

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.; AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

OURARING, INC.
Patent Owner.

IPR2024-00928
U.S. Patent No. 9,582,034

**PATENT OWNER'S PRELIMINARY
RESPONSE PURSUANT TO 37 C.F.R. § 42.107**

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2001	Article titled “The Best Smart Rings to Rule Them All”
2002	Article titled “‘Best Consumer Wellness Company’ award from the UCSF Digital Health Awards and Time magazine's ‘100 Best Inventions of 2020’”
2003	Article titled “Why the Oura Ring Gen 3 was our wearable of the year – Wearable 2022”
2004	Article titled “On the Heels of 1 Million Rings Sold, Oura Now Valued at \$2.55 Billion”
2005	Non-Final Office Action from Application No. 16/224,686, dated October 2, 2019
2006	Response to Non-Final Office Action from Application No. 16/224,686, dated April 1, 2020
2007	Non-Final Office Action from Application No. 15/444,208, dated February 27, 2017
2008	Article titled, “How are PCBs made? A Beginner’s Guide to the PCB Manufacturing Process”
2009	Web capture of OVD Kinegram Website, “KINEGRAM – The Superior DOVID for Highly Secure Passports and IDs”

Patent Owner Ouraring, Inc. (“Oura”) submits this Preliminary Patent Owner Response (“POPR”) to the Petition filed by Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (Samsung or “Petitioner”) requesting *inter partes* review of claims 1–5, 11–13, and 16–18 of U.S. Patent No. 9,582,034 (“the ’034 patent”).

I. INTRODUCTION

Patent Owner Oura manufactures the highly successful Oura Ring. The ’034 patent is one of many patents covering Oura’s revolutionary smart ring technology. Since its introduction, the Oura Ring has seen unprecedented success. That success has engendered competition in the form of copycats and knockoffs who seek to benefit from the market that Oura has built with innovation and hard work. This Petition, which is one of eleven filed by Petitioner against Oura, is the latest attempt to pave the way to trade off Oura’s success, as Petitioner recently announced the introduction of its own smart ring.

The ’034 patent packages the wearable device components in a sleek and elegant form, unlike the references relied on by Petitioner. For example, the Schröder reference relied on by Petitioner utilizes a large protrusion to accommodate its electronics. The LeBoeuf reference utilizes a complex double ring structure. These references serve to illustrate the novel approach of the ’034 patented

invention. Because the references do not disclose or suggest the claimed invention, the Board should deny institution.

II. SUCCESS OF THE OURA RING

Oura introduced its revolutionary Oura Ring in 2015. The Oura Ring is a smart ring used to track sleep, physical activity, and other biometric data. Since its introduction, the Oura Ring has seen unprecedented success and praise for its innovative design and technological advancements in wearable electronics. *See, e.g.*, Ex. 2001 (“The original Oura was a revelation that single-handedly created the smart ring category.”); Ex. 2002 (“‘Best Consumer Wellness Company’ award from the UCSF Digital Health Awards and Time magazine’s ‘100 Best Inventions of 2020’”); Ex. 2003 (“Why the Oura Ring Gen 3 was our wearable of the year – Wearable 2022” and “A big part of awarding the Oura Ring 3 is how it’s defined a whole segment of wearables – and moved forward the discussion about what a wearable should be”); Ex. 2004 (“On the Heels of 1 Million Rings Sold, Oura Now Valued at \$2.55 Billion”). Today, more than 2,500,000 Oura Rings have been sold worldwide.

Oura protects its innovations by investing heavily in its patent portfolio, including the ’034 patent. The ’034 patent is coextensive with and embodies the Oura Ring.

III. OVERVIEW OF THE '034 PATENT

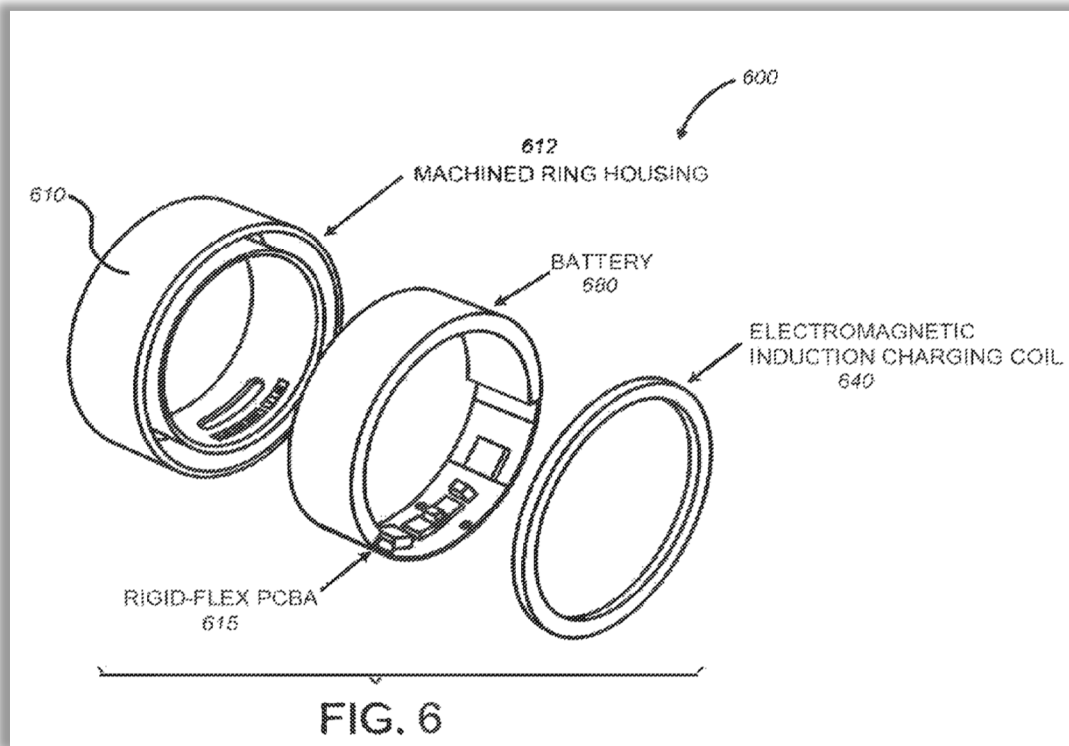
A. Patent Specification

The '034 patent relates to the “the field of wearable electronic devices.” Ex-1001, 1:15-16. Wearable electronics can “help monitor activity within the wearer’s body.” *Id.*, 1:22-23. “However, many current wearable electronics are bulky and can be intrusive or interfere with a person’s daily life.” *Id.*, 1:23-25 Consequently, “conventional wearable fitness monitors such as clip-on devices, wristbands, or watch-type monitors still often suffer from inaccuracy mainly because they lack constant and consistent ways to ready from the body areas they aim to monitor.” *Id.*, 9:12-16.

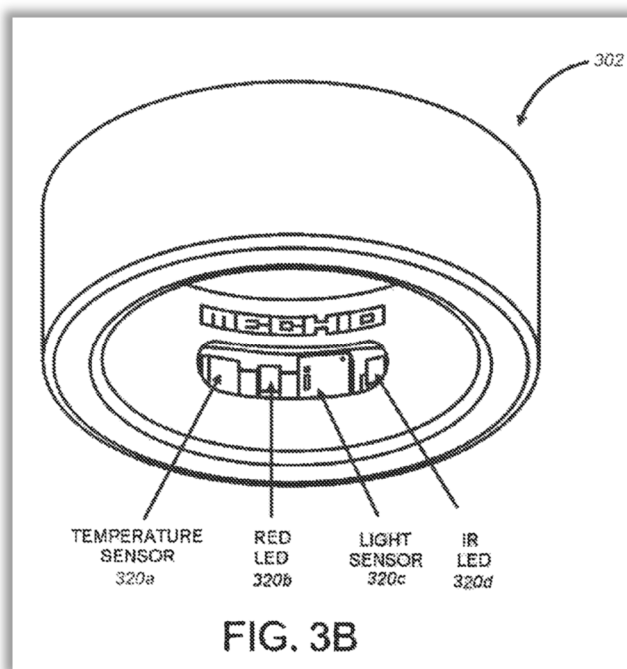
This invention overcomes the disadvantages of the prior art by providing a wearable computing device (WCD) in the shape of a ring. The wearable computing device can be worn for extended periods of time and can take many measurements and perform various functions because of its form factor and position on the finger of a user.

