7EE87E8C17BDE5FAF9A62073660D185B76D7A432EAF88815C2BCC45F1B348276BF6405BA12BEC7B08257110C1E598
2023-08-10-Amendment-Reply-111-4944-0360002-A....pdf	F75AF95568E50F9C835C8717B6F888CF31AA5099BA2E09418A6B558DB3F27C428AFA3280F096FC87D7F9347B6D0D6D96CDFA0779164B00901A356DF45E627FFE
2023-08-10-Amendment-Reply-111-4944-0360002-CLM.pdf	C78F554AF576ECB0760B7533618B9EFB5809F51450ADF5D38120FE787C2203E0B0519D5954E3580A8C0DCC1959941339875E811C8D27838FC12BF3F755D96F6E
2023-08-10-Amendment-Reply-111-4944-0360002-REM.pdf	65DFF29C07EACA341634F370ADF9FA3A9732CA44474014E0AA45049B70FE474220720EEC515242122B752915AD7B3C84908774BBBD1B4D030E080FC064F41B5E

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**08/10/2023 04:30:53 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	62596808	AUTHORIZED BY	Yangbeini Wang
CUSTOMER #	26111	FILING DATE	12/30/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1005	E202380G33509251	Rolonda Lee

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2202	EACH CLAIM IN EXCESS OF 20	40.00	8	320.00
			TOTAL AMOUNT:	**$320.00**

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C.

371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: DE BECDELIEVRE *et al.*	Confirmation No.: 7980
Applicant: Chiaro Technology Limited	Art Unit: 3783
Application No.: 18/148,864	Examiner: FREDRICKSON, Courtney B.
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Amendment and Reply Under 37 C.F.R. § 1.111

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Mail Stop Amendment

Commissioner:

In reply to the Office Action dated **May 10, 2023**, Applicant submits the following Amendment and Remarks.

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A wearable milk collection hub comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising a closed end and a milk port, the milk port being intermediate to the breast flange and the closed end; and

an outer edge;

a diaphragm configured to deform to create negative air pressure in the nipple tunnel, ~~the diaphragm being at least partially~~ at least a part of the diaphragm is arranged over the closed end of the nipple tunnel and concentric with the nipple tunnel; and

an outer shell comprising an outer groove configured to receive the outer edge of the breast shield such that the outer shell is configured to be removably attachable to the breast shield, the outer shell further configured to receive expressed milk via the milk port.

2. (Original) The wearable milk collection hub of claim 1, wherein the outer shell is configured to be removably attachable to the breast shield such that the outer shell is configured to contact the breast shield at a rear end of the outer shell and the breast shield is configured to contact the expressed milk at a front end of the breast shield.

3. (Original) The wearable milk collection hub of claim 1, wherein the outer shell comprises a top end comprising a pouring opening configured to release the expressed milk.

4. (Original) The wearable milk collection hub of claim 1, wherein the outer shell comprises a base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface.

5. (Original) The wearable milk collection hub of claim 1, wherein the breast shield comprises a diaphragm housing part comprising an air hole configured to transfer negative air pressure to the nipple tunnel.

6. (Original) The wearable milk collection hub of claim 1, wherein the diaphragm is configured to be removably mounted between the breast shield and the outer shell.

7. (Currently Amended) The wearable milk collection hub of claim 1, wherein the breast shield and the outer shell are substantially transparent, providing[[,]] to ~~the mother~~ a user placing the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment, and

wherein the outer shell is configured to support an air port configured to provide an air connection to a control unit via a tube~~, the air port being disposed through an opaque portion of the wearable milk collection hub~~.

8. (Currently Amended) A wearable milk collection hub configured to connect to an external negative pressure generating control unit comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising an end remote from the breast flange and a milk port intermediate to the breast flange and the end; and

a diaphragm housing part;

a diaphragm configured to:

be removably mounted to the diaphragm housing part,

extend over and adjacent to the milk port in a relaxed state, and [[to]]

deform based on negative air pressure generated by the control unit to create negative air pressure in the nipple tunnel; and

an outer shell comprising a rear end configured to removably attach the outer shell to the breast shield such that the breast shield and the outer shell form a vessel to receive expressed milk via the milk port, a front end opposing the rear end, the front end comprising a curvature, a base intermediate to the rear end and the front end~~, the base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface~~, and a top end opposing the base, the top end comprising a pouring opening configured to release the expressed milk.

9. (Original) The wearable milk collection hub of claim 8, wherein a structure comprising the diaphragm is configured to be at least partially arranged over the closed end of the nipple tunnel.

10. (Original) The wearable milk collection hub of claim 8, further comprising an air port configured to provide an air connection to the control unit via a tube.

11. (Original) The wearable milk collection hub of claim 10, further comprising a movable cap positioned over the air port.

12. (Currently Amended) The wearable milk collection hub of claim 11, wherein the movable cap is disposed on [[a]]the front end of the outer shell.

13. (Currently Amended) The wearable milk collection hub of claim 8, wherein the breast shield and the outer shell are substantially transparent, providing[[,]] to ~~the mother~~ a user placing

the wearable milk collection hub onto her breast a view of the nipple to facilitate correct nipple alignment, and

wherein the wearable milk collection hub is shaped to be worn inside a bra.

14. (Original) The wearable milk collection hub of claim 8, wherein the rear end of the outer shell is configured to receive an outer edge of the breast shield such that an air-tight seal is formed between the breast shield and the outer shell.

15. (Original) The wearable milk collection hub of claim 8, wherein the breast shield is semi-rigid.

16. (Currently Amended) A breast pump system comprising:

a control unit comprising:

a battery, and

a pump configured to be powered by the battery and to generate negative air pressure; and

a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

a breast shield comprising:

a breast flange; and

a nipple tunnel extending from the breast flange~~, the nipple tunnel comprising a closed end and a milk port intermediate to the breast flange and the closed end; and~~

~~a diaphragm housing part~~;

a diaphragm configured ~~to be removably mounted to the diaphragm housing part, and~~ to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel; ~~and~~

an outer shell comprising a rear end configured to removably attach to the breast shield ~~and~~, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk ~~via the milk port~~; and

a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end.

17. (Canceled)

18. (Currently Amended) The ~~wearable milk collection hub~~ breast pump system of claim 16, wherein the breast shield comprises an outer edge configured to be received by the rear end of the outer shell.

19. (Currently Amended) The ~~wearable milk collection hub~~ breast pump system of claim 16, wherein the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield.

20. (Currently Amended) The ~~wearable milk collection hub~~ breast pump system of claim 16, wherein the control unit further comprises:

a wireless data communications system configured to be powered by the battery;

one or more buttons configured to control the wearable milk collection hub;

at least one of a visual indicator or a haptic indicator configured to indicate the activated pumping profile or pattern;

at least one of a visual indicator or a haptic indicator configured to indicate a status of the battery; and

a Universal Serial Bus (USB) charging socket configured to be connected to a power charging circuit.

21. (New) The wearable milk collection hub of claim 8, wherein the base comprises a flat portion configured to allow the wearable milk collection hub to rest on a flat surface.

22. (New) The breast pump system of claim 16, wherein the diaphragm cap forms a central region on a front surface of the outer shell.

23. (New) The breast pump system of claim 16, further comprising a milk port through which the expressed milk flows into the chamber

24. (New) The breast pump system of claim 23, wherein the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.

25. (New) The breast pump system of claim 23, further comprising a non-return valve configured to be mounted to the milk port.

26. (New) The breast pump system of claim 16, wherein the diaphragm cap comprises an air port configured to receive an end of the air line.

