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Patent Owner's Demonstratives

Samsung Electronics et al. v. Ouraring

PGR2024-00030; PGR2024-00039; IPR2024-00928

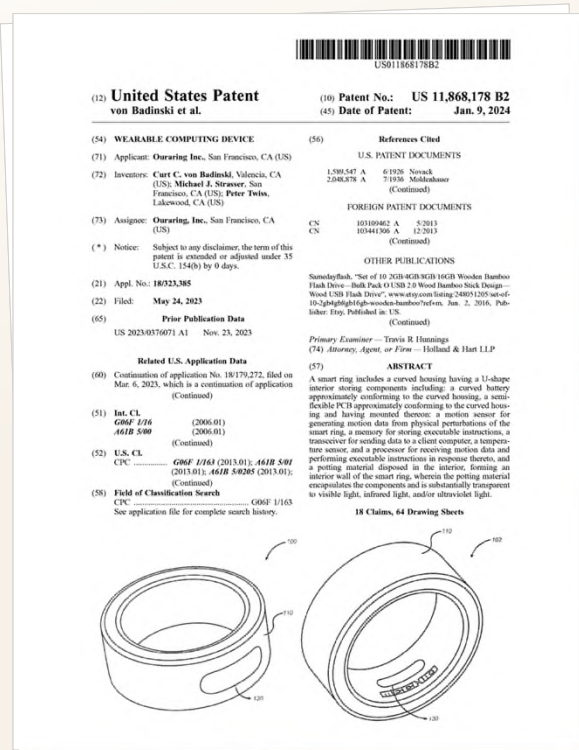
September 11, 2025

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

1



Overview of the '178 Patent



- **Title:**
Wearable Computing Device
- **Priority Date:**
November 29, 2013
- **Challenged Claims:**
1-18

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

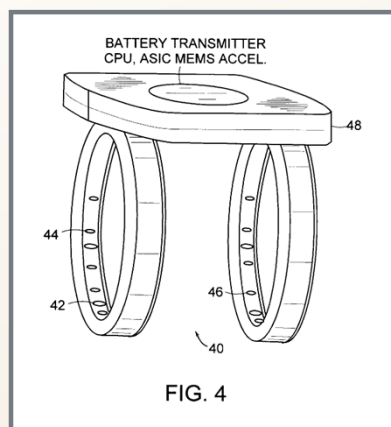
2



Development of Wearable Rings

PGR2024-00030; PGR2024-00039; IPR2024-00928

Development of Wearable Rings



Ex. 2025, Fig. 4

- No housing components
- Flat, coin-type batteries
- Printed circuit boards and battery located *outside* the ring

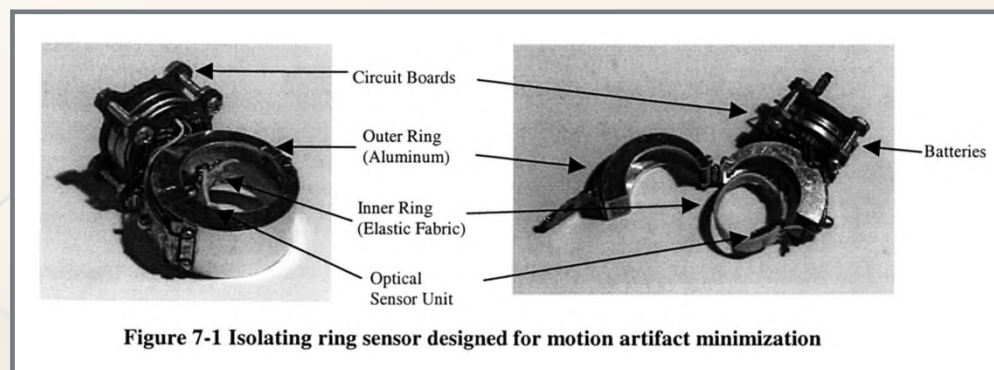


Figure 7-1 Isolating ring sensor designed for motion artifact minimization

Ex 1035, Figs. 7-1, 8-1.

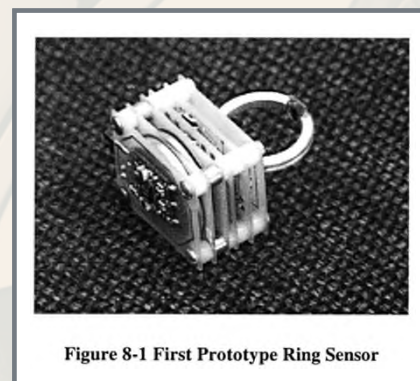


Figure 8-1 First Prototype Ring Sensor

Paper 20 at 9

Paper 20 at 7-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Development of Wearable Rings

Wearable Technology



Mobile Monitoring with Wearable Photoplethysmographic Biosensors

H. HARRY ASADA,
PHILIP SHALIZ,
ANDREW REISER,
EDMOND RHE, AND
REGINALD C. HUTCHINSON

Technical and Clinical Aspects of a Ring Sensor for Ambulatory, Telemetric, Continuous Health Monitoring in the Field, in the Hospital, and in the Home

Wearable biosensors (WBS) will permit continuous, ambulatory (CV) monitoring in a number of novel settings. Benefits may be realized in the diagnosis and treatment of a number of major diseases. WBS, in conjunction with appropriate alarm algorithms, can increase surveillance capabilities for CV catastrophe for high-risk subjects. WBS could also play a role in the treatment of chronic diseases, by providing information that enables precise titration of therapy or detecting lapses in patient compliance.

WBS could play an important role in the wireless surveillance of people during hazardous operations (military, fire-fighting, etc.), or such sensors could be deployed during a mass civilian casualty occurrence. Given that CV physiologic parameters make up the "vital signs" that are the most important information in emergency medical situations, WBS might enable a wireless monitoring system for large numbers of at-risk subjects. This same approach may also have utility in monitoring the waiting areas of today's overcrowded emergency departments. For hospital inpatients who require CV monitoring, current biosensor technology typically subjects patients to a tangle of cables, whereas wearable CV sensors could increase inpatient comfort and may even reduce the risk of tripping and falling, a perennial problem for hospital patients who are ill, medicated, and in an unfamiliar setting.

On a daily basis, wearable CV sensors could detect a missed dose of medication by sensing untreated elevated blood pressure and could trigger an automated reminder for the patient to take the medication. Moreover, it is important for doctors to titrate the treatment of high blood pressure, since both insufficient therapy as well as excessive therapy (leading to abnormally low blood pressures) increase mortality. However, healthcare providers have only intermittent values of blood pressure on which to base therapy decisions; it is possible that continuous blood pressure monitoring would permit enhanced titration of therapy and reductions in mortality. Similarly, WBS would be able to log the physiologic signature of a patient's exercise effort (manifested as changes in heart rate and blood pressure), permitting the patient and healthcare provider to assess compliance with a regimen proven to improve health outcomes. For patients with chronic cardiovascular disease, such as heart failure, home monitoring employing WBS may detect exacerbations in very early and

often easily treated stages, long before the patient progresses to more dangerous levels that necessitate an emergency room visit and costly hospital admission.

In this article we will address both technical and clinical issues of WBS. First, design concepts of a WBS will be presented, with emphasis on the ring sensor developed by the author's group at MIT. The ring sensor is an ambulatory, telemetric, continuous health-monitoring device. This WBS combines miniaturized data acquisition features with advanced photoplethysmographic (PPG) techniques to acquire data related to the patient's cardiovascular state using a method that is far superior to existing finger-tip PPG sensors [1]. In particular, the ring sensor is capable of reliably monitoring a patient's heart rate, oxygen saturation, and heart rate variability. Technical issues, including motion artifact, interference with blood circulation, and battery power issues, will be addressed, and effective engineering solutions to alleviate these problems will be presented. Second, based on the ring sensor technology the clinical potentials of WBS monitoring will be addressed.

WBS System Paradigm

For novel healthcare applications to employ WBS technology, several system criteria must be met. The WBS hardware solution must be adequate to make reliable physiologic measurements during activities of daily living or even more demanding circumstances such as fitness training or military battle. There must exist data processing and decision making algorithms for the waveform data. These algorithms must prompt some action that improves health outcomes. Finally, the systems must be cost effective when compared with less expensive, lower technology alternatives.

WBS Design Paradigm

The monitoring environments for out-of-hospital, wearable devices demand a new paradigm in noninvasive sensor design. There are several design requirements central to such devices. Compactness, stability of signal, motion and other disturbance rejection, durability, data storage and transmission, and low power consumption comprise the major design considerations. Additionally, since WBS devices are to be worn without direct doctor supervision, it is imperative that they are simple to use and comfortable to wear for long periods of time. A challenge unique to wearable sensor design is the

32 IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE

DECEMBER 2000

WATSON 1999

Petitioner Samsung Ex-1037, 0001

Ex. 1037

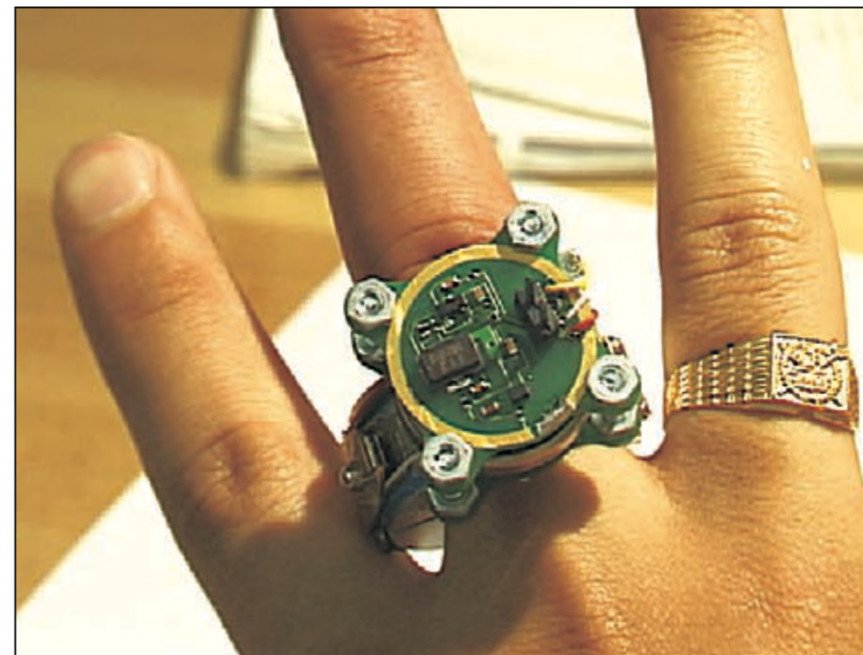


Fig. 9. First prototype ring sensor with RF transmitter powered by a coin-size cell battery.