Id., 1:31-36.

Fig. 6 shows an exploded view of one embodiment of the invention:



As shown in Fig. 6, a battery 680 and rigid-flex PCBA (printed circuit board) 615 are shaped and configured to fit within ring housing 612. Ex-1001, 14:20-24. The ring is also equipped with sensors that enable the ring to “function as a sleep monitor, a heart rate sensor, a cardiac monitor[,] a body temperature detector, or the like.” 9:27-28. Examples of such sensors are shown below in Fig. 3B.



Sensors 320a-320d “are directly related to biological sign monitoring [and] can be configured and positioned in a way that is close to the skin (e.g., facing the interior window 130 of the WCD 110).” *Id.*, 11:1-3. A motion sensor (not shown) may also be used to detect an “activity level” of the wearer and whether the wearer is sleeping or engaged in exercise. *Id.*, 11:41-47 (“In some embodiments, the WCD 110 can utilize the accelerometer to measure the activity level (e.g., arm movement) in conjunction with the measured heart rate to determine if the user is walking horizontally, running, swimming, or climbing stairs. Other activities can be identified by the WCD 110 may include biking or sleeping.”).

Significant to the claims discussed herein, the '034 patent discloses an inner housing coupled to an outer housing to form a cavity for accommodating the battery, circuit board, and sensors. *Id.*, 14:50-52. These housing components are shown below in Fig. 8 as elements 812a (outer ring) and 812b (inner ring).

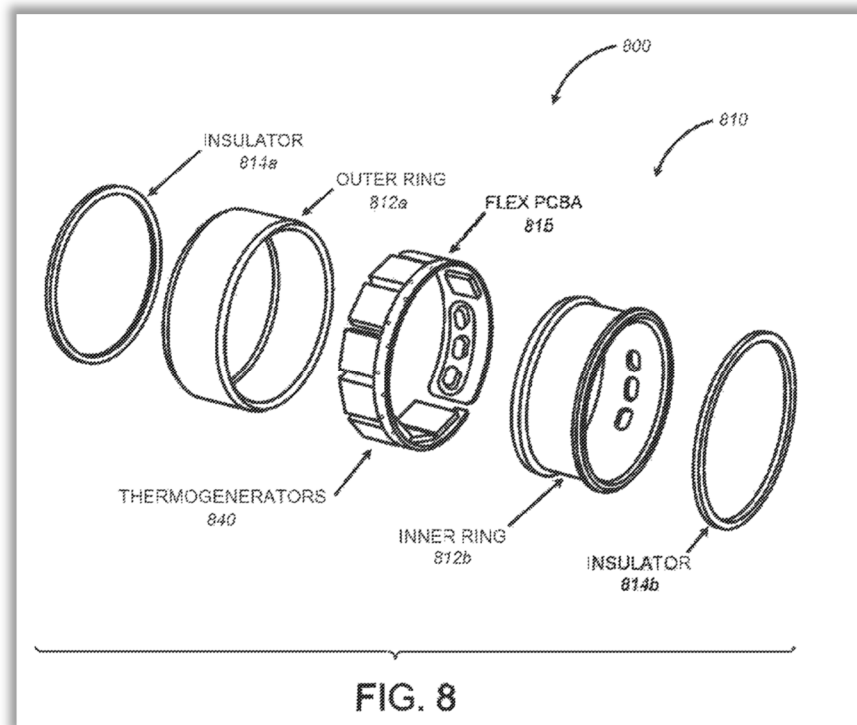
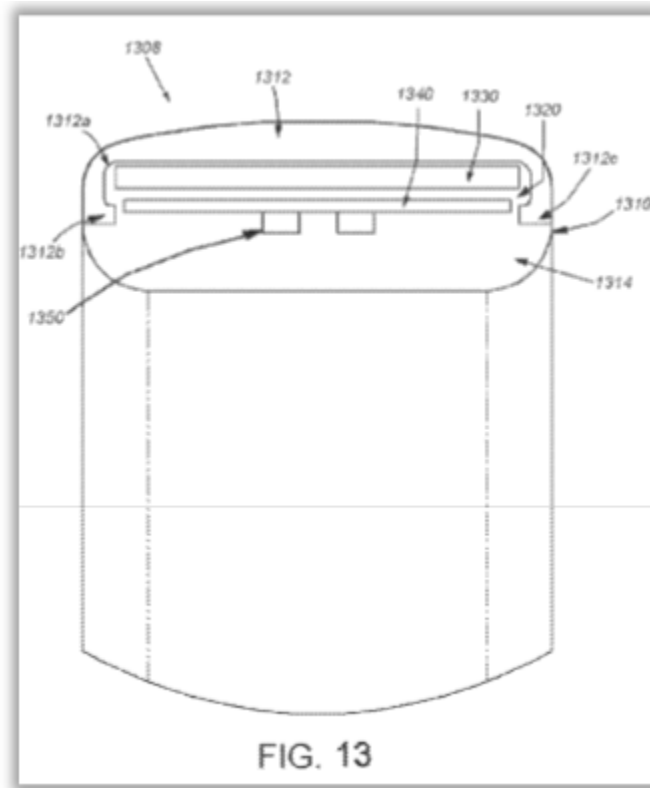


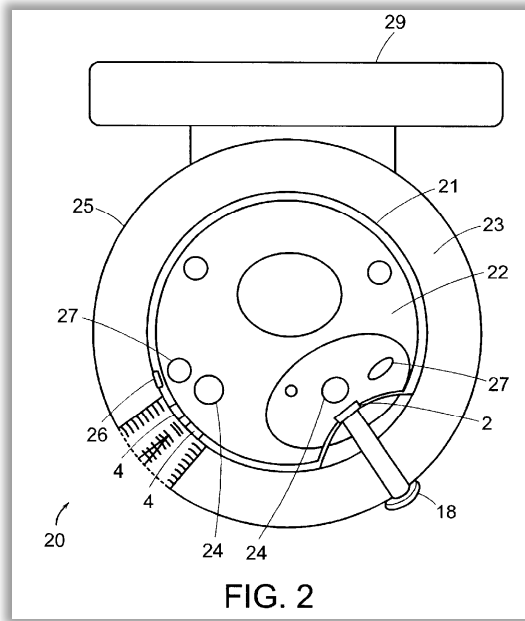
Fig. 13 below shows a cross section of one embodiment of the ring having a housing 1310 comprising internal and external housing components 1314 and 1312. *Id.*, 18:45-49. A space 1320 is formed that is occupied by battery 1330 and printed circuit board 1340. *Id.*, 18:54-59.



IV. PRIOR ART RELIED ON BY PETITIONER

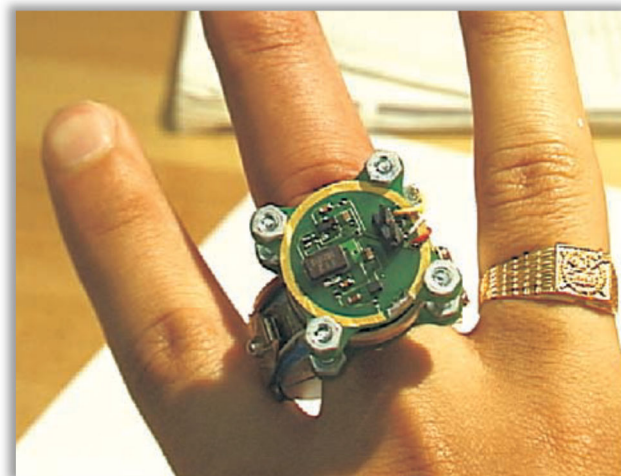
A. Wearable ring devices

In describing the background of the technology, Petitioner’s expert states that “[w]earable electronic devices in the form of a finger-ring structure were also known by 2013.” Ex-1002, ¶ 44. The examples cited by the expert are powerful evidence that prior art designs were drastically different in design compared to the ’034 patent. These prior art designs purposely located electronic components outside of the ring housing. For example, U.S. Patent No. 6,699,199 to Asada (Ex-1034) teaches locating “circuit module 29 containing battery 12, processor 6, and transmitter 8” outside base ring 23 which includes sensor band 21. *Id.*, 3:18-19.