27. (New) The breast pump system of claim 26, wherein the diaphragm cap is configured such that the air port can be located above the nipple tunnel.

28. (New) The breast pump system of claim 16, wherein the diaphragm cap comprises a pair of recessed finger grip features.

29. (New) The breast pump system of claim 16, wherein at least a part of the diaphragm is arranged concentric with the nipple tunnel.

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-20 are pending in the application. Claims 1, 8, and 16 are independent claims. Claims 1, 7, 8, 12, 13, 16, 18–20 are amended. Claim 17 canceled without prejudice or disclaimer. New claim 21–29 are added. These changes introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Statement of the Substance of the Interview

Applicant thanks Examiner Fredrickson for taking the time to speak with Applicant's representatives Richard D. Coller III (#60,390) and Yangbeini Wang (#800,005) during the telephone interview of August 2, 2023. The parties discussed potential amendments to overcome the § 103 rejections of claims 1, 8, and 16. The parties agreed that some proposed amendments would overcome the current rejections. The reply presented here is consistent with what was discussed during the interview.

Claim Objections

Claims 7, 12, and 13 are objected to for informalities.

Without agreeing to the propriety of the objections, and solely to expedite the prosecution, claims 7 and 13 are amended to recite "a user," and claim 12 is amended to recite "the front end," as suggested by the Office. Office Action, 2. Applicant respectfully requests that the objections be withdrawn.

Rejections under 35 U.S.C. § 112

Claim 7 is rejected under 35 U.S.C. § 112(b) as allegedly being indefinite.

Without agreeing to the propriety of the rejection, and solely to expedite the prosecution, claims 7 is amended, and the language "the air port being disposed through an opaque portion of the

wearable milk collection hub" is canceled. Applicant submits that claim 7 as amended is definite, and the term "air port" is not positively recited.

Accordingly, Applicant respectfully requests that the § 112 rejection of claim 7 be withdrawn.

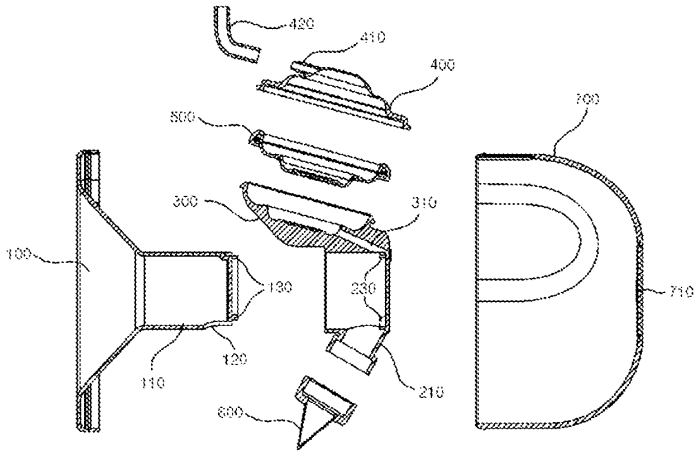
Rejections under 35 U.S.C. § 103

Claims 1–4 are rejected under 35 U.S.C. § 103 as unpatentable over U.S. Patent Application Publication No. 2018/0104396 to Park in view of U.S. Patent Application Publication No. 2018/0008758 to Garbez et al.

Independent claim 1

Without agreeing to the propriety of the rejection, and solely to expedite the prosecution, claims 1 is amended and now recites, in part, "at least a part of the diaphragm is arranged over the closed end of the nipple tunnel and concentric with the nipple tunnel." Applicant explained during the interview that Park does not disclose this feature, and the Examiner also indicated that this feature would overcome the current rejection, as documented in the Interview Summary dated August 8, 2023.

Indeed, Park discloses a breast pump having a flow separation membrane 500 (allegedly a diaphragm), but as shown in FIG. 5, flow separation membrane 500 is placed above and formed at an angle with protruding part 110 (allegedly a nipple tunnel), such that flow separation membrane 500 is not concentric with protruding part 110.



Park, FIG. 5.

Garbez fails to cure the deficiency of Park.

Accordingly, claim 1 and its dependent claims would not have been obvious over the applied references. Applicant respectfully requests reconsideration and withdrawn of the § 103 rejections of claims 1–4.

Claim 6 is rejected under 35 U.S.C. § 103 as unpatentable over Park in view of Garbez, as applied to claim 1 above, and further in view of U.S. Patent Application Publication No. 2018/0021491 to Rigert et al.

Claim 6 depends from and adds features to independent claim 1. Rigert does not overcome the deficiencies of Park and Garbez as discussed above. Accordingly, claim 6 would not have been over the applied references. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 6.

Claim 7 is rejected under 35 U.S.C. § 103 as unpatentable over Park in view of Garbez, as applied to claim 1 above, and further in view of U.S. Patent Application Publication No. 2008/0275386 to Myers.

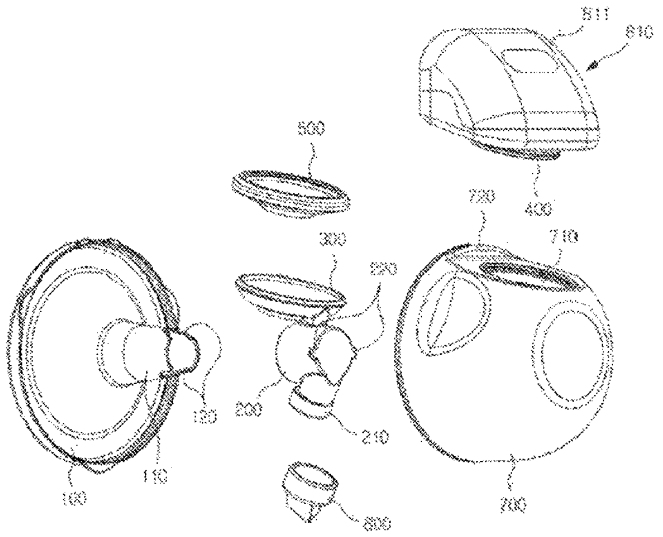
Claim 7 depends from and adds features to independent claim 1. Myers does not overcome the deficiencies of Park and Garbez as discussed above. Accordingly, claim 7 would not have been over the applied references. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 7.

Claims 8–12 and 14 are rejected under 35 U.S.C. § 103 as unpatentable over U.S. Patent Application Publication No. 2021/0093761 to Hwang et al. in view of Rigert and further in view of U.S. Patent Application Publication No. 2018/0361040 to O'Toole et al.

Independent claim 8

Without agreeing to the propriety of the rejection, and solely to expedite the prosecution, claims 8 is amended and now recites, in part, "a diaphragm configured to…extend over and adjacent to the milk port in a relaxed state." The applied references do not teach or suggest at least this feature of claim 8.

Hwang is similar to Park discussed above and discloses a breast pump having a flow separation membrane 500 (allegedly a diaphragm). As shown in FIG. 5, flow separation membrane 500 sits on a funnel connector 300 of a cap connector 200, and a milk outlet tube 210 (allegedly a milk port) extends from cap connector 200 opposite to funnel connector 300. As such, flow separation membrane 500 does not extend over and adjacent to milk outlet tube 210.



Hwang, FIG. 3.

Rigert and O'Toole both fail to cure the deficiency of Hwang.

Accordingly, claim 8 and its dependent claims would not have been obvious over the applied references. Applicant respectfully requests reconsideration and withdrawn of the § 103 rejections of claims 8–12 and 14.