Ex. 1037, at 7

Paper 20 at 10-11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner Oura Ex. 2119, 005



Development of Wearable Rings

- A. [I]n the 2012-2013 timeframe...I was aware of smart ring designs, including...the designs by Professor Harry Asada at MIT, in part because that's where I went to grad school, and I met with him there....

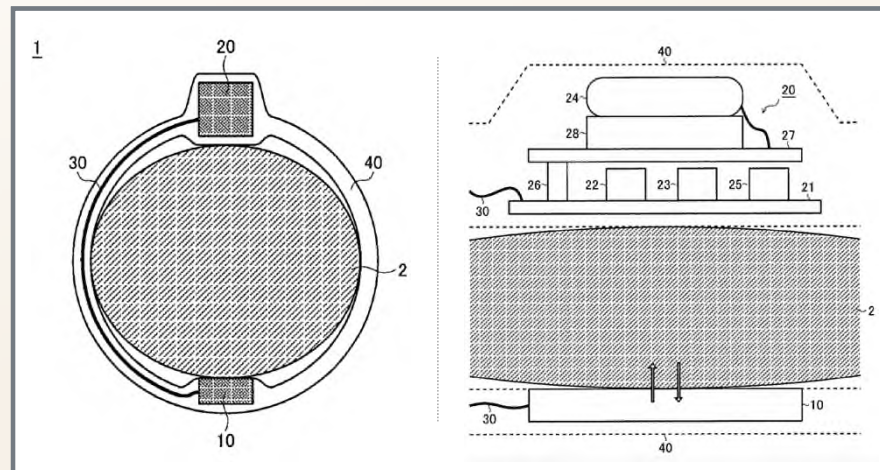
And I very quickly concluded that the most logical way to build such a device was to follow the prior art, including Professor Asada's and the other art that I found in the literature on this topic, and place the battery at the top of the device....

[W]hat I can say is that a POSITA who was...exactly in this space at the time of invention had considered various different ways of building a smart ring, and I concluded, at the time, that I wasn't able to make it sufficiently small.

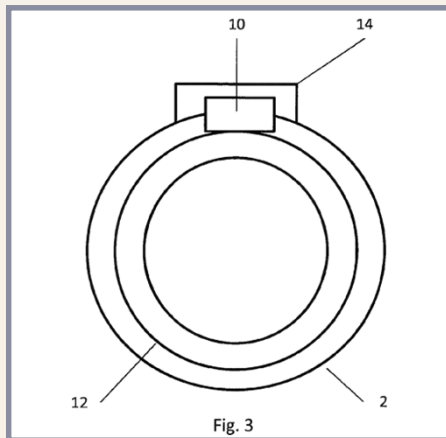
Ex. 1081, 35:9-37:10, Ex. 2018, ¶¶ 63, 70; Paper 20 at 14



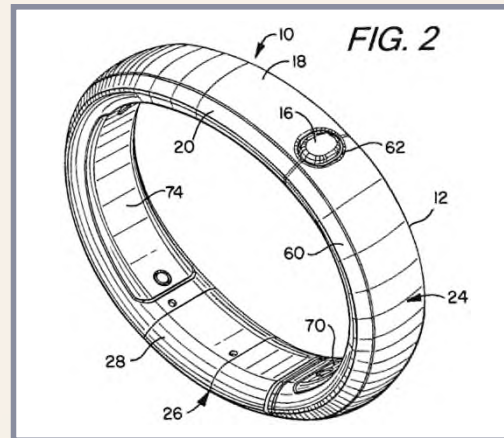
Development of Wearable Rings



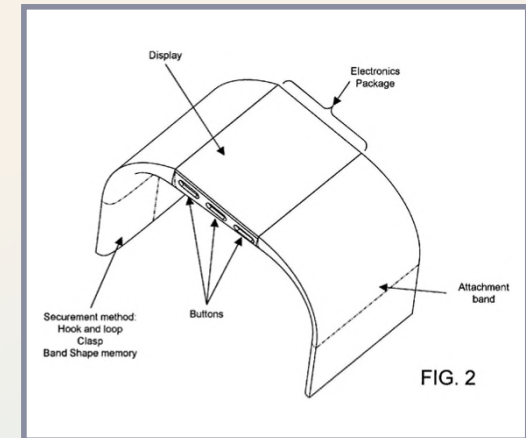
Ex. 1005, Figs. 22, 29



Ex. 1007, Fig. 3



Ex 1010, Fig. 2



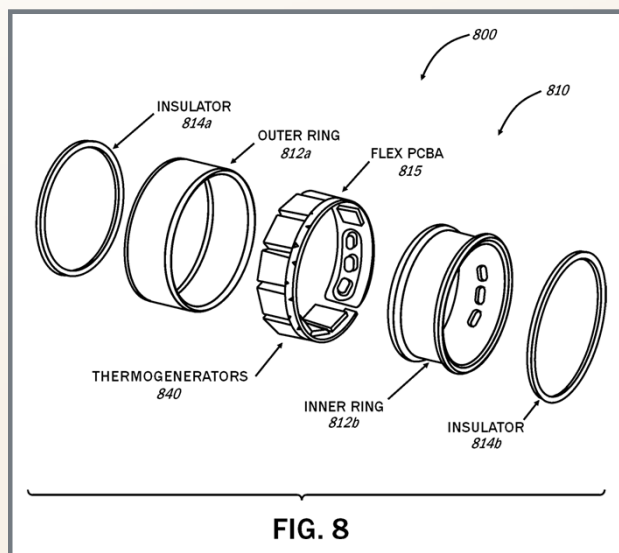
Ex. 1006, Fig. 2

Paper 20 at 7-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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The '178 Patent Claim 1



Ex. 1001, Fig. 8

1. A finger-worn wearable ring device, comprising:
 - an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;
 - an internal housing component defining an inner circumferential surface of the finger-worn wearable ring device, the internal housing component coupled with the external housing component, wherein at least a portion of the inner circumferential surface of the internal housing component is configured to contact a tissue of a user when the finger-worn wearable ring device is being worn by the user;
 - a battery positioned within a cavity formed between the internal housing component and the external housing component, wherein the battery comprises a shape and size configured to fit within the cavity between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device;
 - a printed circuit board disposed between the internal housing component and the external housing component, wherein the printed circuit board extends through at least a second portion of the cavity of the finger-worn wearable ring device different from the first portion; and
 - one or more sensors electrically coupled with the printed circuit board and the battery and configured to acquire data from the user through the internal housing component.

EX-1001 at 44:45-45:8

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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The '178 Patent: Summary of Grounds

1	Schröder (Claims 1-3, 17-18)
2	Schröder/Niwa (Claims 1-3, 13-16)
3	Schröder/Mestas (Claims 3 and 12)
4	Schröder/Yuen (Claims 1, 4-11, 13-16)
5	Niwa/Schröder (Claims 1-3, 13-18)
6	Niwa/Schröder/Mestas (Claim 12)
7	Niwa/Schröder/Yuen (Claims 4-11)

Paper 3 at i-iii

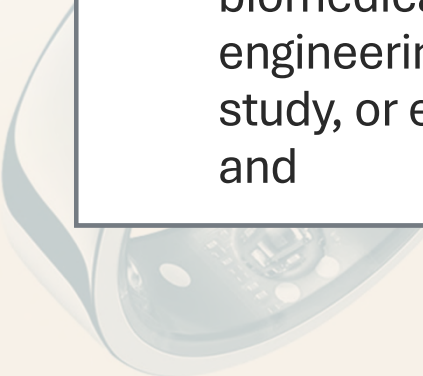
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

9



Level of Skill of POSITA

Proposed by Petitioner:



1. At least four-year degree in electrical engineering, biomedical engineering, optical engineering, or related field of study, or equivalent experience; and

2. At least two years' experience in academia or industry studying or developing physiological monitoring devices such as non-invasive biosensors. A person of ordinary skill in the art would have also been familiar with, for example, sensor system design and signal processing.