Id. at Fig. 2.

Isolating the sensor band 21 was a design objective of Asada. *Id.*, 4:58-60 (“Being decoupled from the sensor band 21, a direct force on the surroundings of the sensors will not affect the output of the signal.”). A prototype published by Asada was of similar design:



Ex-1037 at 7.

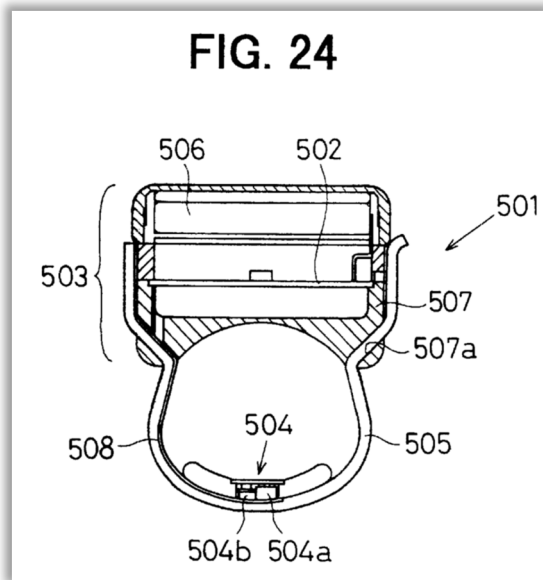
The experts in the field noted that isolating the sensor ring from the main ring body and other components was a “must,” as noted by Petitioner’s expert:

46. Asada explains that “[a]n obvious source of signal corruption results from the direct interaction of the sensor unit with the wearer’s surrounding environment; e.g., holding objects, touching surfaces, etc.” Ex-1037, 34 (Asada 2003). Therefore, “the body of the ring *must* separate the sensor unit in order to decouple the sensor unit from these interactions.” Ex-1037, 34 (Asada 2003). He therefore designed and implemented “a double ring configuration” such that “[t]he disturbance force is born by the outer ring and is not transmitted to the inner ring holding the sensor unit” and “the outer ring serves as an optical shield for protecting the sensor unit from the ambient light.” Ex-1037, 34 (Asada 2003).

Ex-1002, ¶ 46 (emphasis added).

The double ring configuration implemented by Asada is contrary to the claimed invention of the ’034, which, for example, requires that the printed circuit board be disposed between interior and exterior walls of the wearable computing device.

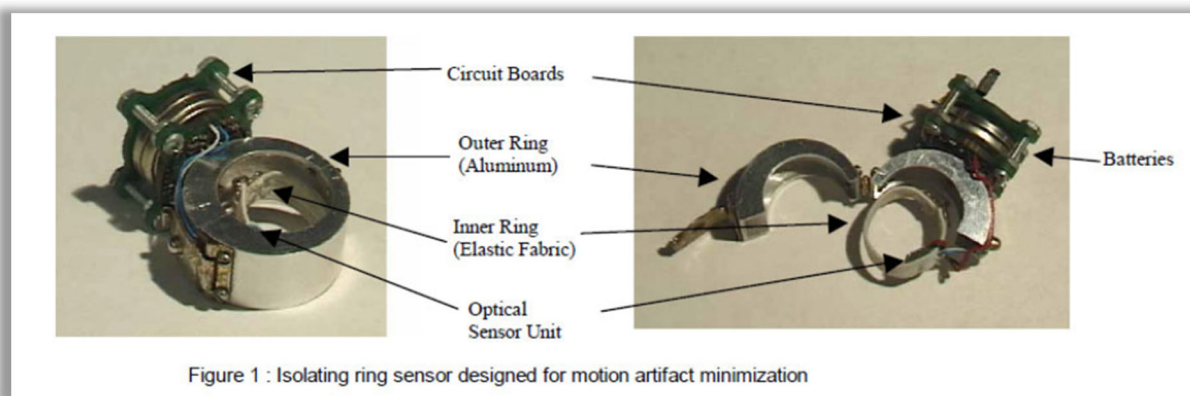
Kimura (Ex-1028), also cited by Petitioner’s expert (Ex-1002, ¶ 47), continued the prior art use of externally mounting components to the ring body:



Ex-1028 at Fig. 24.

Kimura shows the battery 506, sensor 503, circuit 502, and a belt 505 holding the detector 504 at the bottom of the finger and coupling the housing 507 to the finger. Ex-1028, 14:55-67.

Petitioner's expert cites to several articles authored by Rhee as further evidence of the state of the art, but these references further demonstrate the stark contrast between the prior art and the '034 patent:



Ex-1002, ¶ 72.

Petitioner's expert notes that "[f]inger-ring structures having inner and outer surfaces with electronics housed inside within a cavity were known. For example, Rhee's thesis and papers teach a finger-ring sensor having inner and outer surfaces." Ex-1002, ¶ 72.

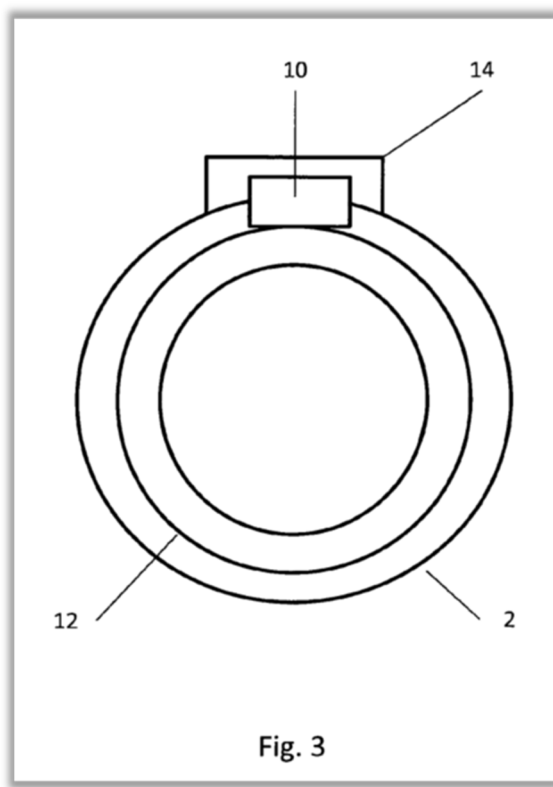
This is a far cry from the '034 patent, which discloses components enclosed within a housing formed by internal and external housing structures.

B. Schröder

Schröder does not relate to monitoring health or fitness. Rather, Schröder describes an "external secure unit" for the purpose of authenticating a user. Ex-1007, Abstract ("security-relevant data necessary for executing the application program in the communication device are stored the external unit[.]"). Schröder attempts to improve upon existing "smart card" and RFID devices, which have poor range. *Id.*, 4:63-5:9. Schröder employs an antenna coil in the ring to achieve this purpose. *Id.*, 5:12-14 ("For solving these problems, the invention therefore proposes integrating into the external secure unit 2, e.g., the finger ring 2, an antenna coil 8 . . .").