Claim 13 is rejected under 35 U.S.C. § 103 as unpatentable over Hwang in view of Rigert in view of O'Toole, as applied to claim 8 above, and further in view of Myers.

Claim 13 depends from and adds features to independent claim 8. Myers does not overcome the deficiencies of Hwang, Rigert, and O'Toole as discussed above. Accordingly, claim 13 would not have been over the applied references. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 13.

Claim 15 is rejected under 35 U.S.C. § 103 as unpatentable over Hwang in view of Rigert in view of O'Toole, as applied to claim 8 above, and further in view of U.S. Patent Application Publication No. 2017/0173232 to Chang et al.

Claim 15 depends from and adds features to independent claim 8. Chang does not overcome the deficiencies of Hwang, Rigert, and O'Toole as discussed above. Accordingly, claim 15 would not have been over the applied references. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 15.

Claims 16–19 are rejected under 35 U.S.C. § 103 as unpatentable over Park in view of Rigert and further in view of U.S. Patent Application Publication No. 2008/0009815 to Grabenkort et al.

Independent claim 16

Without agreeing to the propriety of the rejection, and solely to expedite the prosecution, claims 16 is amended and now recites, in part, "a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end." Examiner also indicated that this feature would overcome the current rejection, as documented in the Interview Summary dated August 8, 2023.

Indeed, in Park, flow separation membrane 500 (allegedly a diaphragm) is sealed by a cover 400, Park, ¶ [0037], but cover 400 is not positioned at a front end of the outer shell. Grabenkort fails to cure the deficiency of Park in this respect.

Accordingly, claim 16 and its dependent claims would not have been obvious over the applied references. Applicant respectfully requests reconsideration and withdrawn of the § 103 rejections of claims 16–19.

Claim 20 is rejected under 35 U.S.C. § 103 as unpatentable over Park in view of Rigert in view of Grabenkort, as applied to claim 16 above, and further in view of U.S. Patent Application Publication No. 2019/0209748 to Analytis et al.

Claim 20 depends from and adds features to independent claim 16. Analytis does not overcome the deficiencies of Park and Grabenkort as discussed above. Accordingly, claim 20 would not have been over the applied references. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 20.

New claims

New claims 21–29 are added, and they each depend from claim 8 or claim 16. Accordingly, claims 21–29 are patentable for at least their dependencies and additionally recited features.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Yangbeini Wang #800,005/

Yangbeini Wang
Attorney for Applicant
Registration No. 800,005

Date: August 10, 2023

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Doc Code: TRAN.LET
Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	12/30/2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B.
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
- ☑ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please identify below):

Remarks

Online Credit Card Authorization for $320.00 to cover the Excess Dependent Claims Fee.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any over payment, to our Deposit Account No. 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Yangbeini Wang #800,005/		
Printed name	Yangbeini Wang		
Date	August 10, 2023	Reg. No.	800,005

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

26111 7590 09/08/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER
FREDRICKSON, COURTNEY B

ART UNIT	PAPER NUMBER
3783	

DATE MAILED: 09/08/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

TITLE OF INVENTION: WEARABLE BREAST PUMP SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26111 7590 09/08/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

TITLE OF INVENTION: WEARABLE BREAST PUMP SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
FREDRICKSON, COURTNEY B	3783	604-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 09/08/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	
ART UNIT	**PAPER NUMBER**
3783	

DATE MAILED: 09/08/2023

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 18/148,864	Applicant(s) DE BECDELIEVRE et al.	
	Examiner COURTNEY FREDRICKSON	Art Unit 3783	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the amendment filed on 8/10/2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-16 and 18-30 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information , please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Information Disclosure Statement

The information disclosure statement (IDS) submitted is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

EXAMINER'S AMENDMENT

A fee for any claim in independent form in excess of 3 under 37 CFR 1.16(h) is required in order to make an examiner's amendment which places this application in condition for allowance. During a conversation conducted on September 5, 2023, Yangbeini Wang authorized the Director to charge Deposit Account No. 19-0036 the required fee of $192 for this additional independent claim and authorized the following examiner's amendment.

Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

- Amend **claim 7, line 3** as follows:

providing[[,]] to a user placing the wearable milk collection hub onto [[her]] the user's breast a view of [[the]] a nipple to facilitate correct nipple alignment,

- Amend **claim 13, line 3** as follows:

providing[[,]] to a user placing the wearable milk collection hub onto [[her]] the user's breast a view of [[the]] a nipple to facilitate correct nipple alignment,

- Amend **the last two lines of claim 16** as follows:

a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end, the diaphragm cap forms a central region on a front surface of the outer shell.

- Cancel **claim 22**

- Add a period at **the end of claim 23**

- Add **new independent claim 30** as follows:

A breast pump system comprising:

a control unit comprising:

a battery, and

a pump configured to be powered by the battery and to generate negative air pressure; and

a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

a breast shield comprising:

a breast flange; and

a nipple tunnel extending from the breast flange;

a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel, at least a part of the diaphragm is arranged concentric with the nipple tunnel;

an outer shell comprising a rear end configured to removably attach to the breast shield, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and

a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end.

Allowable Subject Matter

Claims 1-16 and 18-30 are allowed over the prior art of record.

The following is an examiner's statement of reasons for allowance: The claims in this application are allowed because the prior art of record fails to disclose either singly or in combination the claimed breast pump system and hub.

The closest prior art of record is Park (US 20180104396).

Regarding independent claims 1 and 30, Park fails to teach among all the limitations or render obvious at least a part of the diaphragm is arranged concentric with the nipple tunnel, in combination with the total structure and function as claimed. Instead, as seen in figs. 2 and 7, the diaphragm of Park (membrane 500 in fig. 2) is shown to be entirely positioned above the nipple tunnel (protruding part 110 in fig. 2) so that no part of the diaphragm is arranged concentric with the nipple tunnel.

Regarding independent claim 8, Park fails to teach among all the limitations or render obvious a diaphragm configured to extend over and adjacent to the milk port in a relaxed state, in combination with the total structure and function as claimed. Instead, Park teaches a diaphragm (membrane 500 in fig. 7) and a milk port (discharge tube 210 in fig. 5). The diaphragm of Park is shown to be separated from the milk port by funnel connector 300 so that the diaphragm is not adjacent to the milk port.

Regarding independent claim 16, Park fails to teach among all the limitations or render obvious the diaphragm cap forms a central region on a front surface of the outer shell, in combination with the total structure and function as claimed. Instead, Park teaches a diaphragm cap (cover 400 in fig. 7); however, this cap is entirely positioned within the outer shell (housing 700 in fig. 7) so that the cap does not form a central region on a front surface of the outer shell.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COURTNEY FREDRICKSON whose telephone number is (571)270-7481. The examiner can normally be reached Monday-Friday (9 AM - 5 PM EST).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NATHAN PRICE can be reached on 571-270-5421. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

Examiner-Initiated Interview Summary	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.		
	Examiner COURTNEY FREDRICKSON	**Art Unit** 3783	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
COURTNEY FREDRICKSON	Primary Examiner	Telephonic
Yangbeini Wang	Attorney	

Date of Interview: 05 September 2023

Issues Discussed:

Proposed Amendment(s)

The examiner indicated that the claims were in condition for allowance except for claim 16. The examiner indicated that no art could be applied for dependent claims 22, 24, and 29. Applicant authorized the examiner to amend claim 16 to incorporate the subject matter of claim 22 to allow the application. Applicant also requested claim 29 be converted into independent claim form and authorized the examiner to charge the deposit account for the excess claim fee.