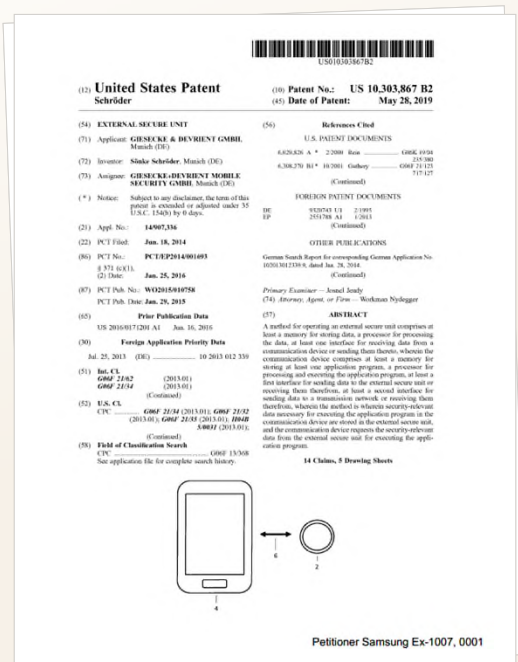
Paper 3 at 8



Deficiencies of Ground 1: Schröder

PGR2024-00030

Schröder Does Not Render Claim 1 Obvious

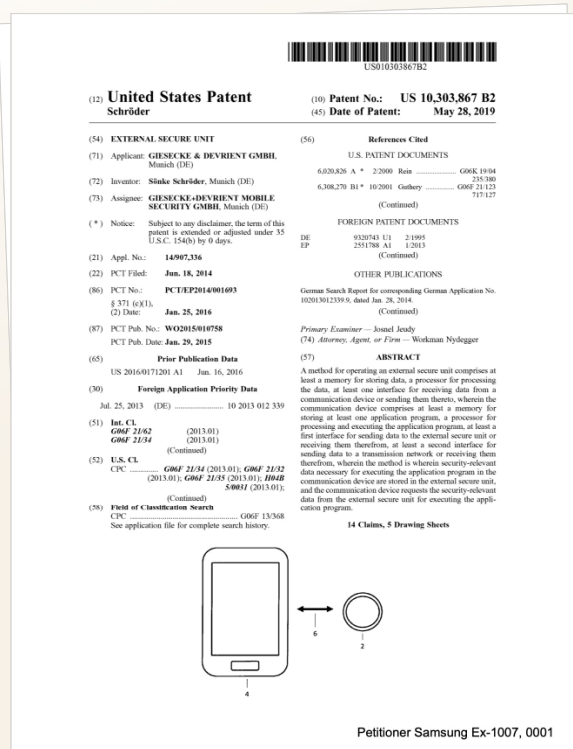


Ex. 1007
Paper 20 at 28

- 1[pre] A finger-worn wearable ring device, comprising:
- 1[a] **an external housing component defining an outer circumferential surface** of the finger-worn wearable ring device;
- 1[b][i] **an internal housing component defining an inner circumferential surface of the finger-worn wearable ring device, the internal housing component coupled with the external housing component,**
- 1[b][ii] wherein at least a portion of **the inner circumferential surface of the internal housing component** is configured to contact a tissue of a user when the finger-worn wearable ring device is being worn by the user;
- 1[c] a battery positioned within a cavity formed **between the internal housing component and the external housing component**, wherein the battery comprises a shape and size configured to fit within the cavity **between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component**, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device;
- 1[d] a printed circuit board disposed **between the internal housing component and the external housing component**, wherein the printed circuit board extends through at least a second portion of the cavity of the finger-worn wearable ring device different from the first portion; and
- 1[e] one or more sensors electrically coupled with the printed circuit board and the battery and configured to acquire data from the user **through the internal housing component.**



Schröder



Ex. 1007
Paper 20 at 18

(57)

ABSTRACT

A method for operating an external secure unit comprises at

- Schröder's rings are directed to security applications – not health monitoring

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner Oura Ex. 2119, 013



Schröder

United States Patent
Schröder

(10) Patent No.: **US 10,303,867 B2**
(45) Date of Patent: **May 28, 2019**

(54) **EXTERNAL SECURE UNIT**

(71) Applicant: **GEISECKE & DEVRIENT GMBH**
Münich (DE)

(72) Inventor: **Stefan Schröder**, Munich (DE)

(73) Assignee: **GEISECKE-DEVRIENT MOBILE SECURITY GMBH**, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/907,336**

(22) PCT Filed: **Jan. 18, 2014**

(86) PCT No.: **PCT/EP2014/001693**
§ 371 (c)(1),
(2) Date: **Jan. 25, 2016**

(87) PCT Pub. No.: **WO2015/010758**
PCT Pub. Date: **Jan. 29, 2015**

(65) **Prior Publication Data**
US 2016/0171280 A1 Jan. 16, 2016

(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.**
G06F 21/62 (2013.01)
G06F 21/34 (2013.01)
(Continued)

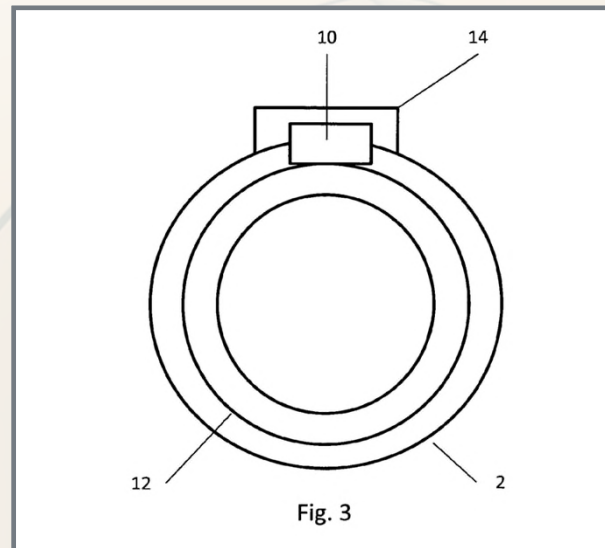
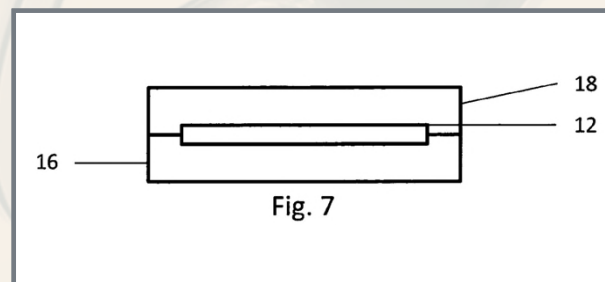
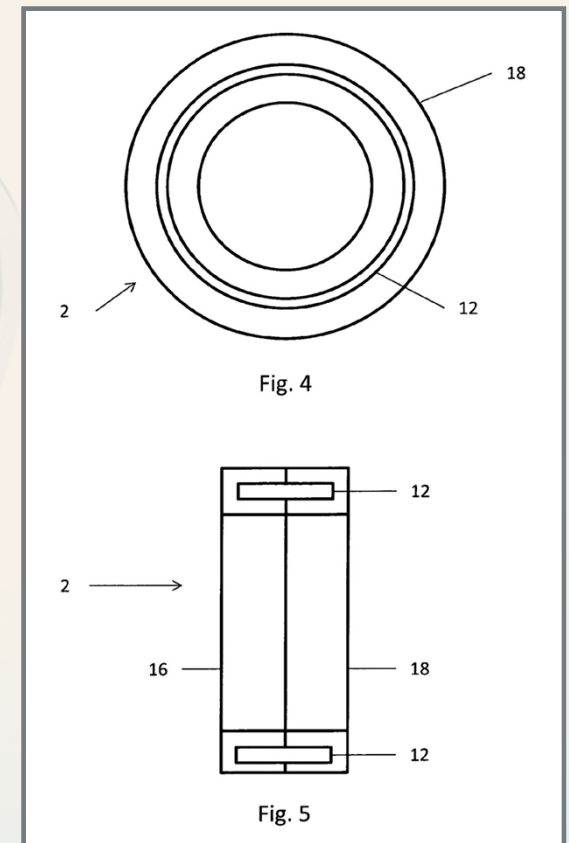
(52) **U.S. Cl.**
CPC: **G06F 21/34** (2013.01); **G06F 21/32** (2013.01); **G06F 21/05** (2013.01); **H04B 5/001** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC: G06F 13/368
See application file for complete search history.

14 Claims, 5 Drawing Sheets

Petitioner Samsung Ex-1007, 0001

Ex. 1007
Paper 39 at 2-8



Ex. 1007, Figs. 3, 4, 5, and 7

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE



Schröder's "Ring Halves"

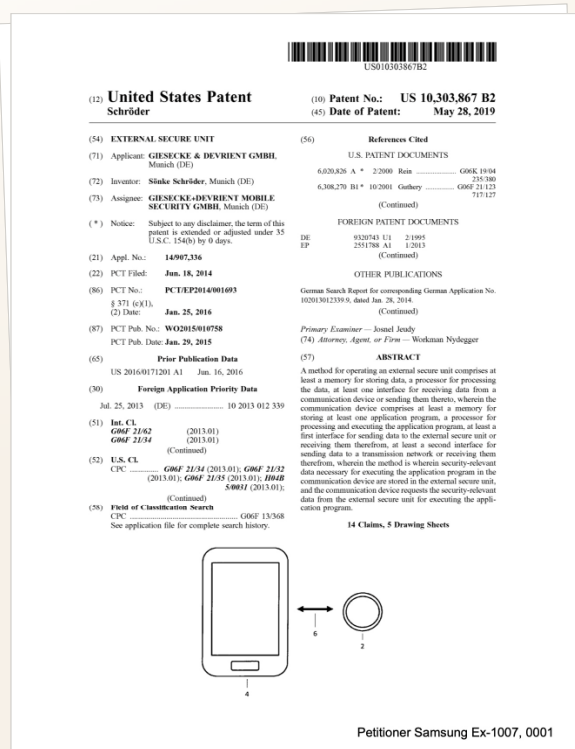
FIG. 3 shows a finger-ring according to the invention having an insertable chip module with a cover.

FIG. 4 shows a longitudinal section through a finger-ring as an example of an external secure unit.

FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring.

FIGS. 6 to 10 show different cross sections through a finger-ring.

FIGS. 6 to 10 show different cross sections through a finger-ring 2, consisting of ring-shaped components 16, 18 of the finger-ring 2 and of an inlay 12. FIG. 6 shows a cross section with the components 14 and 16 having an L-shaped profile. Between the two L-shaped components 16 and 18 an inlay 12 is arranged. FIG. 7 accordingly shows two U-shaped components 16 and 18 between which an inlay 12 is arranged. FIG. 8 shows a U-shaped component 18 and an even component 16, with the inlay 12 being arranged between the components 16 and 18. FIG. 9 shows two even components 16 and 18 between which the inlay 12 is arranged. FIG. 10 shows an L-shaped component 18 and an even component 16 between which the inlay 12 is arranged.