Schröder's disclosure of a ring structure is rudimentary, nonspecific, and completely lacks the specific structure of the '034 patent. The only component shown in the figures is chip module 10, which protrudes beyond the surface of the

ring housing, making it accessible via hinged cover 14. *Id.* at Fig. 3; *Id.*, 9:1-3 (“The chip module 10 is arranged in particular replaceably in the finger-ring 2.”).



Id. at Fig. 3.

Schröder’s focus is on an improved antenna. *Id.*, 5:12-18. Schröder only discloses that a “further embodiment example” has a battery, which is “connected to” a chip module 10. *Id.*, 11:48-49. Schröder does not disclose that the chip module is mounted to a printed circuit board. Rather, Schröder discloses that the chip module 10 is connected to an antenna coil 8 that is located on the inlay 12. *Id.*, 8:57-58 (“The inlay 12 serves as a carrier for at least one antenna coil 8.”); *id.*, 8:63-66 (“The chip

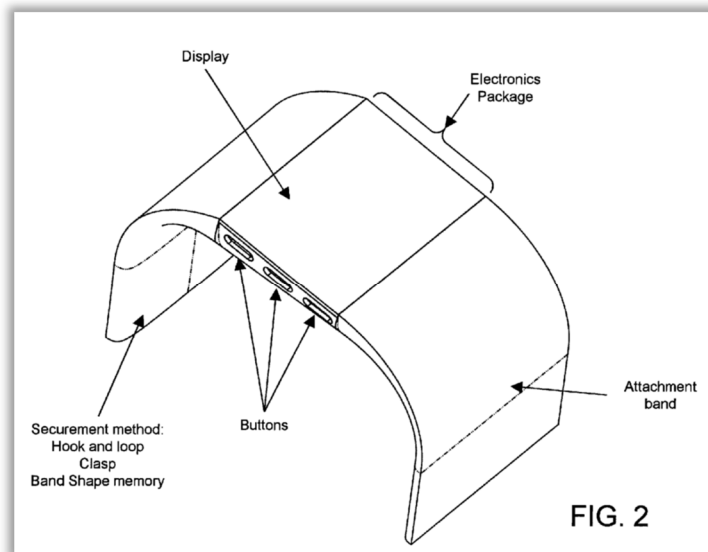
module 10 is electroconductively connected by means of electroconductive contacts to the at least one antenna coil 8 which is located on inlay 12.”).

Schröder also discloses an embodiment using a “biometric sensor” for authentication purposes. *Id.*, 9:54-56 (“In a further embodiment example of the invention, the external secure unit 2 has a biometric sensor. This enables the user of the external secure unit 2 to authenticate himself.”). Like the battery, the biometric sensor is not depicted in any figure, but “can be arranged on the chip module 10 or it can be arranged in the finger-ring 2 separately from the chip module 10 e.g., on a separate circuit foil.” *Id.*, 9:60-62.

Schröder teaches scanning the ring wearer’s vein pattern and comparing it to a stored pattern for authentication. *Id.*, 10:42-44 (“The user of the finger-ring 2 authenticates himself by means of the biometric data stored in the finger-ring 2. The terminal compares the biometric data received from the finger-ring 2, e.g. the data of finger veins, with the data stored in a background system and authorizes e.g. a transaction in dependence on the comparison.”).

C. Yuen

Yuen discloses a wearable device but does not contemplate a device in the form factor of a ring: “The biometric monitoring device is adapted (for example, includes a size and a shape) to be worn or carried on the body of a user (for example, arm, wrist, leg and/or ankle).” Ex-1006, 12:50-52. The device of Yuen is shown below in Fig. 2:

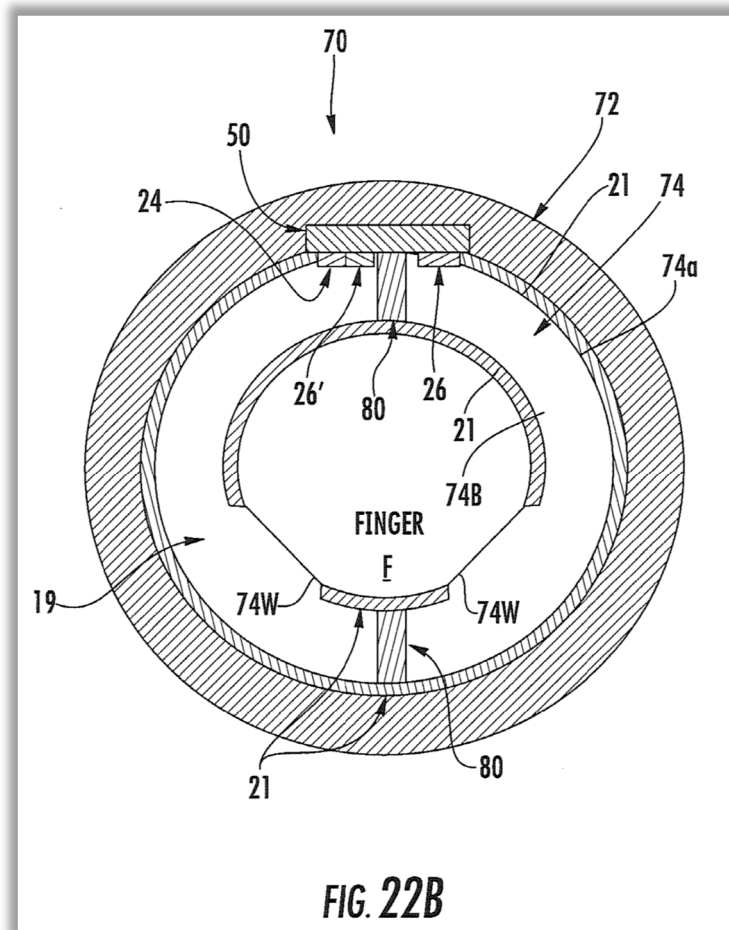


The device utilizes an attachment band with an appropriate fastener to secure the device to a user’s arm or wrist. Ex-1006, 12:53-55 (“[T]he device may be a wrist-worn or arm-mounted accessory such as a watch or bracelet. (See, for example, FIGS. 2-13.”).

Yuen was before the same examiner in subsequent related patents, such as U.S. Patent No. 11,868,178. (Ex. 2005.)

D. LeBoeuf

LeBoeuf discloses an earbud that includes an optical emitter and detector. Ex-1012, Abstract. In one embodiment, LeBoeuf discloses a finger ring. *Id.*, Figs. 22A-22B.



LeBoeuf discloses an inner housing 74 and an outer housing 72. Base 50 supports optical emitter 24 and optical detector 26. *Id.*, 28:14-17. Light guiding region 19 serves to “deliver[] light from the optical emitter 24 to the finger F of a subject at one or more predetermined locations and that collects light from the finger

F and delivers light to the optical detectors.” *Id.*, 28:29-34.

LeBoeuf states that outer housing 72 “may include a flex circuit containing various electronic components, such as a microprocessor, D/A converter, power source, power regulator, and the like.” *Id.*, 28:4-6.

V. CLAIM CONSTRUCTION

In an IPR, “a claim of a patent . . . shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b) . . .” 37 C.F.R. ¶ 42.100(b). Under that standard, “the words of a claim ‘are generally given their ordinary and customary meaning’ . . . that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc) (citations omitted).

Patent Owner agrees with Petitioner that no terms need to be construed to determine whether to institute this IPR. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d. 795, 803 (Fed. Cir. 1999) (“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”).

VI. ARGUMENT

A. Legal Standard

Institution of an inter partes review is always discretionary. 35 U.S.C. § 314(a); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (“§ 314(a) invests the

Director with discretion on the question *whether* to institute review[]”); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Id.* at 1363. An IPR may not be instituted unless “the information presented in the petition ... shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

A patent claim is unpatentable as obvious only if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to a POSITA at the time the invention was made. 35 U.S.C. § 103. The obviousness inquiry requires considering the four Graham factors. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Furthermore, “the prior art, taken as a whole, must enable a skilled artisan to make and use the claimed invention[]” without undue experimentation. *Raytheon Techs. Corp. v. Gen. Elec. Co.*, 993 F.3d 1374, 1380 (Fed. Cir. 2021).