/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	Art Unit
	COURTNEY FREDRICKSON	3783

CPC - Searched*		
Symbol	Date	Examiner
a61m1/06-0697	05/05/2023	cbf

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
see SEARCH history	05/05/2023	cbf
searched inventor in SEARCH and PALM	05/05/2023	cbf
Updated search	09/05/2023	cbf

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	see SEARCH history	09/05/2023	cbf

/COURTNEY B FREDRICKSON/ Examiner, Art Unit 3783	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

CPC								
Symbol							**Type**	**Version**
A61M	/	1	/	067			F	2021-05-01
A61M	/	1	/	60			I	2021-05-01
A61M	/	39	/	22			I	2013-01-01
A61M	/	2205	/	42			A	2013-01-01
A61M	/	2209	/	088			A	2013-01-01

CPC Combination Sets								
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	28	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20230905

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A61M	/	1	/	06

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	28	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

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	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19	26	28								
2	2	11	11	20	20	27	29								
3	3	12	12	16	21	28	30								
4	4	13	13		22										
5	5	14	14	21	23										
6	6	15	15	22	24										
7	7	17	16	23	25										
8	8		17	24	26										
9	9	18	18	25	27										

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	28	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	05 September 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office Part of Paper No.: 20230905

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2023	09/05/2023							
1	1	✓	=							
2	2	✓	=							
3	3	✓	=							
4	4	✓	=							
5	5	✓	=							
6	6	✓	=							
7	7	✓	=							
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27	29		=							
28	30		=							

Equivalent of Form PTO/SB/08

Substitute for form 1449/PTO

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Sheet 1 of 3

Complete if Known	
Application Number	18/148,864
Filing Date	December 30, 2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B
Attorney Docket Number	4944.0360002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	US1	US20040024351A1	02-05-2004	GRETER	
	US2	US20050228342A1	10-13-2005	YUEN	
	US3	US20150157775A1	06-11-2015	HU	
	US4	US20230111110A1	04-13-2023	DE BECDELIEVRE et al.	
	US5	US20230143842A1	05-11-2023	O'TOOLE et al.	
	US6	US20230158215A1	05-25-2023	O'TOOLE et al.	
	US7	US4,673,388A	06-16-1987	SCHLENSOG et al.	
	US8	US9498565B2	11-22-2016	NOWROOZI et al.	
	US9	US11260151B2	03-01-2022	O'TOOLE et al.	
	US10	US11311654B2	04-26-2022	O'TOOLE et al.	
	US11	US11324866B2	05-10-2022	O'TOOLE et al.	
	US12	US11357894B2	06-14-2022	O'TOOLE et al.	
	US13	US11357893B2	06-14-2022	O'TOOLE et al.	
	US14	US11376352B2	07-05-2022	O'TOOLE et al.	
	US15	US11413380B2	08-16-2022	O'TOOLE et al.	

FOREIGN PATENT DOCUMENTS

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Examiner Signature		Date Considered	

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				Art Unit	3783
				Examiner Name	FREDERICKSON, Courtney B
Sheet	2	of	3	Attorney Docket Number	4944.0360002

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T[2]
	NPL1	Amended Complaint in Shenzhen Root Technology Co., Ltd. v. Chiaro Technology, Ltd., WDWA-2-23-cv-00631, filed June 2, 2023; 24 pages.	

Examiner Signature	/COURTNEY B FREDRICKSON/	Date Considered	09/05/2023

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Sheet	3	of	3	Attorney Docket Number	4944.0360002

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Yangbeini Wang #800,005 /	Date (YYYY-MM-DD)	2023-06-27
Name/Print	Yangbeini Wang	Registration Number	800,005

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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	US1	2003/0069536 A1	04-10-2003	Greter et al.	
	US2	2007/0054651 A1	03-08-2007	Farmer et al.	
	US3	2014/0227112 A1	08-14-2014	Felber	
	US4	2019/0365966 A1	12-05-2019	Bächler et al.	
	US5	2020/0016307 A1	01-16-2020	Edelman et al.	
	US6	2020/0300237 A1	09-24-2020	Marbet et al.	

FOREIGN PATENT DOCUMENTS

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	FP1	EP 3482782 A1	05-15-2019	MEDELA HOLDING AG		

Examiner Signature		Date Considered	

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Sheet	2	of	3	Attorney Docket Number	4944.0360002

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Examiner Signature	/COURTNEY B FREDRICKSON/	Date Considered	09/05/2023

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Signature	/Yangbeini Wang #800,005/	Date (YYYY-MM-DD)	2023-05-15
Name/Print	Yangbeini Wang	Registration Number	800,005

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.B.F./

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	34	((US-20020193731-A1 OR US-20030191433-A1 OR US-20140121593-A1 OR US-20150328380-A1 OR US-20160325031-A1 OR US-20170182231-A1 OR US-20170216505-A1 OR US-20180008758-A1 OR US-20180361040-A1 OR US-20210093761-A1 OR US-20130023821-A1 OR US-20080208116-A1 OR US-20080275386-A1 OR US-20150217033-A1 OR US-20160220745-A1 OR US-20160296682-A1 OR US-20170072119-A1 OR US-20170080135-A1 OR US-20180021491-A1 OR US-20180154055-A1 OR US-20200139027-A1 OR US-20180104396-A1).did. AND PGPB.dbnm.) OR ((WO-2021084283-A1 OR DE-19652232-A1 OR WO-2019194418-A1).did. AND FPRS.dbnm.) OR ((WO-2021145820-A1 OR KR-102296715-B1 OR CN-110623320-A OR CN-112472891-A OR WO-2021191637-A1 OR EP-2687246-A1 OR CN-111658859-A OR CN-113975503-A).did. AND FTDB.dbnm.) OR ((US-11235093-B1).did. AND USPT.dbnm.)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/04/13 02:33 PM
L2	661	((("DE") near3 ("BECDELIEVRE") near3 ("Thibault")) OR (("BLANCHARD") near3 ("Oliver")) OR	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/04/13 02:54 PM

		(("THOMAS") near3 ("Georgia")) OR (("THOMPSON") near3 ("Daniel")) OR (("ROLLO") near3 ("Adam")) OR (("REID") near3 ("Paul")) OR (("O'TOOLE") near3 ("Jonathan")) OR (("BILTCLIFFE") near3 ("Jack")) OR (("LARKSPUR") near3 ("Clare")) OR (("BRUEN") near3 ("Claudia"))).INV.					
L3	146	("0000002" OR "10039871" OR "10398816" OR "1062500582" OR "10864306" OR "10881766" OR "10926011" OR "20020193731" OR "20040056641" OR "20040074281" OR "20040087898" OR "20040127845" OR "20040267215" OR "20050219302" OR "20050245860" OR "20060122575" OR "20070051172" OR "20070051727" OR "20070135761" OR "20070179439" OR "20070219486" OR "20070228059" OR "20070236584" OR "20080177224" OR "20080262420" OR "20080275386" OR "20090281482" OR "20090281485" OR "20100292636" OR "20110004154" OR "20110009824" OR "20110196291" OR "20110274566" OR "20120021068" OR "20120035951" OR "20120043065" OR "20120072117" OR "20120072118" OR "20120095599" OR "20120109083" OR "20120143879" OR "20120165729" OR "20120220753" OR	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/13 03:22 PM