Ex. 1007, 3:45-52; 12:43-55
Paper 39 at 2-8



Schröder's "Ring Halves"

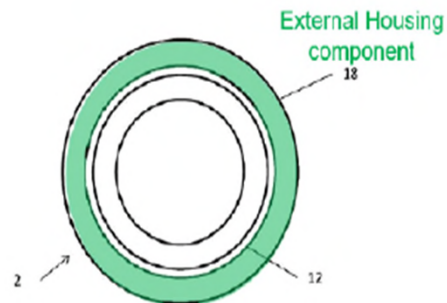


Fig. 4

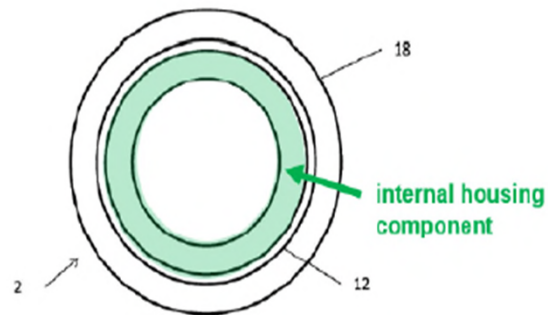


Fig. 4

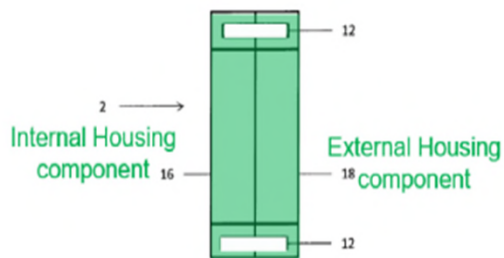


Fig. 5



Fig. 7

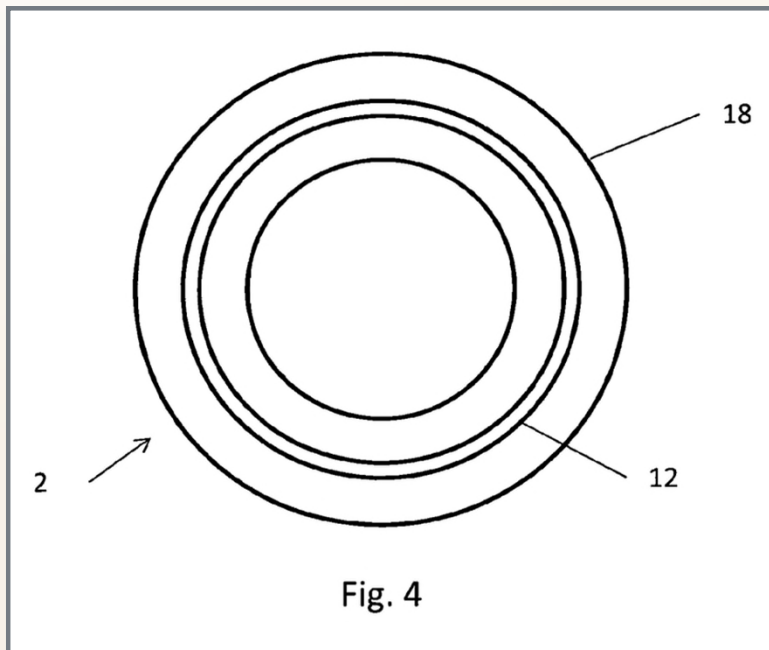
“As shown below in Figure 4, ring half 18 is the claimed external housing component (green)....”

“As shown below in Figure 4, ring half 16 is the claimed external housing component (green)....”

Ex. 1007, Figs. 4, 5, 7
Paper 3 at 19-20
Paper 39 at 3



Schröder's "Ring Halves"



- A. And a good analogy for this would be thinking like a bagel. The normal dimension that you would cut a bagel is in half. You would open up the bagel. To complete the analogy, maybe you'd use your finger and dig a little trench into one half of the bagel or possibly both sides of the bagel, put some cream cheese in here, which would correspond in this analogy to the inlay, and then take those two halves and bring them back together. That's my interpretation of the ring halves of figure 4.
- Q. I think that's what's shown here in figure 5. This is kind of the bagel interpretation.
- A. Exactly.

*Ex. 1081, 82:21-83:11
Ex. 1007. Fig. 4
Paper 39 at 6*



Schröder's "Ring Halves"

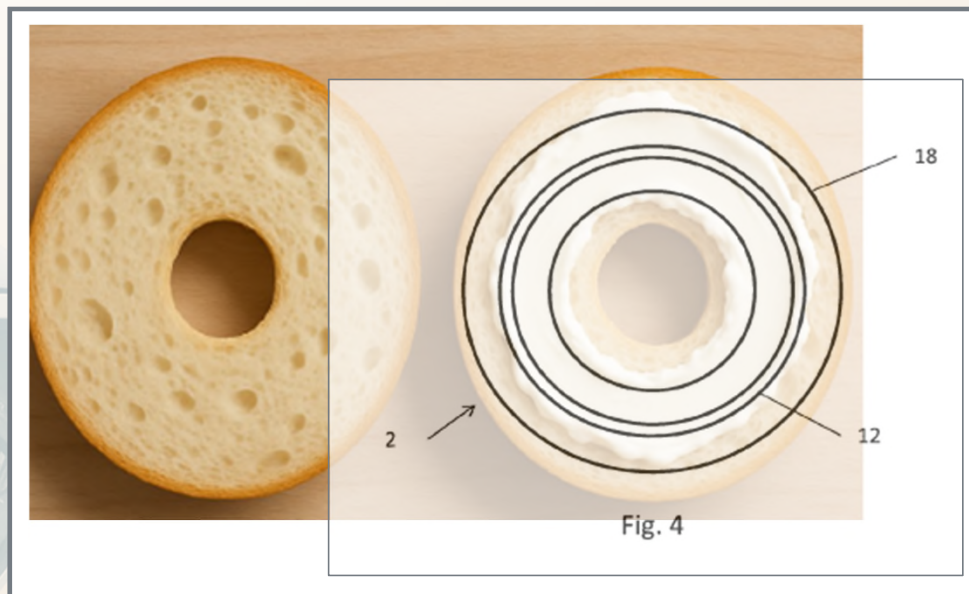
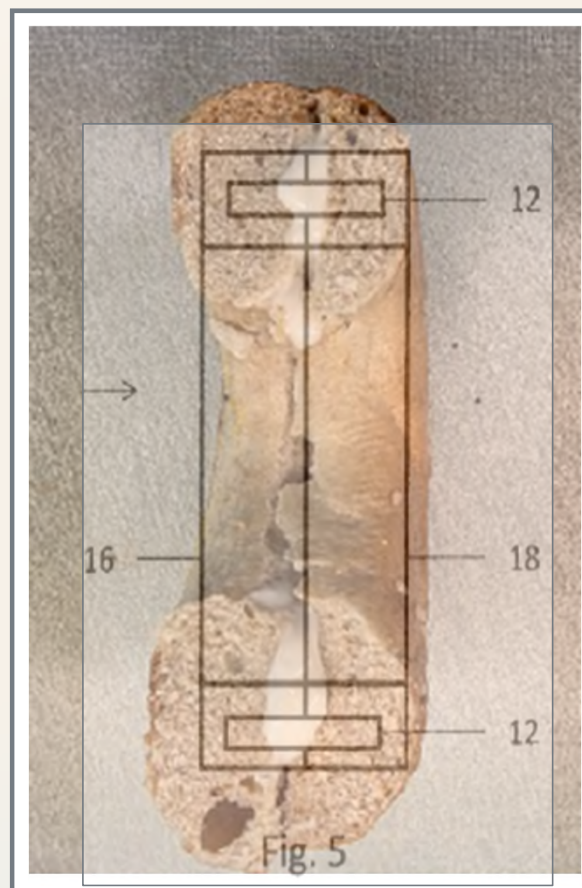


FIG. 4 shows a longitudinal section through a finger-ring 2. Here, an inlay 12 is inserted into one half 18 of the finger-ring 2. FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring 2. The finger-ring 2 consists of two ring halves 16 and 18. The two ring halves 16 and 18 respectively have a recess into which the inlay 12 is inserted.

*Ex. 1007, 12:5-6; Fig. 4
Paper 39 at 6*

Schröder's "Ring Halves"

FIG. 4 shows a longitudinal section through a finger-ring 2. Here, an inlay 12 is inserted into one half 18 of the finger-ring 2. FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring 2. The finger-ring 2 consists of two ring halves 16 and 18. The two ring halves 16 and 18 respectively have a recess into which the inlay 12 is inserted.



Ex. 1007, Fig. 5
Paper 39 at 7.

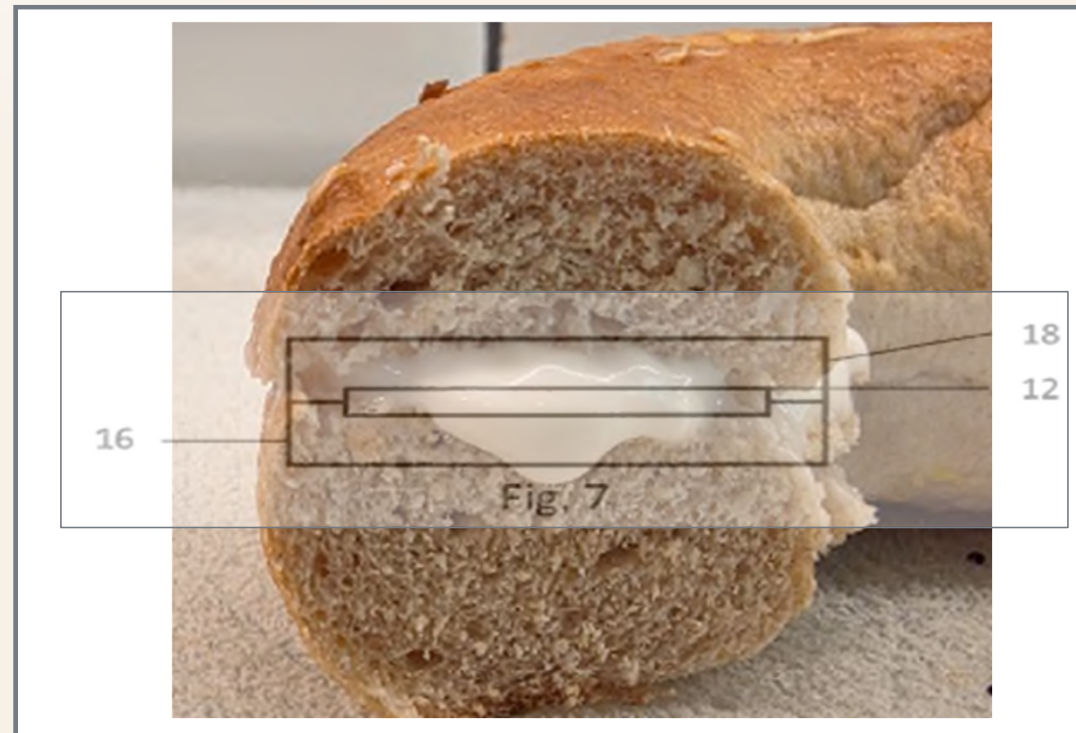


Schröder's “Ring Halves”

Q. And so would you agree that, at least in figure 7, what's shown as element 18 would correspond to an outer half and what's shown in element 16 would correspond to an inner half?