To prevail on any obviousness ground, it is insufficient to simply identify individual components of the claims in the prior art—one must show why a “skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365,

1371 (Fed. Cir. 2000). To satisfy its burden of proving obviousness, Petitioner cannot rely on “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Rather, it must set forth “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. 398, 418 (2007) (citation omitted). And a motivation to combine must be “accompanied by a reasonable expectation of achieving what is claimed in the patent-at-issue.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). Additionally, the obviousness inquiry must be made without any “hint of hindsight.” *Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1375 (Fed. Cir. 2011).

B. Grounds 1 and 2: The challenged claims are patentable over Schröder or Schröder in view of Yuen.

1. One having ordinary skill in the art would not combine Schröder and Yuen.

Petitioner has not proven that one of ordinary skill in the art would combine Schröder and Yuen in the manner suggested. Petitioner spends four pages describing various features of Yuen that could be applied to Schröder, but fails to identify a single claim limitation to which the proposed modifications relate. Pet. at 16-20. Petitioner generalized statements that Schröder and Yuen are “the same type of devices,” “teach electronic wearable devices,” and “both describe the devices having a processor, battery, and one or more sensors,” are insufficient motivation to support

any obviousness theory. Even if the Board sifts through these proposed modifications, contrary to Petitioner, one having ordinary skill in the art would not combine the teachings of Schröder and Yuen for several reasons.

First, Schröder is an RFID security device while Yuen gathers data related to a user's "physiological condition." Ex-1006, Abstract. Thus, Yuen is designed for continuous health monitoring while Schröder is designed for discrete security validation. Second, Schröder is a finger ring while Yuen is specifically designed as a much larger device. Ex-1006, 12:50-52 ("The biometric monitoring device is adapted (for example, includes a size and a shape) to be worn or carried on the body of a user (for example, arm, wrist, leg and/or ankle)."). In a related application, the same examiner accepted the argument that wearable wrist bands (such as Yuen) are not applicable to finger rings because they contain no teaching as to how the much larger components could be adapted to a ring. Ex. 2006 (During prosecution of related U.S. Patent No. 10,768,666, Patent Owner successfully arguing "Applicants' claims are directed to [a] ring, and the device of Weast is directed to a bracelet, the two devices are not capable of being combined in the manner suggested by the Office."). In another related application, the examiner withdrew a rejection based on the notion that it would be obvious to apply a wrist worn wearable device teachings to a ring because such a modification was a "mere change in the shape." Ex. 2007 (rejection during prosecution of U.S. Patent No. 10,139,859). Thus, the examiner

has considered and rejected Petitioner's proposed ground that seeks to apply the teachings of a bracelet (Yuen) to a ring (Schröder).

2. Schröder or Schröder in view of Yuen does not disclose or suggest “a flexible printed circuit board disposed between the interior wall and the exterior wall” of claim 1, or “a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal/external housing” of claims 11 and 16.

As shown below in Fig. 8 of the '034 patent and recited in claim 1, the printed circuit board is disposed in a cavity formed between the outer ring 812a and inner ring 812b:

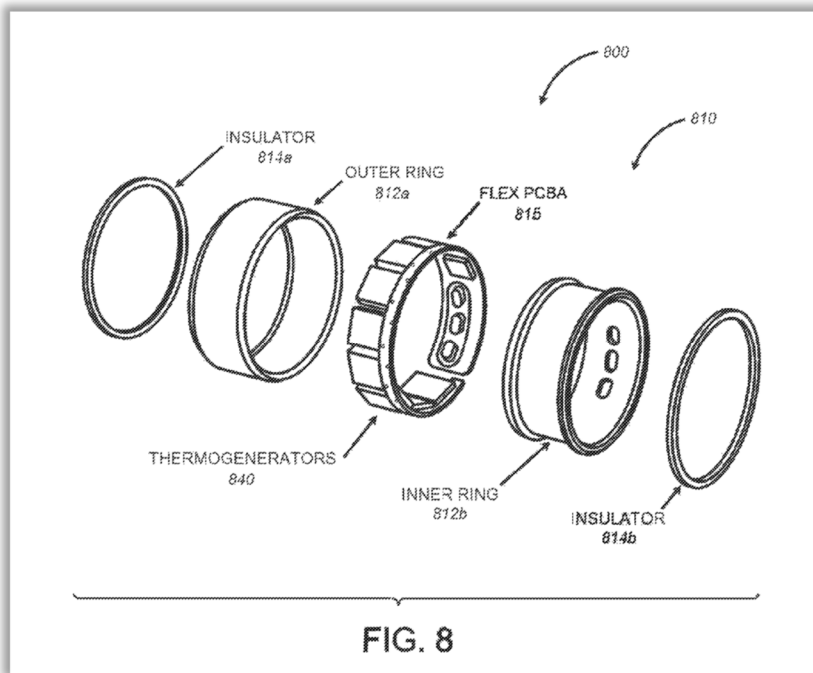
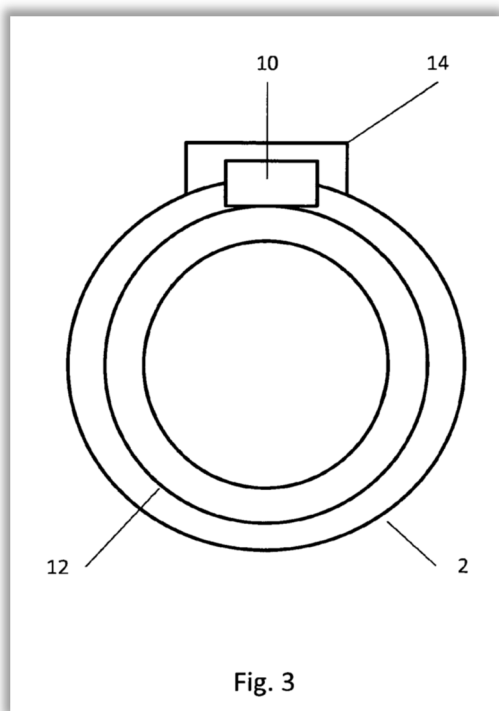


Fig. 3 of Schröder, which Petitioner avoids showing or discussing, is the only figure that shows the position of the chip module 10. As shown below, chip module 10 sits atop inlay 12, on which antenna coil 8 is placed:

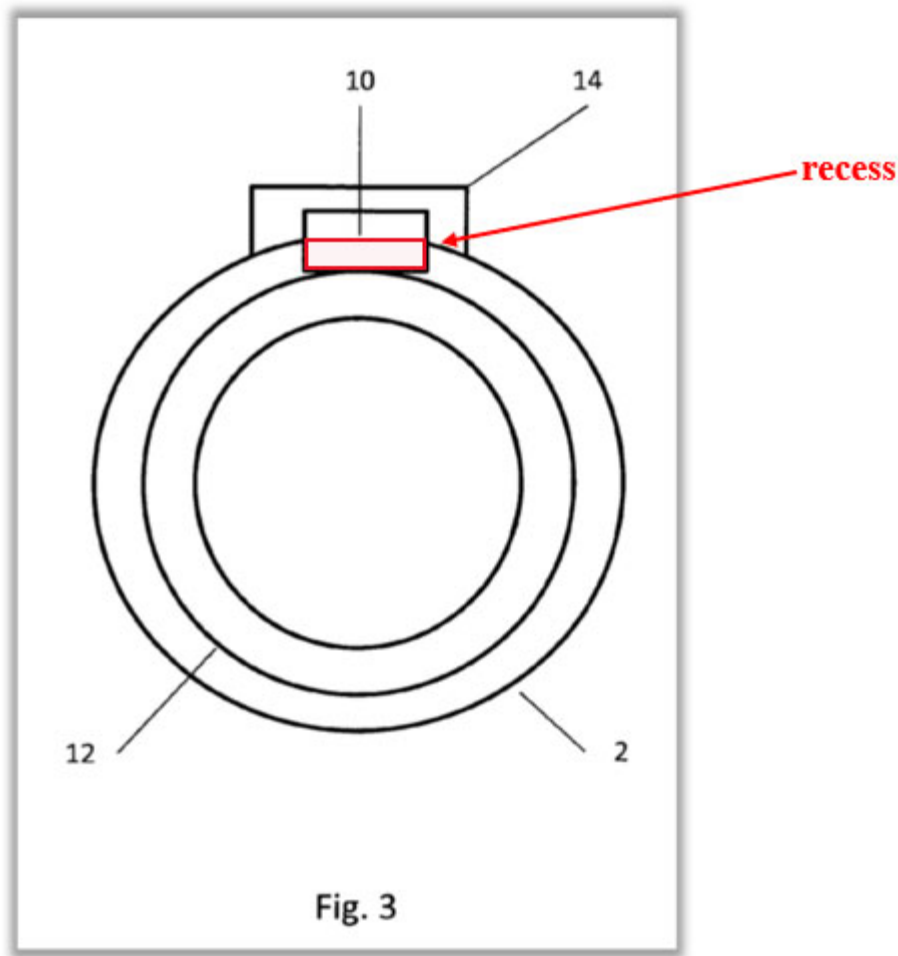


Schröder explicitly shows that the chip module 10 is located outside of the recess occupied by inlay 12. Ex-1007, 8:63-66 (“The chip module 10 is electroconductively connected by means of electroconductive contacts to the at least one antenna coil 8 which is located on the inlay 12.”); *cf.*, Pet. at 23 (“a recess into which the inlay 12 is inserted”).

Schröder teaches and shows that the chip module is located “on” the carrier inlay, which is located “in” the recess: “The chip module 10 and the antenna coil 8 and possibly further electronic devices are arranged on a carrier as described above. The carrier is preferably inserted into a recess in the second component.” Ex-1007, 15:19-22. Locating the chip outside of the inlay recess serves a function, as Schröder teaches that the chip is replaceable using hinged window 14. *Id.*, 8:60-63 (“The chip

module 10 is protected against external influences by a cover 14. The cover 14 is e.g. a hinged cover or a cover that is connected e.g., by means of a thread to the finger-ring 2.”).

The recess in which the chip module 10 is located is located on the outer surface of the ring:



As explained in Schröder:

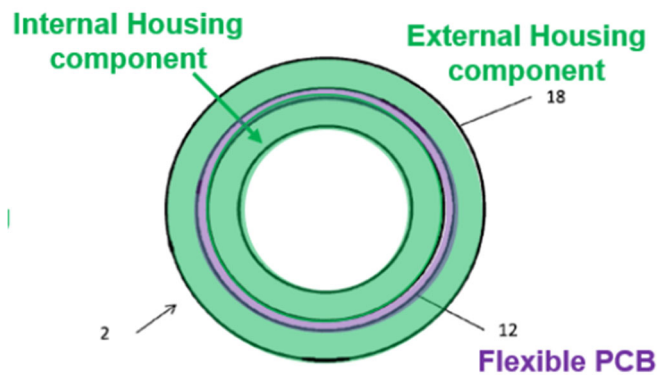
FIG. 3 shows a cross section through an external secure unit 2 in the form of a finger-ring 2 with a replaceable chip module 10. In the interior of the finger-ring 2 is arranged an inlay 12. The inlay 12 serves

as a carrier for at least one antenna coil **8**. *The chip module 10 is inserted into a recess of the finger-ring 2.* The position of the recess on the finger-ring **2** is arbitrary. The chip module **10** is protected against external influences by a cover **14**. The cover **14** is e.g. a hinged cover or a cover that is connected e.g. by means of a thread to the finger-ring **2**. The chip module **10** is electroconductively connected by means of electroconductive contacts to the at least one antenna coil **8** which is located on the inlay **12**.

Ex-1007, 8:54-66.

Thus, Schröder expressly teaches (and shows) that the chip module is located outside the recess occupied by inlay 12. As such, Schröder does not disclose, and indeed teaches away from, a printed circuit board “disposed between the interior and the exterior wall” which define “a first enclosing structure” and “a second enclosing structure,” respectively, of claim 1. Similarly, Schröder does not disclose or suggest “a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing,” which defines “first enclosing structure” of claims 11 and 16.

Petitioner contends that inlay 12 constitutes “a flexible printed circuit board” as recited in claim 1, and presents the following annotated figure of Schröder:



Pet. at 23-24.

First, there is no support for the contention that a mere inlay is a printed circuit board. Petitioner’s notion that the inlay materials are “commonly understood to be printed circuit board materials” does not inevitably lead to the conclusion that inlay 12 is a printed circuit board. Pet. at 23; *see e.g.*, Ex. 2008 (describing five components and fourteen manufacturing steps for printed circuit boards).

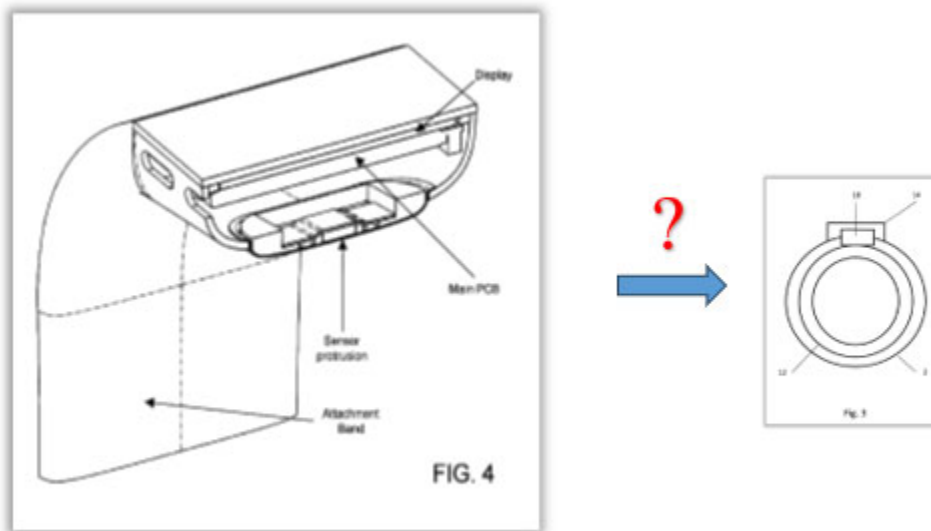
Second, Petitioner’s interpretation of Fig. 4 of Schröder is wrong. Petitioner labels “internal” and “external” housing components, but those “components” both point to single ring half 18. Fig. 4 essentially shows a top view of the bottom half of a bagel (18) with inlay 12 acting as the cream cheese on the bagel half. Ring half 16 is not shown in Fig. 4. This is made clear by Fig. 5, which “shows a cross section, corresponding to FIG. 4, of the finger-ring.” Ex-1007, 3:49-50.

Therefore, contrary to the Petition, ring halves 16 and 18 of Fig. 5 in Schröder do not constitute “interior” and “exterior” walls of claim 1, or “internal” and

“external” housing portions of claims 11 and 16. Rather, Fig. 5 discloses top and bottom ring halves 16 and 18 that are joined in the middle of the ring (like a bagel).

Implicitly acknowledging Schröder’s failure to disclose this limitation, Petitioner claims “A POSITA would have been motivated to have Yuen’s flexible printed circuit board as Schröder’s flexible carrier material in order to provide electrical connection to all the components inside the finger ring with an explicit flexible circuit board” Pet. at 24.