		"20120277636" OR "20130023821" OR "20140031744" OR "20140052056" OR "20140142501" OR "20140263611" OR "20140275857" OR "20140288466" OR "20140323962" OR "20140378895" OR "20150212036" OR "20150212037" OR "20150217036" OR "20150217037" OR "20150283311" OR "20160000980" OR "20160058928" OR "20160058929" OR "20160082165" OR "20160082166" OR "20160135998" OR "20160151551" OR "20160158424" OR "20160166745" OR "20160206794" OR "20160220743" OR "20160220745" OR "20160228625" OR "20160256617" OR "20160271305" OR "20160287767" OR "20160296681" OR "20160296682" OR "20160310650" OR "20160325031" OR "20170021068" OR "20170035951" OR "20170043065" OR "20170072117" OR "20170072118" OR "20170095599" OR "20170112983" OR "20170143879" OR "20170173233" OR "20170216505" OR "20170220753" OR "20170292509" OR "20180008758" OR "20180021490" OR "20180028733" OR "20180104396" OR "20180110900" OR "20180110906" OR "20180333523" OR "20180361040" OR "20210030934" OR "20210170080" OR "20210196873" OR					

		"20210196874" OR "20210196875" OR "20210196876" OR "20210205511" OR "20210205513" OR "20210205514" OR "20210205515" OR "20210205516" OR "20210205517" OR "20210205518" OR "20210228789" OR "20210268158" OR "2849881" OR "4390024" OR "4535627" OR "5406063" OR "5474683" OR "5542921" OR "5941847" OR "5973770" OR "6045529" OR "6090065" OR "6227936" OR "6328709" OR "6358226" OR "6383163" OR "6440100" OR "6461324" OR "6547756" OR "6579258" OR "666358782" OR "674958282" OR "704851982" OR "720173582" OR "7312554" OR "7314400" OR "7641629" OR "7662018" OR "7666162" OR "777600882" OR "7833190" OR "8057425" OR "811877282" OR "818722782" OR "8262606" OR "8282596" OR "837698682" OR "860868582" OR "870264682" OR "8801495" OR "887676082" OR "892655682" OR "903391382" OR "917358782" OR "9345274" OR "953937782" OR "D548831" OR "D788293" OR					

		"D809646" OR "D832995" OR "D888225").pn.					
L4	9406	a61m1/06-0697.cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:45 PM
L5	30	4 AND wireless$4 AND (usb "universal serial bus") AND (button key switch input) AND ((haptic alarm led light diode) WITH (battery))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:46 PM
L6	708	4 AND ((diaphragm membrane) WITH (remov$4 detach$4))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/03 03:47 PM
L7	53	3 AND transparent	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 04:14 PM
L8	16	3 AND "air tight"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 04:19 PM
L9	18	"20080009815"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:00 PM
L10	55	4 AND wireless$4 AND ((charg$4 recharg$4) WITH (usb "universal serial"))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU,	OR	ON	ON	2023/05/04 05:12 PM

			SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L11	2797	4 AND (diaphragm membrane)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:18 PM
L12	92	4 AND (shield contact flange cup) WITH (semi-rigid)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:33 PM
L13	26	a61m1/06-0697.cpc. AND (shield cup flange contact) WITH "air tight" WITH (shell housing)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 05:57 PM
L14	787	4 AND (flat WITH (base surface))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 06:13 PM
L15	155	4 AND opaque	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/05/04 06:37 PM
L16	1435	a61m1/06-0697.cpc.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2023/05/04 06:58 PM
L17	1	18/148864.app.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/08/02 10:58 AM
L18	1	17 AND (diaphragm WITH seal$4)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2023/08/02 11:11 AM

			AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L19	1	17 AND (shell WITH cap)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/08/02 11:17 AM
L20	27	("2004395").pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/08/15 10:57 AM
L21	2	("20080171970").pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/08/15 11:01 AM
L22	9	("4046696").pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/08/16 09:14 AM
L23	16	N1 AND N2 AND N3 AND N4 AND N5 AND N6	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/09/05 01:51 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	72487	breast.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:46 PM
N2	462849	pump$4.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:46 PM

N3	144066	shield.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:46 PM
N4	81576	diaphragm.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:46 PM
N5	200751	shell.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:50 PM
N6	15397	nipple.clm.	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:51 PM
N7	2	N1 AND N2 AND N3 AND N4 AND N5 AND N6	(US-PGPUB; USPAT)	OR	ON	ON	2023/09/05 01:51 PM

Bibliographic Data

Application No: 18/148,864

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /COURTNEY B FREDRICKSON/ Examiner's Signature | Initials

Title: WEARABLE BREAST PUMP SYSTEM

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/30/2022	604	3783	
RULE			

APPLICANTS

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Paul REID,

Jonathan O'TOOLE,

Jack BILTCLIFFE,

Clare LARKSPUR,

Claudia BRUEN,

CONTINUING DATA

This application is a CON of 17907347 09/26/2022

17907347 is a 371 of PCT/GB21/50764 03/26/2021

FOREIGN APPLICATIONS

UNITED KINGDOM GB2004395.6 03/26/2020

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/25/2023

**** SMALL ENTITY ****

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 09/20/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
09/20/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Corrected ***Notice of Allowability***	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.	
	Examiner COURTNEY FREDRICKSON	**Art Unit** 3783	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the previous NOA.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-16,18-21 and 23-30 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Corrected Notice of Allowance

This Notice of Allowance supersedes the previous Notice of Allowance mailed on September 8, 2023 which erroneously indicated cancelled claim 22 as being allowed.

Allowable Subject Matter

Claims 1-16, 18-21, and 23-30 are allowed over the prior art of record.

See Reasons for Allowance provided in the Notice of Allowance mailed on 9/8/2023.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COURTNEY FREDRICKSON whose telephone number is (571)270-7481. The examiner can normally be reached Monday-Friday (9 AM - 5 PM EST).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an

interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NATHAN PRICE can be reached on 571-270-5421. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: Chiaro Technology Limited	Art Unit: 3783
Application No.: 18/148,864	Examiner: FREDRICKSON, Courtney B.
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Amendment Under 37 C.F.R. § 1.312

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Mail Stop Issue Fee

Commissioner:

Submitted herein is an Amendment Under 37 C.F.R. § 1.312. As payment of the issue fee has not yet been made or is filed herewith, Applicant respectfully submits that filing under 37 C.F.R. § 1.312 is proper. (M.P.E.P. § 714.16.)

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims, or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) A wearable milk collection hub comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising a closed end and a milk port, the milk port being intermediate to the breast flange and the closed end; and

an outer edge;

a diaphragm configured to deform to create negative air pressure in the nipple tunnel, at least a part of the diaphragm is arranged over the closed end of the nipple tunnel and concentric with the nipple tunnel; and

an outer shell comprising an outer groove configured to receive the outer edge of the breast shield such that the outer shell is configured to be removably attachable to the breast shield, the outer shell further configured to receive expressed milk via the milk port.

2. (Original) The wearable milk collection hub of claim 1, wherein the outer shell is configured to be removably attachable to the breast shield such that the outer shell is configured to contact the breast shield at a rear end of the outer shell and the breast shield is configured to contact the expressed milk at a front end of the breast shield.

3. (Original) The wearable milk collection hub of claim 1, wherein the outer shell comprises a top end comprising a pouring opening configured to release the expressed milk.

4. (Original) The wearable milk collection hub of claim 1, wherein the outer shell comprises a base comprising a flat portion configured to allow the wearable milk collection hub to rest on a flat surface.

5. (Original) The wearable milk collection hub of claim 1, wherein the breast shield comprises a diaphragm housing part comprising an air hole configured to transfer negative air pressure to the nipple tunnel.

6. (Original) The wearable milk collection hub of claim 1, wherein the diaphragm is configured to be removably mounted between the breast shield and the outer shell.