A. No, I wouldn't agree with that. I think element 18 and 16 in figure 7 are the same as element 18 and 16 in figure 5. And they're the two halves of the bagel. And so, you know, in the context of the '178 patent, we have an external surface and internal surface which is very clearly defined in that patent.

And here, it's my opinion that figure 7 is simply just showing figure 5 rotated by 90 degrees and with a different cross section through the ring. So it's actually showing the two ring halves with the carrier foil in between them.



Ex. 1007, Fig. 5
Ex. 1081, 85:13-23
Paper 39 at 8



Petitioner's shifting theories

Petition	Reply
<p>Fig. 5</p>	<p>Fig. 5'</p>

Paper 39 at 4

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

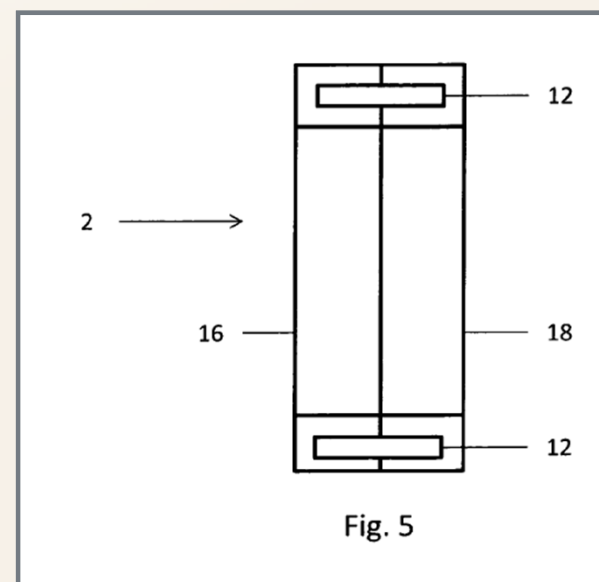
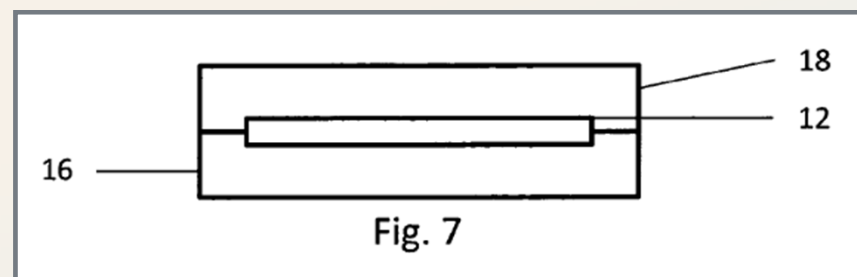
21

Schröder's "Ring Halves"

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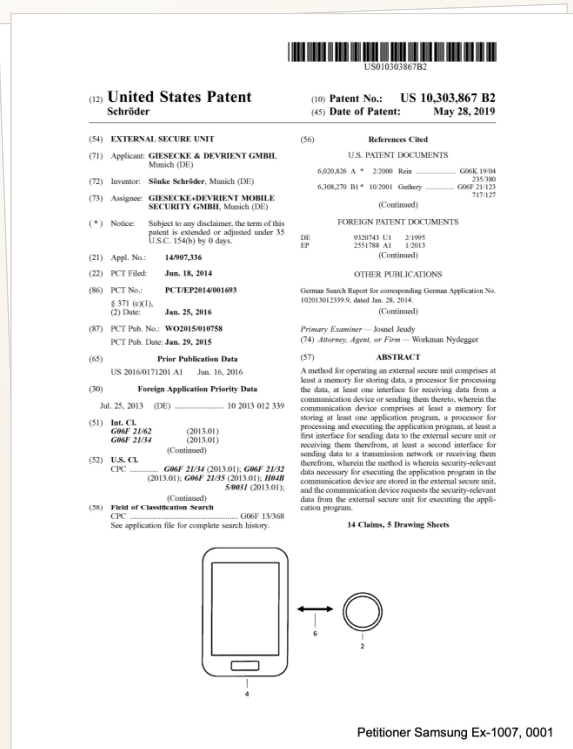
And here, it's my opinion that figure 7 is simply just showing figure 5 rotated by 90 degrees and with a different cross section through the ring. So it's actually showing the two ring halves with the carrier foil in between them.



Ex. 1007, Fig. 5
Ex. 1081, 85:13-23
Paper 39 at 8



Schröder's "Ring Halves"



Ex. 1007, 3:45-52
Paper 39 at 2-8

FIG. 3 shows a finger-ring according to the invention having an insertable chip module with a cover.

FIG. 4 shows a longitudinal section through a finger-ring as an example of an external secure unit.

FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring.

FIGS. 6 to 10 show different cross sections through a finger-ring.

Schröder Fails To Disclose Limitation 1[c]

United States Patent
Schröder

(10) Patent No.: US 10,303,867 B2
(45) Date of Patent: May 28, 2019

(54) **EXTERNAL SECURE UNIT**

(71) Applicant: GIESECKE & DEVRIENT GMBH, Munich (DE)

(72) Inventor: Steike Schröder, Munich (DE)

(73) Assignee: GIESECKE-DEVRIENT MOBILE SECURITY GMBH, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/907,336

(22) PCT Filed: Jan. 18, 2014

(86) PCT No.: PCT/EP2014/001693
§ 371 (c)(1),
(2) Date: Jan. 25, 2016

(87) PCT Pub. No.: WO2015/010758
PCT Pub. Date: Jan. 29, 2015

(65) **Prior Publication Data**
US 2016/0171280 A1 Jan. 16, 2016

(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.**
G06F 21/62 (2013.01)
G06F 21/34 (2013.01)
(Continued)

(52) **U.S. Cl.**
CPC: G06F 21/34 (2013.01); G06F 21/32 (2013.01); G06F 21/35 (2013.01); H04B 5/0011 (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC: G06F 13/368
See application file for complete search history.

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EP 251788 A1 1/2003
(Continued)

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German Search Report for corresponding German Application No. 102013012339-9, dated Jan. 28, 2014.
(Continued)

Primary Examiner—Isabel Jeady
(74) *Attorney, Agent, or Firm*—Wookman Nydegger
(57) **ABSTRACT**
A method for operating an external secure unit comprises at least a memory for storing data, a processor for processing the data, at least one interface for receiving data from a communication device or sending them thereto, wherein the communication device comprises at least a memory for storing at least one application program, a processor for processing and executing the application program, at least a first interface for sending data to the external secure unit or receiving them therefrom, at least a second interface for sending data to a transmission network or receiving them therefrom, wherein the method is wherein security-relevant data necessary for executing the application program in the communication device are stored in the external secure unit, and the communication device requests the security-relevant data from the external secure unit for executing the application program.

14 Claims, 5 Drawing Sheets

Petitioner Samsung Ex-1007, 0001

Ex. 1007, 11:46-50
Paper 20 at 17.

In a further embodiment example, the external secure unit 2 has an energy storage device, e.g. an accumulator or a battery. The energy storage device is connected to the chip module 10 in order to supply the chip module 10 with energy outside an electromagnetic field of a reader. Within the

Schröder Fails To Disclose Limitation 1[c]

US 10,303,867 B2

(12) **United States Patent**
Schröder

(10) **Patent No.:** US 10,303,867 B2
(45) **Date of Patent:** May 28, 2019

(54) **EXTERNAL SECURE UNIT**

(71) **Applicant:** GIESECKE & DEVRIENT GMBH
Münch (DE)

(72) **Inventor:** Stecke Schröder, Münch (DE)

(73) **Assignee:** GIESECKE-DEVRIENT MOBILE
SECURITY GMBH, Münch (DE)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) **PCT Filed:** Jan. 18, 2014

(86) **PCT No.:** PCT/EP2014/001693
§ 371 (c)(1),
(2) **Date:** Jan. 25, 2016

(87) **PCT Pub. No.:** WO2015/010758
PCT Pub. Date: Jan. 29, 2015

(65) **Prior Publication Data**
US 2016/0171280 A1 Jan. 16, 2016

(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.** (2013.01)
G06F 21/62
G06F 21/34
(Continued)

(52) **U.S. Cl.** (2013.01)
CPC: G06F 21/34 (2013.01); G06F 21/32 (2013.01); G06F 21/35 (2013.01); H04B 5/0011 (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC: G06F 13/368
See application file for complete search history.

(56) **References Cited**
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6,030,828 A * 2/2000 Rein G06K 15/04 2/25/2000
6,308,270 B4 * 10/2001 Gubrey G06F 21/123 7/17/2001
(Continued)

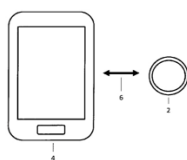
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(Continued)

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German Search Report for corresponding German Application No. 102013012339-9, dated Jan. 28, 2014.
(Continued)

Primary Examiner—Joan Jeady
(74) **Attorney, Agent, or Firm**—Wookman Nydegger

(57) **ABSTRACT**
A method for operating an external secure unit comprises at least a memory for storing data, a processor for processing the data, at least one interface for receiving data from a communication device or sending them thereto, wherein the communication device comprises at least a memory for storing at least one application program, a processor for processing and executing the application program, at least a first interface for sending data to the external secure unit or receiving them therefrom, at least a second interface for sending data to a transmission network or receiving them therefrom, wherein the method is wherein security-relevant data necessary for executing the application program in the communication device are stored in the external secure unit, and the communication device requests the security-relevant data from the external secure unit for executing the application program.