Petitioner’s motivation is lacking. There is no evidence that Schröder’s arrangement has any shortcomings with respect to “electrical connection,” or why the electrical connections of a wearable device for monitoring fitness like Yuen would be appropriate for an RFID security device such as Schröder. Even more troubling is Petitioner’s complete failure to explain how Yuen’s planar “main PCB” would apply to Schröder’s device, which is at least twice its diameter, particularly when Schröder has already designed how chip module 10 is integrated in its ring:



Simply put, there is no disclosure in Schröder of a “a flexible printed circuit board disposed between the interior wall and the exterior wall” of claim 1, or “a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal/external housing” of claims 11 and 16, and Petitioner offers no evidence of how or why a skilled artisan would take the main PCB board from Yuen and insert it into Schröder’s ring.

3. Schröder or Schröder in view of Yuen does not disclose or suggest “a window that facilitates at least one of data acquisition, data transmission, and battery recharge” of claim 1.

The '034 patent discloses and claims a “window” for data acquisition, data transmission, and battery recharge. By way of example, such windows 120 and 130 are shown in Figs. 1A and 1B of the '034 patent. Schröder does not disclose or suggest the claimed window. Schröder mentions a window, but the window

mentioned is for displaying a visual security feature, such as “holograms, Kinegrams, security threads, microprint, guilloches, fluorescent, or phosphorescent inks, optically variable inks, color gradations, e.g. gradients, iridescent print, intaglio print, transparent regions, e.g. windows, etc.” Ex-1007, 9:30-34. A Kinegram, for example is a security feature on a passport. Ex. 2009. These security features perform none of the claimed “window” functions of claim 1.

Petitioner makes the leap that despite the fact that Schröder does not disclose a window, a “window must be provided for the infrared diode to transmit infrared radiation from the diodes to the tissue and then back to the sensor to capture the vein image because Schröder’s internal housing is made of metal which would impede or block the infrared transmission.” Pet. at 27. There are several problems with Petitioner’s assumptions.

First, there is no dispute that Schröder does not disclose a window for the stated purpose. Second, Schröder states that in one embodiment “[a]dvantageously, the casing consists of a non-metallic material, e.g. plastic, at least in the region of antenna coil 8.” Ex-1007, 15:1-3. This plastic embodiment would need no window as infrared passes through plastic. Third, the sensor for vein recognition is not shown in any figure of Schröder, and Schröder only states that the “sensor can be arranged on the chip module 10 or it can be arranged in the finger-ring 2 separately from the chip module 10 e.g. on a separate circuit foil.” *Id.*, 9:60-62. Since Schröder does not

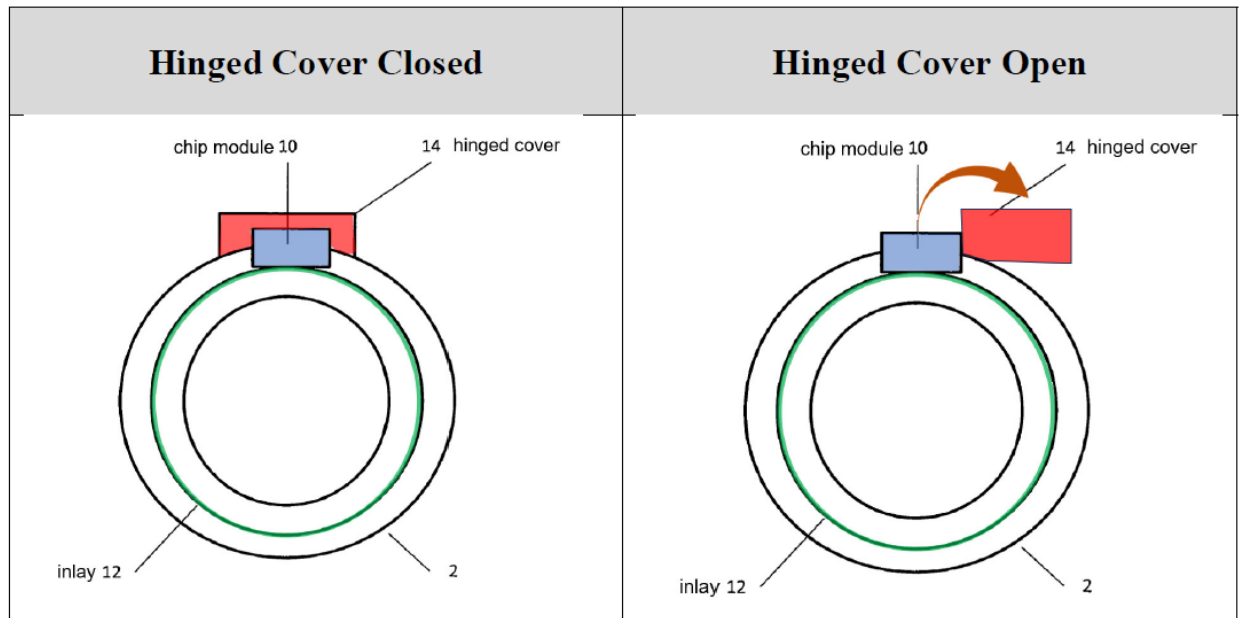
show the sensor, it certainly does not disclose or suggest a window to facilitate use of the sensor.

Petitioner's reliance on Yuen for a "window" is also unsupported and entirely based on hindsight. Pet. at 28. Petitioner states that one of ordinary skill in the art would implement Yuen's window in Schröder "to further acquire additional biometric data." *Id.* Schröder, however, is concerned with security validation, not "acquiring additional biometric data." Collecting data on the user's heart rate, as taught by Yuen, has no application in Schröder and one of ordinary skill in the art therefore would not attempt to apply this feature of Yuen to Schröder. Accordingly, neither Schröder nor Schröder in view of Yuen discloses or suggests the "window" limitation.

4. Schröder or Schröder in view of Yuen does not disclose or suggest "the external/internal housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the internal/external housing" of claims 11 and 16.

As explained above, chip module 10 of Schröder is not "sealed" in an internal space defined by internal and external housing portions. Schröder actually teaches the opposite—that the chip module be accessible and replaceable via a hinged cover 14. Ex-1007, 8:54-56 ("Fig. 3 shows a cross section through an external secure unit 2 in the form of a finger-ring 2 with a replaceable chip module 10."); *id.* at 9:1-2 ("The chip module 10 is arranged in particular replaceably in the finger-ring 2."); *id.*

at 8:60-63 (“The chip module 10 is protected against external influences by a cover 14. The cover 14 e.g., a hinged cover or a cover that is connected e.g., by means of a thread to the finger-ring 2.”).



Id. at Fig. 3 (modified).

Thus, to modify Schröder in a way that “seals” chip module 10 would require a complete redesign of Schröder.

Petitioner contends that inlay 12 of Schröder is the printed circuit board that is “sealed.” Pet. at 29. But as explained above, not only does Schröder not disclose a printed circuit board, Schröder does not disclose a printed circuit board with at least one component. The '034 patent states that “the term ‘components’ is considered to generally include any of the modules depicted and/or described in FIG. 2 as well as any other modules described herein.” Ex-1001, 10:15-17. The modules

referred include a “processor module,” “sensor modules,” “a status indicator module,” “a power generation and management module,” and “a communication module” among others. *Id.*, 10:2-6. The only component in Schröder that can be considered a component described and claimed in the ’034 patent is the chip module 10, which is not sealed. Even if the coil 8 attached to the chip module were a “component,” there is no evidence that it is sealed, since it is attached to the unsealed chip module. Petitioner relies on Yuen’s disclosure of waterproof sealant, but that disclosure does not cure the fact that, contrary to Petitioner, Schröder fails to disclose or suggest a printed circuit board and component sealed in a space as recited in claims 11 and 16.