7. (Previously Presented) The wearable milk collection hub of claim 1, wherein the breast shield and the outer shell are substantially transparent, providing to a user placing the wearable milk collection hub onto the user's breast a view of a nipple to facilitate correct nipple alignment, and

wherein the outer shell is configured to support an air port configured to provide an air connection to a control unit via a tube.

8. (Previously Presented) A wearable milk collection hub configured to connect to an external negative pressure generating control unit comprising:

a breast shield comprising:

a breast flange;

a nipple tunnel extending from the breast flange, the nipple tunnel comprising an end remote from the breast flange and a milk port intermediate to the breast flange and the end; and

a diaphragm housing part;

a diaphragm configured to:

be removably mounted to the diaphragm housing part,

extend over and adjacent to the milk port in a relaxed state, and

deform based on negative air pressure generated by the control unit to create negative air pressure in the nipple tunnel; and

an outer shell comprising a rear end configured to removably attach the outer shell to the breast shield such that the breast shield and the outer shell form a vessel to receive expressed milk via the milk port, a front end opposing the rear end, the front end comprising a curvature, a base intermediate to the rear end and the front end, and a top end opposing the base, the top end comprising a pouring opening configured to release the expressed milk.

9. (Original) The wearable milk collection hub of claim 8, wherein a structure comprising the diaphragm is configured to be at least partially arranged over the closed end of the nipple tunnel.

10. (Original) The wearable milk collection hub of claim 8, further comprising an air port configured to provide an air connection to the control unit via a tube.

11. (Original) The wearable milk collection hub of claim 10, further comprising a movable cap positioned over the air port.

12. (Previously Presented) The wearable milk collection hub of claim 11, wherein the movable cap is disposed on the front end of the outer shell.

13. (Previously Presented) The wearable milk collection hub of claim 8, wherein the breast shield and the outer shell are substantially transparent, providing to a user placing the wearable milk collection hub onto the user's breast a view of a nipple to facilitate correct nipple alignment, and

wherein the wearable milk collection hub is shaped to be worn inside a bra.

14. (Original) The wearable milk collection hub of claim 8, wherein the rear end of the outer shell is configured to receive an outer edge of the breast shield such that an air-tight seal is formed between the breast shield and the outer shell.

15. (Original) The wearable milk collection hub of claim 8, wherein the breast shield is semi-rigid.

16. (Previously Presented) A breast pump system comprising:

a control unit comprising:

a battery, and

a pump configured to be powered by the battery and to generate negative air pressure; and

a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

a breast shield comprising:

a breast flange; and

a nipple tunnel extending from the breast flange;

a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel;

an outer shell comprising a rear end configured to removably attach to the breast shield, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and

a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end, the diaphragm cap forms a central region on a front surface of the outer shell.

17. (Canceled)

18. (Previously Presented) The breast pump system of claim 16, wherein the breast shield comprises an outer edge configured to be received by the rear end of the outer shell.

19. (Previously Presented) The breast pump system of claim 16, wherein the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield.

20. (Previously Presented) The breast pump system of claim 16, wherein the control unit further comprises:

a wireless data communications system configured to be powered by the battery;

one or more buttons configured to control the wearable milk collection hub;

at least one of a visual indicator or a haptic indicator configured to indicate the activated pumping profile or pattern;

at least one of a visual indicator or a haptic indicator configured to indicate a status of the battery; and

a Universal Serial Bus (USB) charging socket configured to be connected to a power charging circuit.

21. (Previously Presented) The wearable milk collection hub of claim 8, wherein the base comprises a flat portion configured to allow the wearable milk collection hub to rest on a flat surface.

22. (Canceled)

23. (Previously Presented) The breast pump system of claim 16, further comprising a milk port through which the expressed milk flows into the chamber.

24. (Previously Presented) The breast pump system of claim 23, wherein the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.

25. (Previously Presented) The breast pump system of claim 23, further comprising a non-return valve configured to be mounted to the milk port.

26. (Previously Presented) The breast pump system of claim 16, wherein the diaphragm cap comprises an air port configured to receive an end of the air line.

27. (Previously Presented) The breast pump system of claim 26, wherein the diaphragm cap is configured such that the air port can be located above the nipple tunnel.

28. (Previously Presented) The breast pump system of claim 16, wherein the diaphragm cap comprises a pair of recessed finger grip features.

29. (Previously Presented) The breast pump system of claim 16, wherein at least a part of the diaphragm is arranged concentric with the nipple tunnel.

30. (Previously Presented) A breast pump system comprising:

a control unit comprising:

a battery, and

a pump configured to be powered by the battery and to generate negative air pressure; and

a wearable milk collection hub configured to connect to the control unit via an air line, the wearable milk collection hub comprising:

a breast shield comprising:

a breast flange; and

a nipple tunnel extending from the breast flange;

a diaphragm configured to deform based on the negative air pressure generated by the pump to create negative air pressure in the nipple tunnel, at least a part of the diaphragm is arranged concentric with the nipple tunnel;

an outer shell comprising a rear end configured to removably attach to the breast shield, an interior volume between the outer shell and the breast shield defining a chamber to receive expressed milk; and

a diaphragm cap configured to cover and seal the diaphragm at a front end of the outer shell, the front end being opposite to the rear end.

31. (New) The breast pump system of claim 30, wherein the interior volume is bounded by the rear end of the outer shell and a front end of the breast shield.

32. (New) The breast pump system of claim 30, wherein the diaphragm cap forms a central region on a front surface of the outer shell.

33. (New) The breast pump system of claim 30, further comprising a milk port through which the expressed milk flows into the chamber, wherein the diaphragm is configured to extend over and adjacent to the milk port in a relaxed state.

34. (New) The breast pump system of claim 30, wherein the diaphragm cap comprises an air port configured to receive an end of the air line.

35. (New) The breast pump system of claim 30, wherein the diaphragm cap comprises a pair of recessed finger grip features.

Remarks

Upon entry of the foregoing amendment, claims 1–16, 18–21, and 23–35 are pending in the application. Claims 1, 8, 16, and 30 are independent claims. New claims 31–35 are added and depend from allowed independent claim 30. Excess claim fees of $200.00 for claims 31–35 (37 CFR § 1.16(i), 5 claims in excess of 20) are also submitted herewith. Excess claim fees of $192.00 for claim 30 (37 CFR § 1.16(h), 1 independent claim in excess of 3) has been authorized via Examiner's Amendment in the Notice of Allowance issued on September 8, 2023.

In compliance with MPEP 714.16, Applicant submits the following.

(A) The new dependent claims are needed to further define the scope of the invention.

(B) The new dependent claims, which depend from allowed independent claim 30, require no additional search or examination because they are substantially identical to allowed dependent claims 19, 22, 23, 26, and 28. Allowed dependent claims 19, 22, 23, 26, and 28 depend from allowed independent claim 16. Allowed independent claim 16 and allowed independent 30 themselves are substantially similar except for the limitations requiring the diaphragm cap forming a central region on a front surface of the outer shell (claims 16) and at least a part of the diaphragm being arranged concentric with the nipple tunnel (claim 30).

(C) The new dependent claims are patentable at least for their dependencies from allowed independent claim 30 and separately recited subject matter.

(D) The new dependent claims were not presented earlier because allowed independent claim 30 was only added via the Examiner's Amendment of September 8, 2023, accompanying the Notice of Allowance.