14 Claims, 5 Drawing Sheets



Petitioner Samsung Ex-1007, 0001

Ex. 1007, 4:65-5:9
Paper 20 at 30

Smart cards can generally be easily forgotten or lost, and are a nuisance to a user due to their increasing number. Known finger-rings or wristbands with an RFID function are employed merely for identification, and not connected to further services. RFID wristbands and corresponding watches can be poorly employed for authentication with a communication device, since they are usually outside the range of an NFC reader. RFID rings or RFID tags with a conventional ring-shaped antenna can hardly be employed, since the coupling position of the antennas is very unfavorable between an RFID finger-ring and an RFID reader when employing a communication device, since the arrangement is orthogonal when the user holds the communication device in his hand.

Schröder Fails To Disclose Limitation 1[c]

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

OURARING, INC.,
Patent Owner.

Case PGR2024-00030
U.S. Patent No. 11,868,178

PGR2024-00030
U.S. Patent No. 11,868,178

DECLARATION OF DR. PATRICK MERCIER

Patent Owner Oura Ex. 2018, 0001

94. This cursory description of a battery is not surprising, as Schröder relates to RFIDs, which are usually fully passive and do not require battery at all. *Id.*, 4:65-5:9; 18:45-46 (“The application on the finger-ring 2 simulates e.g., an RFID tag.”); Ex. 2013 (“Passive RFID systems use tags with **no internal power source** and instead are powered by the electromagnetic energy transmitted from an RFID reader.”).

Ex. 2018, ¶ 94
Paper 20 at 30-31

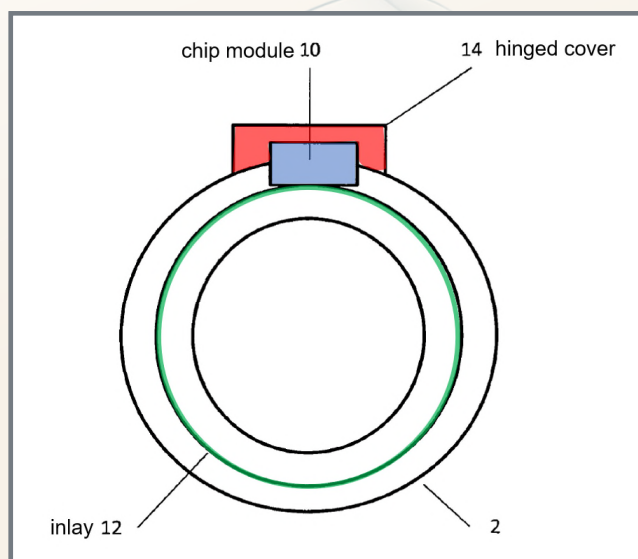
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

26

Patent Owner Oura Ex. 2119, 026

Schröder Fails To Disclose Limitation 1[c]

- Schröder's chip module is located *outside* and above the ring so it can be replaced



Ex 1007, Fig. 3
Paper 20 at 18.

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

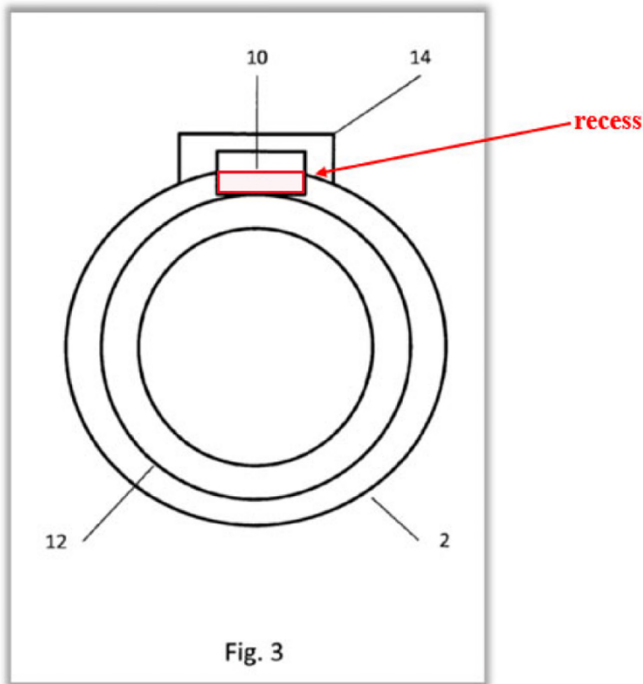
Ex. 1007 at 8:54-56

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

Ex. 1007 at 8:60-63

Schröder Fails To Disclose Limitation 1[c]

- Schröder's chip module is located *outside* and above the ring so it can be replaced



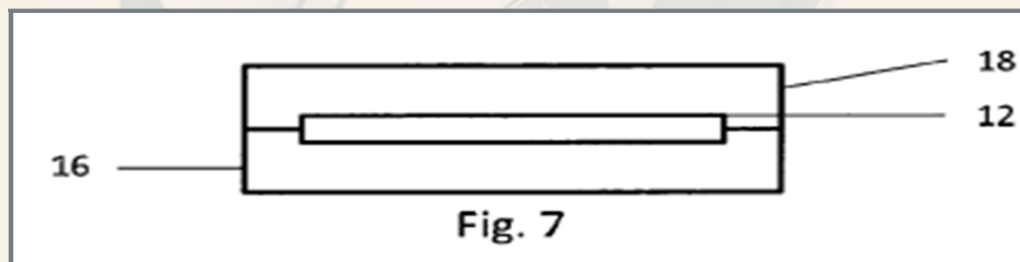
antenna coil 8. The chip module 10 is inserted into a recess of the finger-ring 2. The position of the recess on the

Ex. 1007 at 8:58-59

*Ex 1007, Fig. 3
Paper 20 at 35-36.*

Schröder Fails To Disclose Limitation 1[c]

- Q. So how big is the battery or what's the size of the battery that's occupying the second half of the rectangle in Figure 7? Would a POSITA know that?
- A. A POSITA would size the battery appropriately for the function that they were trying to accomplish.



Ex. 2020, 214:7-215:17
Paper 20 at 31



Schröder Fails To Disclose Limitation 1[c]

Q. Have you in your work on this case attempted to find whether there was a battery available in 2013 that was appropriate to fit in Schröder as you've proposed?

A. I did not find it necessary to do that, no.

*Ex. 2021, 321:5-10
Paper 20 at 32*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

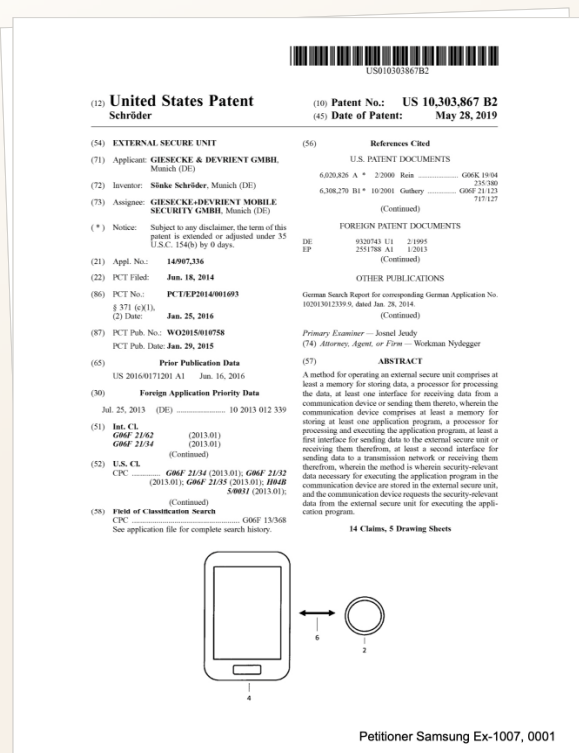
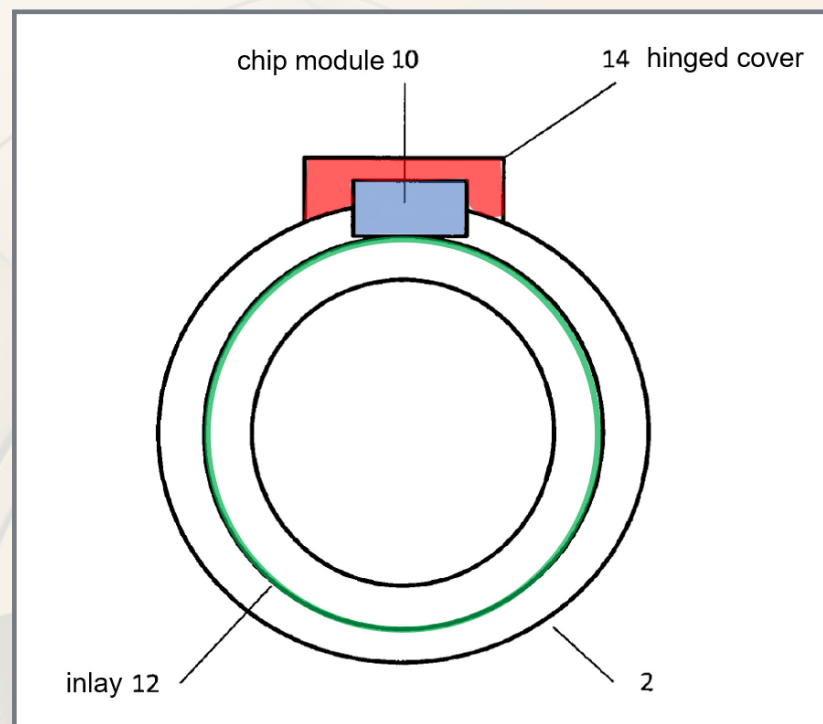
30

Schröder Fails To Disclose Limitation 1[c]

- Q. Reading Schröder, can you draw any conclusion about what size battery -- I'll say what size and capacity of battery you would need to accomplish the functions described in Schröder?
- A. Well, again, it's silent on the particular capacity. But in an embodiment, for example, that uses a battery, it would depend on how long you wanted that device to maintain charge and function in those active situations.

*Ex. 2020, 162:14-163:11
Paper 20 at 32*

Schröder Fails To Disclose Limitation 1[c]



Paper 20 at 34
Ex. 1007, Fig. 3)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

32

Patent Owner Oura Ex. 2119, 032

Schröder Fails To Disclose Limitation 1[c]

Q. The question is, that citation is describing Figure 3, is it not, of Schröder?

A. It is describing column 8, 58, 60 is with respect to Figure 3.

Q. And you're not relying on -- you've stated that you're not relying on Figure 3?

A. I'm not. That's a mistake because what I'm highlighting is the description 12 where the inlay is inserted in the cavity between 16 and 18.