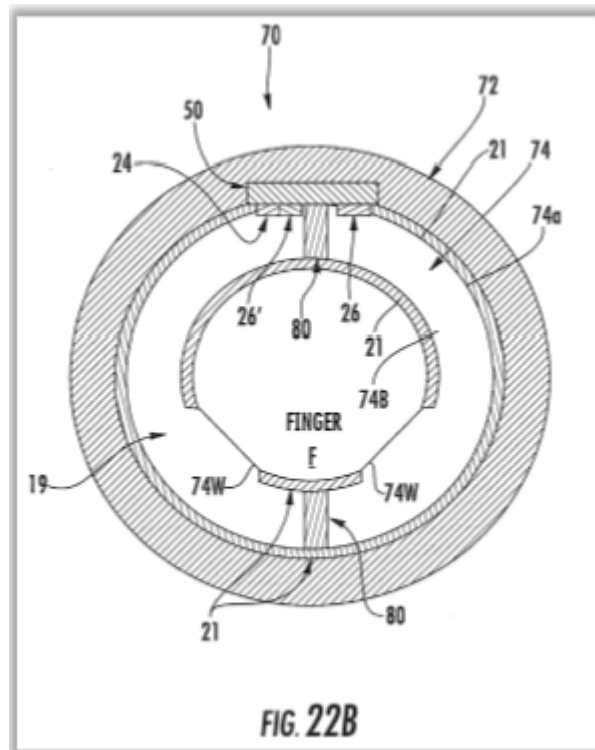
Thus, neither Schröder alone or in view of Yuen disclose “the external/internal housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the internal/external housing” of claims 11 and 16.

C. Ground 3: The challenged claims are patentable over LeBoeuf.

- 1. LeBoeuf does not disclose or suggest interior and exterior walls defining first and second enclosing structures having a flexible printed circuit board disposed therebetween and at least one of the walls defines a window, as recited in claim 1.**

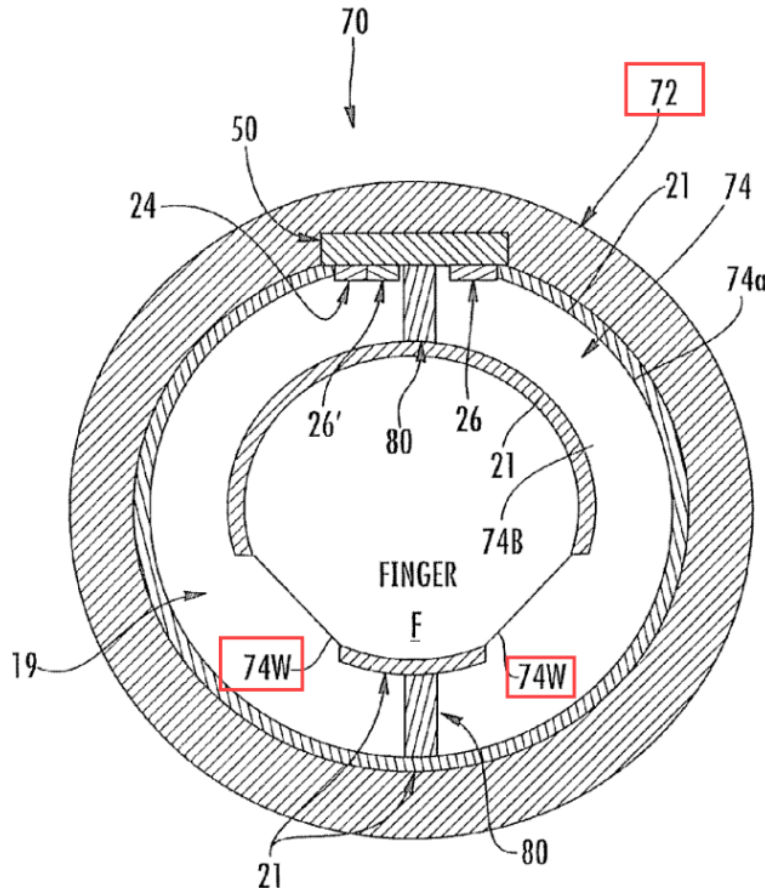
Claim 1 requires that “a flexible printed circuit board [is] disposed between the interior wall and the exterior wall,” and that “at least one of the interior wall and the exterior wall defines a window that facilitates at least one of data acquisition,

data transmission, and battery recharge.” Ex-1001 at 35:41-48. Petitioner alleges that LeBoeuf discloses the claimed limitation. Pet. at 42-45. But LeBoeuf’s finger ring is shown below:



LeBoeuf discloses a separate inner housing 74 and outer housing 72. Ex-1012, 28:1-10. Base 50 supports optical emitter 26 and optical detector 26. *Id.*, 28:11-17. Light guiding region 19 serves to “deliver[] light from the optical emitter 24 to the finger F of a subject at one or more predetermined locations and that collects light from the finger F and delivers light to the optical detectors.” *Id.*, 28:29-34. LeBoeuf states that the outer housing 72 “may include a flex circuit containing various electronic components, such as a microprocessor, D/A converter, power source, power regulator, and the like.” *Id.*, 28:4-6.

Thus, as shown in Fig. 22B of LeBoeuf, the outer housing 72 includes a “flex circuit,” but a *separate* inner housing 74 is the one that includes windows 74W:



Id. at Fig. 22B (annotated).

Thus, LeBoeuf does not disclose or suggest “wherein at least one of the interior wall and the exterior wall [between which the printed circuit board is disposed] defines a window that facilitates at least one of data acquisition, data transmission, and battery recharge” of claim 1.

LeBoeuf also does not disclose or suggest a first and second “enclosing structures” of claim 1 that contain a flexible printed circuit board therebetween (such

as inner and outer rings of Fig. 8 of the '034 patent). Rather, LeBoeuf discloses a unitary housing 72 that may contain a flex circuit. Petitioner points to base 50 as a printed circuit board (Pet. at 42-44), but LeBoeuf specifically states that a “flex circuit” is separately located in housing 72. Ex-1012, 28:3-6. And even if base 50 is considered a printed circuit board (for which there is no support), base 50 is not located between interior and exterior walls that define first and second enclosing structures.

Thus, LeBoeuf fails to disclose or suggest interior and exterior walls defining first and second enclosing structures having a flexible printed circuit board disposed therebetween and at least one of the walls defines a window, as recited in claim 1.

2. LeBoeuf does not disclose or suggest internal/external housing portions that define first/second enclosing structures, the external/internal housing portion configured to seal the at least one component and printed circuit board in an internal space defined by the interior surface of the internal housing, as recited in claims 11 and 16.

As explained above, LeBoeuf discloses a unitary inner housing 74 wrapped around a second unitary outer housing 72. No internal and external housing “portions” that each define enclosing structures are disclosed or suggested. Additionally, LeBoeuf discloses that “flex circuit” is located in outer housing 72 and thus is not 1) “arranged around a portion of a circumference of an interior surface of the internal housing,” or 2) sealed within an “internal space defined by the interior

surface of the internal housing,” as recited in claim 11.

Similarly, with respect to claim 16, LeBoeuf fails to disclose or suggest external and internal housing “portions” that each define enclosing structures. Additionally, LeBoeuf does not disclose the position of “flex circuit” in outer housing, and therefore does not disclose or suggest that “flex circuit” is “arranged around a portion of a circumference of an interior surface of the external housing.” LeBoeuf also does not disclose or suggest “the internal housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the external housing.

Accordingly, Petitioner has not shown that claims 1, 11, and 16, or any claims that depend therefrom, are obvious in view of LeBoeuf.

VII. CONCLUSION

For the reasons stated herein, Patent Owner respectfully requests that the Board deny institution.

Dated: September 13, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT UNDER 37 C.F.R. § 42.24(d)

I hereby certify that the foregoing Patent Owner's Preliminary Response contains 5,674 words as measured by the word-processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(d).

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CERTIFICATE OF SERVICE

I hereby certify that, on September 13, 2024, I caused a true and correct copy of Patent Owner's Preliminary Response Pursuant to 37 C.F.R. §42.107 to be served via email to the following counsel for Petitioner:

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