Accordingly, Applicant respectfully requests that the amendments be entered.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Yangbeini Wang #800,005/

Yangbeini Wang
Attorney for Applicant
Registration No. 800,005

Date: September 21, 2023

1101 K Street, NW. 10th Floor
Washington, D.C. 20005
Main: 202-371-2600

20940368_1.docx

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26111 7590 09/08/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

TITLE OF INVENTION: WEARABLE BREAST PUMP SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0.00	$0.00	$480	12/08/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
FREDRICKSON, COURTNEY B	3783	604-074000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Sterne, Kessler, Goldstein & Fox P.L.L.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Chiaro Technology Limited

(B) RESIDENCE: (CITY and STATE OR COUNTRY): London, United Kingdom

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 19-0036

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Yangbeini Wang #800,005/ Date September 21, 2023

Typed or printed name Yangbeini Wang Registration No. 800,005

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES
PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**09/21/2023 04:53:52 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	62843192	AUTHORIZED BY	Yangbeini Wang
CUSTOMER #	26111	FILING DATE	12/30/2022
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1005	E20239KG59407221	Rolonda Lee

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2202	EACH CLAIM IN EXCESS OF 20	40.00	5	200.00
2501	UTILITY ISSUE FEE	480.00	1	480.00
			TOTAL AMOUNT:	**$680.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**09/21/2023 04:53:52 PM ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

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CONFIRMATION #	7980	FILED BY	Rolonda Lee
PATENT CENTER #	62843192	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangbeini Wang

Documents

TOTAL DOCUMENTS: 5

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2023-09-21-Transmittal-Form-4944-0360002.PDF		1	Transmittal Letter	164 KB
2023-09-21-Issue-Fee-4944-0360002.PDF		1	Issue Fee Payment (PTO-85B)	19 KB
2023-09-21-Amendment-312-4944-0360002.PDF		10	-	115 KB
2023-09-21-Amendment-312-4944-0360002-A.NA.pdf	(1-1)	1	Amendment after Notice of Allowance (Rule 312)	98 KB
2023-09-21-Amendment-	(2-8)	7	Claims	81 KB

312-4944-0360002-CLM.pdf				
2023-09-21-Amendment-312-4944-0360002-REM.pdf	(9-10)	2	Applicant Arguments/Remarks Made in an Amendment	96 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2023-09-21-Transmittal-Form-4944-0360002.PDF	189631F30B350223E8091D2F1F71332E3CE573E8211C5FF5499 06B308DD3D4C99622DB43F09CB07618112F853763F00B8A343 4B63BC7BF27CB2223B8D0ACBE44
2023-09-21-Issue-Fee-4944-0360002.PDF	0A54EC1D4164CA02434CFD9616F4063BB05193E661EBA91B9 097B3B7D6F9E78373E681423915D2FB8DA58F3C909C200F62A BF8998AE0F694BCA33B0975824A0E
2023-09-21-Amendment-312-4944-0360002.PDF	86F7714077CA2AF579CE14C6D2547FB8A7FFEC53CBB0DD18 D46CBEFFB15950BF7C289CD6583C2AE35FA5E374D3AE8E2E BB2CB6F24C30CC3169786789AF9DBF52
2023-09-21-Amendment-312-4944-0360002-A.NA.pdf	F0CD38899D00C95FE20EF5CC3F9F0C9B83111A9A624ED59A8 74A6C21B671190818ED1906185303480960E4E6F501D28E4442 4DAD642D1CB47D25603F10EE385A
2023-09-21-Amendment-312-4944-0360002-CLM.pdf	A88640309B7B4E3713E0CDF1CEE5917F183D1F9C40AC81A43 20724B4E1923620152DA3C8C25BB4D30084E9FFF39D2343D28 6115DA977BF492A7906C027EE1D7B
2023-09-21-Amendment-312-4944-0360002-REM.pdf	91101469043D833314C5E5F24FCF547F49163FD676C1E6C106 3EE18C4F4299193544675FE152BD06D1765402C10FBFABB82 DF04233606691180855B7C4B9A1B8

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New Applications Under 35 U.S.C. 111

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and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: TRAN.LET
Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	12/30/2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B.
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☑ Fee Transmittal Form
  - ☑ Fee Attached
- ☑ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☑ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please identify below):

Remarks

Online Credit Card Authorization for $680.00 to cover:

$480.00 - Issue Fee; $200.00 - Excess Claim Fees.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any over payment, to our Deposit Account No. 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Yangbeini Wang #800,005/		
Printed name	Yangbeini Wang		
Date	September 21, 2023	Reg. No.	800,005

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 09/29/2023
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
09/29/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Response to Rule 312 Communication	Application No.	Applicant(s)	
	18/148,864	DE BECDELIEVRE et al.	
	Examiner	Art Unit	AIA (FITF) Status
	COURTNEY FREDRICKSON	3783	Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ The amendment filed on 21 September 2023 under 37 CFR 1.312 has been considered, and has been:

a) ☑ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.

Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

f) ☐ not entered because the supplemental or corrected Application Data sheet (ADS)

☐ was not accompanied by a petition to accept an unintentionally delayed claim under 37 CFR 1.55 or 27 CFR 1.78;

☐ did not identify the information being changed in accordance with 37 CFR 1.76(c)(2);

☐ was not properly signed in accordance with 37 CFR 1.76(e) (or 37 CFR 1.33(b) for applications filed prior to September 16, 2012).

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

OK TO ENTER: /C.B.F./

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Thibault DE BECDELIEVRE	Confirmation No.: 7980
Applicant: Chiaro Technology Limited	Art Unit: 3783
Application No.: 18/148,864	Examiner: FREDRICKSON, Courtney B.
Filing Date: December 30, 2022	Atty. Docket: 4944.0360002

Title: **WEARABLE BREAST PUMP SYSTEM**

Amendment Under 37 C.F.R. § 1.312

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Mail Stop Issue Fee

Commissioner:

Submitted herein is an Amendment Under 37 C.F.R. § 1.312. As payment of the issue fee has not yet been made or is filed herewith, Applicant respectfully submits that filing under 37 C.F.R. § 1.312 is proper. (M.P.E.P. § 714.16.)

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees required to continue prosecution or appeal of this application (including issue fee, fees for net addition of claims, or forwarding to appeal) are hereby authorized to be charged to our Deposit Account No. 19-0036.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 10/06/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
10/06/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

Corrected ***Notice of Allowability***	**Application No.** 18/148,864	**Applicant(s)** DE BECDELIEVRE et al.	
	Examiner COURTNEY FREDRICKSON	**Art Unit** 3783	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to See Continuation Sheet.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-16,18-21 and 23-35 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some* c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/COURTNEY B FREDRICKSON/
Primary Examiner, Art Unit 3783

Continuation of 1. This communication is responsive to: the claims filed on 9/21/2023 which added claims 31 -35. The updated/corrected allowed claims are listed below.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	Art Unit
	COURTNEY FREDRICKSON	3783

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2023	10/04/2023							
1	1	✓	=							
2	2	✓	=							
3	3	✓	=							
4	4	✓	=							
5	5	✓	=							
6	6	✓	=							
7	7	✓	=							
8	8	✓	=							
9	9	✓	=							
10	10	✓	=							
11	11	✓	=							
12	12	✓	=							
13	13	✓	=							
14	14	✓	=							
15	15	✓	=							
17	16	✓	=							
	17	✓	-							
18	18	✓	=							
19	19	✓	=							
20	20	✓	=							
16	21		=							
	22		-							
21	23		=							
22	24		=							
23	25		=							
24	26		=							
25	27		=							
26	28		=							
27	29		=							
28	30		=							
29	31		=							
30	32		=							
31	33		=							
32	34		=							
33	35		=							