Q. So that's another mistake in your report?

A. That is.

Paper 20 at 36
Ex. 2020, 190:18-193:14

Schröder Fails To Disclose Limitation 1[c]

U.S. Patent No. 11,868,178
Declaration of Brian W. Anthony, Ph.D.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Case No. PGR2024-00030
U.S. Patent No. 11,868,178

DECLARATION OF DR. BRIAN W. ANTHONY
IN SUPPORT OF PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,868,178

Petitioner Samsung Ex-1002, 0001

Schröder's "finger-ring" has a battery positioned within a cavity between the internal and external housing components. Ex-1002 ¶¶162-165. Schröder's "finger-ring" consists of "two ring halves 16 and 18" with a recess so that "inlay 12 is inserted." Ex-1007, 12:7-9; 8:56-57. Inlay 12 has a "chip module 10 with at least one antenna coil 8, with at least one further electronic device." *Id.*, 12:61-65, 8:58-60 ("chip module 10 is inserted into a recess of the finger-ring 2"); Ex-1002 ¶¶165-168.



Fig. 7

Paper 3 at 23
Paper 20 at 36
Ex. 1007, 8:64-66

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

34

Schröder Fails To Disclose Limitation 1[c]

In the finger-ring 2 as an external secure unit 2 there can be arranged at least one inlay 12. The inlay 12 can have at least one chip module 10 with at least one antenna coil 8, with at least one further electronic device, e.g. a display, optionally being arranged on the inlay 12.

(12) **United States Patent**
Schröder

(10) **Patent No.:** US 10,303,867 B2
(45) **Date of Patent:** May 28, 2019

(54) **EXTERNAL SECURE UNIT**

(71) **Applicant:** GIESECKE & DEVRIENT GMBH, Munich (DE)

(72) **Inventor:** Sönke Schröder, Munich (DE)

(73) **Assignee:** GIESECKE & DEVRIENT MOBILE SECURITY GMBH, Munich (DE)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 14/967,336

(22) **PCT Filed:** Jun. 18, 2014

(86) **PCT No.:** PCT/EP2014/001493
§ 371 (G)(1),
(2) **Date:** Jan. 25, 2016

(87) **PCT Pub. No.:** WO2015/010758
PCT Pub. Date: Jan. 29, 2015

(65) **Prior Publication Data**
US 2016/0171201 A1 Jan. 16, 2016

(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.** (2013.01)
G06F 21/62
G06F 21/34
(Continued)

(52) **U.S. Cl.** (2013.01): **G06F 21/34** (2013.01); **G06F 21/32** (2013.01); **G06F 21/35** (2013.01); **H04B 5/001** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC: G06F 13/508
See application file for complete search history.

(56) **References Cited**
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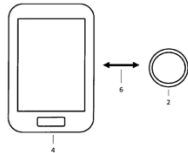
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(Continued)

OTHER PUBLICATIONS
German Search Report for corresponding German Application No. 102013012339.9, dated Jan. 28, 2014.
(Continued)

Primary Examiner—Jared Jendy
(74) **Attorney, Agent, or Firm**—Wickman Nydegger

(57) **ABSTRACT**
A method for operating an external secure unit comprises at least a memory for storing data, a processor for processing the data, at least one interface for receiving data from a communication device or sending them thereto, wherein the communication device comprises at least a memory for storing at least one application program, a processor for processing and executing the application program, at least a first interface for sending data to the external secure unit or receiving them therefrom, at least a second interface for sending data to a transmission network or receiving them therefrom, wherein the method is wherein security-relevant data necessary for executing the application program in the communication device are stored in the external secure unit, and the communication device requests the security-relevant data from the external secure unit for executing the application program.

14 Claims, 5 Drawing Sheets



Petitioner Samsung Ex-1007, 0001

Ex. 1007, 12:61-65; Fig. 7
Paper 20 at 37

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

35

Schröder Fails To Disclose Limitation 1[c]

Ideally, a ring blank has a uniform thickness over its total length, in order to avoid later steps or shoulders. Should steps or shoulders nevertheless arise e.g through the chip module 10, said steps or shoulders can be compensated by applying a paste which is e.g. thermally or UV-curing.

(12) **United States Patent**
Schröder

(10) Patent No.: US 10,303,867 B2
(45) Date of Patent: May 28, 2019

(54) **EXTERNAL SECURE UNIT**

(71) Applicant: GIESECKE & DEVRIENT GMBH, Munich (DE)

(72) Inventor: Sönke Schröder, Munich (DE)

(73) Assignee: GIESECKE & DEVRIENT MOBILE SECURITY GMBH, Munich (DE)

(* *) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/067,336

(22) PCT Filed: Jun. 18, 2014

(86) PCT No.: PCT/EP2014/001493
§ 371 (G)(1),
(2) Date: Jan. 25, 2016

(87) PCT Pub. No.: WO2015/010758
PCT Pub. Date: Jan. 29, 2015

(65) **Prior Publication Data**
US 2016/0171201 A1 Jan. 16, 2016

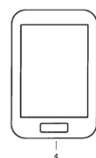
(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.**
G06F 21/62 (2013.01)
G06F 21/34 (2013.01)
(Continued)

(52) **U.S. Cl.**
CPC: G06F 21/34 (2013.01); G06F 21/32 (2013.01); G06F 21/35 (2013.01); 1010B 5/001 (2013.01);
(Continued)

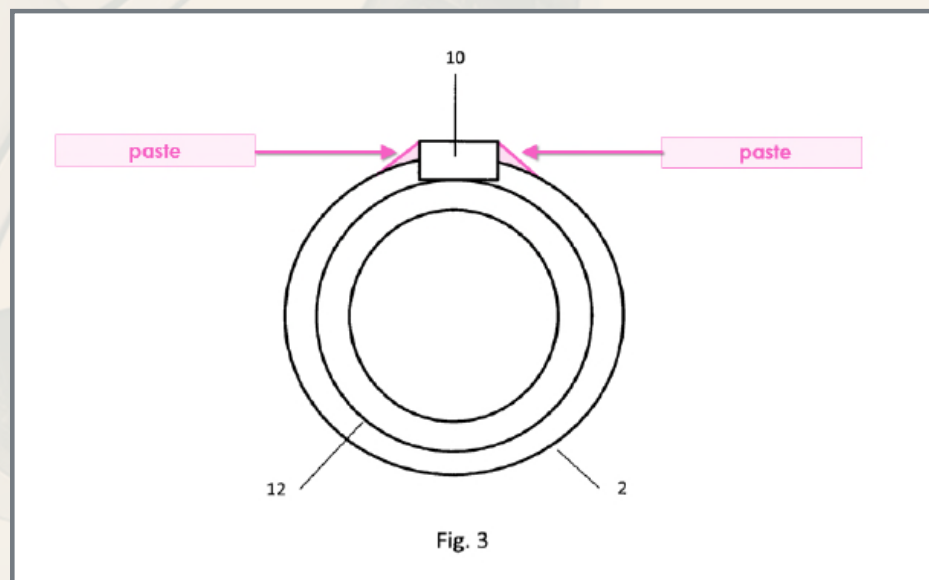
(58) **Field of Classification Search**
CPC: G06F 13/368
See application file for complete search history.

14 Claims, 5 Drawing Sheets



Petitioner Samsung Ex-1007, 0001

Ex. 1007, 14:10-13; Fig. 3
Paper 20 at 38



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Petitioner's Hindsight Analysis

U.S. Patent No. 11,868,178
Declaration of Brian W. Anthony, Ph.D.

UNITED STATES PATENT AND TRADEMARK OFFICE

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Patent Owner.

Case No. PGR2024-00030
U.S. Patent No. 11,868,178

DECLARATION OF DR. BRIAN W. ANTHONY
IN SUPPORT OF PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,868,178

Petitioner Samsung Ex-1002, 0001

166. Schröder teaches a battery of a shape and size that fits within the cavity between the outer circumferential surface of the external component and the inner circumferential surface of the internal housing component. In order to fit inside the “finger-ring,” the battery must be configured in size and shape to fit within the cavity. As I discussed above, a POSITA would understand that within the body of

Ex. 1002, ¶ 166
Paper 20 at 39

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner Oura Ex. 2119, 037

Petitioner's Justifications Fail

U.S. Patent No. 11,868,178
Declaration of Brian W. Anthony, Ph.D.

UNITED STATES PATENT AND TRADEMARK OFFICE
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Case No. PGR2024-00030
U.S. Patent No. 11,868,178

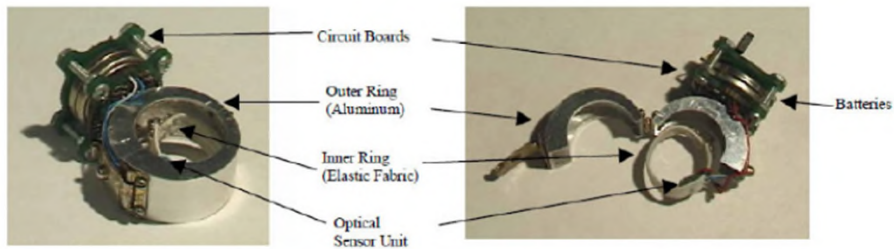
DECLARATION OF DR. BRIAN W. ANTHONY
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OF U.S. PATENT NO. 11,868,178

Petitioner Samsung Ex-1002, 0001

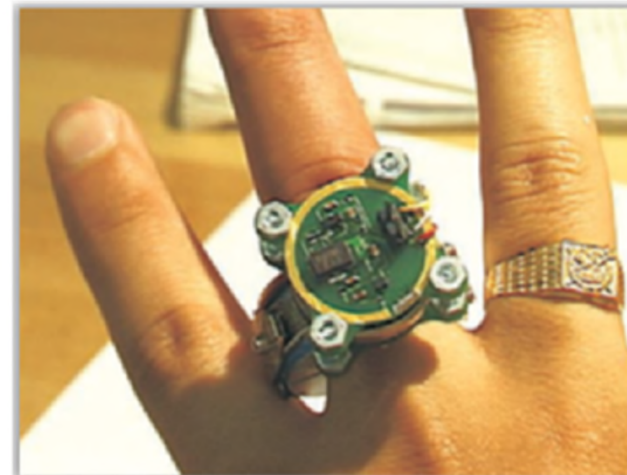
1. Placing the battery within the inlay would be obvious “because the battery . . . is charged wirelessly.” Ex. 1002 ¶164.
2. The battery “must” be located within the inlay because it otherwise “sticks out or is exposed to the environment.”
3. The battery “must” be located within inlay 12 because otherwise there would be “a wired connection to power its components, which is contrary to the intent of having a portable, wearable device.”