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

CPC							
Symbol						**Type**	**Version**
A61M	/	1	/	067		F	2021-05-01
A61M	/	1	/	60		I	2021-05-01
A61M	/	39	/	22		I	2013-01-01
A61M	/	2205	/	42		A	2013-01-01
A61M	/	2209	/	088		A	2013-01-01

CPC Combination Sets								
Symbol						**Type**	**Set**	**Ranking**	**Version**
	/		/						

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	33	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	04 October 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20231004

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A61M	/	1	/	06

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	33	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	04 October 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	18/148,864	DE BECDELIEVRE et al.
	Examiner	**Art Unit**
	COURTNEY FREDRICKSON	3783

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	19	19	26	28								
2	2	11	11	20	20	27	29								
3	3	12	12	16	21	28	30								
4	4	13	13		22	29	31								
5	5	14	14	21	23	30	32								
6	6	15	15	22	24	31	33								
7	7	17	16	23	25	32	34								
8	8		17	24	26	33	35								
9	9	18	18	25	27										

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	33	
/COURTNEY B FREDRICKSON/ Primary Examiner, Art Unit 3783	04 October 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

U.S. Patent and Trademark Office — Part of Paper No.: 20231004

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	11/07/2023	11806454	4944.0360002	7980

26111 7590 10/18/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (https://patentcenter.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional inventors):

Thibault DE BECDELIEVRE, London, UNITED KINGDOM;
Oliver BLANCHARD, London, UNITED KINGDOM;
Georgia THOMAS, Bristol, UNITED KINGDOM;
Daniel John THOMPSON, Bristol, UNITED KINGDOM;
Adam ROLLO, London, UNITED KINGDOM;

APPLICANT(s) (Please see PATENT CENTER site https://patentcenter.uspto.gov for additional applicants):

Chiaro Technology Limited, London, UNITED KINGDOM

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	7980

26111 7590 11/07/2023

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
10th Floor
WASHINGTON, DC 20005

EXAMINER	
FREDRICKSON, COURTNEY B	

ART UNIT	PAPER NUMBER
3783	

NOTIFICATION DATE	DELIVERY MODE
11/07/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

e-office@sternekessler.com

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/148,864	07-Nov-2023	11806454

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1101 K Street, NW
WASHINGTON, DC 20005

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 12/31/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	18/148,864
Filing Date	12/30/2022
First Named Inventor	Thibault DE BECDELIEVRE
Art Unit	3783
Examiner Name	FREDERICKSON, Courtney B.
Attorney Docket Number	4944.0360002

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):

  Request for Certificate of Correction Under 37 C.F.R. § 1.322; PTO/SB/44 Form

Remarks

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any over payment, to our Deposit Account No. 19-0036.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sterne, Kessler, Goldstein & Fox P.L.L.C.		
Signature	/Yangbeini Wang #800,005/		
Printed name	Yangbeini Wang		
Date	Novemer 27, 2023	Reg. No.	800,005

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
18/148,864	**11/28/2023 05:09:02 PM Z ET**	**4944.0360002**

Title of Invention

WEARABLE BREAST PUMP SYSTEM

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11806454
CONFIRMATION #	7980	FILED BY	Kim Perry
PATENT CENTER #	63403419	FILING DATE	12/30/2022
CUSTOMER #	26111	FIRST NAMED INVENTOR	Thibault DE BECDELIEVRE
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Yangbeini Wang

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2023-11-28-Transmittal-Form-4944-0360002.pdf	1	Transmittal Letter	310 KB
2023-11-28-Request-COC-4944-0360002.pdf	2	Request for Certificate of Correction	99 KB
2023-11-28-PTOSB44-4944-0360002.pdf	2	Request for Certificate of Correction	129 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

2023-11-28-Transmittal-Form-4944-0360002.pdf	F53C8B03F70FD8ED75D67A344D3C3E7186C578656037900046 59373F5ACF611CC2657C00099AC8EEEE51231E4D3A52EFA64 2C31B57F366433D8A5ECF81A5F28F
2023-11-28-Request-COC-4944-0360002.pdf	9CA1A361C725705C426BF4D31BECBD21809CA9724385455F1 0F714162A067B3404127FBD7C33AEF32DBC3EE9F19E6596D3 B7025B8AA55A294ADC8056D02C94D5
2023-11-28-PTOSB44-4944-0360002.pdf	5F36571592E1021CC790933A4F2F1872D148C261B8BA9B2D9E B826062B58C6D7F8B4CD247914FAFA3873CD1889CFBA4CFE A8A2F30FD9F789089DD48F797FA189

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No.: 11,806,454	Confirmation No.: 7980
Date of Patent: November 7, 2023	Art Unit: 3783
First Named Inventor: Thibault DE BECDELIEVRE	Atty. Docket: 4944.0360002
Patentee: Chiaro Technology Limited	
Title: **WEARABLE BREAST PUMP SYSTEM**	

Request for Certificate of Correction Under 37 C.F.R. § 1.322

Attn: Certificate of Correction Branch

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

It is hereby requested that a Certificate of Correction under 37 C.F.R. § 1.322 be issued for the above-captioned United States Patent. This Certificate of Correction is being requested due to mistakes which appear in the printed patent. These mistakes were made by the U.S. Patent and Trademark Office.

Specifically, the printed patent contains the following errors for which a Certificate of Correction is respectfully requested:

In Col. 25, Claim 17, Line 32, delete "shield and," and insert - - shield, - -, therefor.

Remarks

The above-noted corrections do not involve such changes in the patent as would constitute new matter or would require reexamination.

A completed Form PTO/SB/44 accompanies this request, with the above-noted corrections printed thereon. Accordingly, a Certificate of Correction is believed proper and issuance thereof is respectfully requested.

The Commissioner is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 19-0036.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

/Yangbeini Wang #800,005/

Yangbeini Wang
Attorney for Patentee
Registration No. 800,005

Date: November 27, 2023

1101 K Street, NW, 10th Floor
Washington, D.C. 20005
Main: 202-371-2600
Direct: 202-772-8764

21337067.1

PTO/SB/44 (09-07)
Approved for use through 03/31/2026. OMB 0651-0033
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.
(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 11,806,454 B2

APPLICATION NO. : 18/148,864

ISSUE DATE : November 07, 2023

INVENTOR(S) : De Becdelievre, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Col. 25, Claim 17, Line 32, delete “shield and,” and insert - - shield, - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Sterne, Kessler, Goldstein & Fox P.L.L.C. 1101 K Street, NW, 10th Floor
Washington, DC 20005

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 11,806,454 B2
APPLICATION NO. : 18/148864
DATED : November 7, 2023
INVENTOR(S) : De Becdelievre et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Column 25, Claim 17, Line 32, delete “shield and,” and insert -- shield, --, therefor.

Signed and Sealed this
Second Day of January, 2024

Katherine Kelly Vidal

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

ACKNOWLEDGEMENT OF LOSS OF ENTITLEMENT TO ENTITY STATUS DISCOUNT

APPLICATION #	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET #	REQUEST ID
18/148,864	12/30/2022	Thibault DE BECDELIEVRE	4944.0360002	184286

The entity status change request below filed through Patent Center on 03/19/2024 has been accepted.

Certifications

APPLICANT CHANGING TO REGULAR UNDISCOUNTED FEE STATUS

Signature

I certify, in accordance with 37 CFR 1.4(d)(4), that I am one of the signatories making the entity status change.

Signature	Name	Registration #
/Yangbeini Wang #800,005/	Yangbeini Wang	800005