*Ex. 1002, ¶ 166
Paper 20 at 39-40*

POSITA Would Apply Teachings Of Prior Art



Ex-1002, ¶71 (citing Ex-1032).



Id., ¶85 (citing Ex-1037, 7).

Paper 20 at 41-42

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

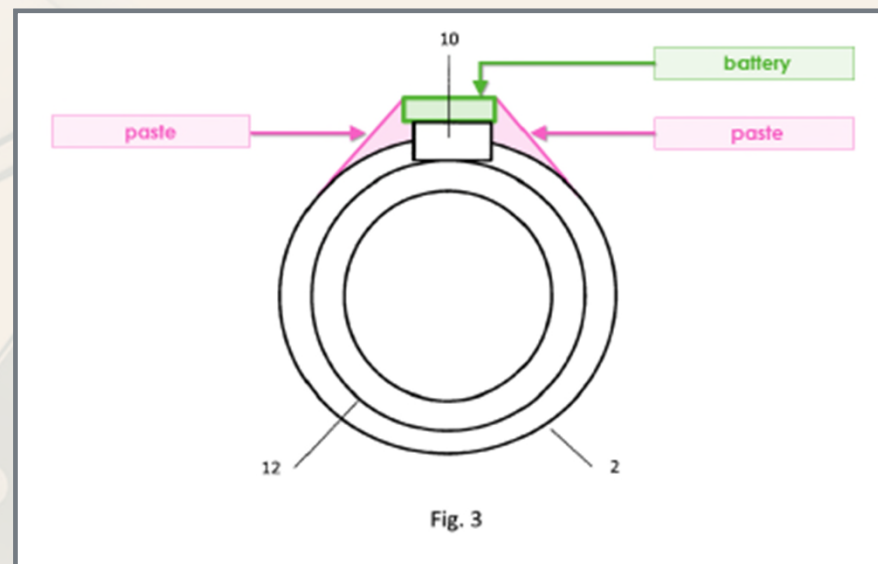
39

POSITA Would Apply Teachings Of Prior Art

- A. And in the 2012-2013 time frame, as I was beginning to launch the center, we were looking at all sorts of different types of wearable device form factors. I was aware of smart ring designs, including, you know, the designs by Professor Harry Asada at MIT, in part because that's where I went to grad school, and I met with him there.

And when I was trying to look at different types of wearables I could potentially make within my center, I had considered designing a wearable smart ring, and I had done some exploration on what would need to go into, you know, the design of such a ring to make it small and comfortable and so on for a user to wear.

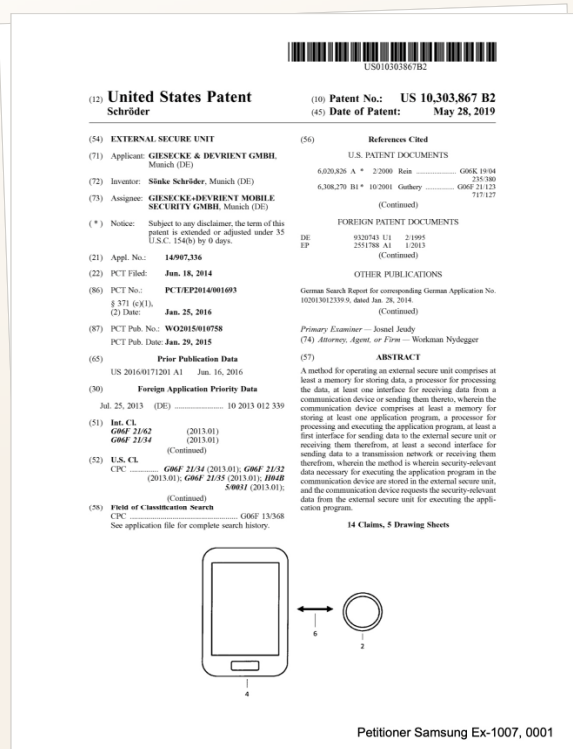
And I very quickly concluded that the most logical way to build such a device was to follow the prior art, including Professor Asada's and the other art that I found in the literature on this topic, and place the battery at the top of the device, as all the other prior art did, simply because there's just not enough room in kind of the body, if you will, of the ring that goes around the sides and the bottom of the finger, while making the user comfortable.



Ex. 1081 at 35:16-36:12
Paper 20 at 43-44



Schröder Fails To Disclose Limitations 1[d] and 1[e]



Ex. 1007
Paper 20 at 44

- 1[d] a printed circuit board disposed between the internal housing component and the external housing component, wherein the printed circuit board extends through at least a second portion of the cavity of the finger-worn wearable ring device different from the first portion; and
- 1[e] one or more sensors electrically coupled with the printed circuit board and the battery and configured to acquire data from the user through the internal housing component.



Schröder Fails To Disclose Limitations 1[d] and 1[e]

Q. Where does the rectangle tell them to put the battery relative to the printed circuit board relative to the antenna coil relative to the sensors, relative to any communication module, relative to any power regulation circuitry? Where does the rectangle tell the POSITA where to put all that stuff and how to arrange it?

* * *

A. Right. And as I was going through my declaration pointing out it's Schröder with the knowledge of a POSITA, and I subsequently started to describe the various arrangements of components inside of that cavity. So knowledge of POSITA in addition to what's disclosed in Schröder gives them the guidance in how to arrange this.

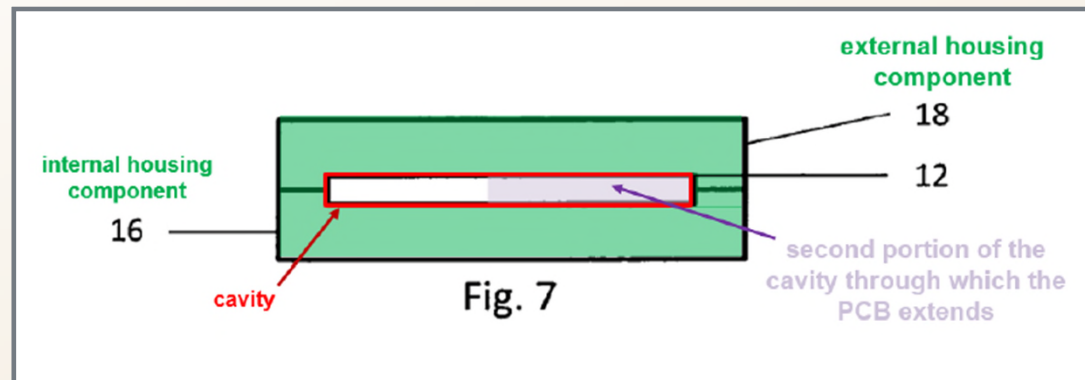
Q. So Schröder doesn't tell them, but the knowledge of the POSITA fills in all those blanks?

A. Yes. And I described that in the subsequent parts of my declaration, for example, on pages 120, 121, 122, 123 and beyond.

*Ex. 2020 at 208:5-209:15
Paper 20 at 46*



Schröder Fails To Disclose Limitations 1[d] and 1[e]



That said, we are not unsympathetic to Patent Owner's criticisms of Petitioner's showing. As Patent Owner points out, the highlighting Petitioner adds to Figure 7 to visually depict the "second portion of the cavity through which PCB extends" seems arbitrary and is not directly supported by the text or drawings of Schröder. See Prelim. Resp. 37–38.

In addition, Patent Owner raises a serious issue about whether a POSITA would have understood Schröder's inlay 12 as teaching a PCB. Prelim. Resp. 36 (citing Ex. 2014). These issues would benefit from further development at trial.

Paper 9 at 23-24
Paper 20 at 47



Schröder Fails To Disclose Limitations 1[d] and 1[e]



Fig. 7

190. Schröder's "finger-ring" has a cavity between the internal and external housing components which house and thus surround **Schröder's inlay 12 (PCB)** and battery. See §VIII.A.1.e-f (elements 1[c]-1[d]). As I explained for Claim 1, §V.B.4. It is my opinion that a POSITA would have understood that Schröder's inlay corresponds to the claimed PCB.

common PCB materials. *Id.*, 12:28-29; Ex-1002 ¶171. A POSITA would have understood that **Schröder's inlay corresponds to the claimed PCB** disposed between the internal and external housings. Ex-1002 ¶171.

Ex. 1002, ¶¶ 164, 171, 190, 265
Paper 20 at 24, 47

Schröder Fails To Disclose Limitations 1[d] and 1[e]

2/04/25, 7:34 AM

Printed circuit board - Wikipedia



Printed circuit board

A **printed circuit board (PCB)**, also called **printed wiring board (PWB)**, is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto or between sheet layers of a non-conductive substrate.^[1] PCBs are used to connect or "wire" components to one another in an electronic circuit. Electrical components may be fixed to conductive pads on the outer layers, generally by soldering, which both electrically connects and mechanically fastens the components to the board. Another manufacturing process adds vias, metal-lined drilled holes that enable electrical interconnections between conductive layers, to boards with more than a single side.



Printed circuit board of a DVD player

Printed circuit boards are used in nearly all electronic products today. Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Electronic design automation software is available to do much of the work of layout. Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout has to be done only once. PCBs can also be made manually in small quantities, with reduced benefits.^[2]



Part of a 1984 Sinclair ZX Spectrum computer board, a printed circuit board, showing the conductive traces, the through-hole paths to the other surfaces, and some electronic components mounted using through-hole mounting

PCBs can be single-sided (one copper layer), double-sided (two copper layers on both sides of one substrate layer), or multi-layer (stacked layers of substrate with copper plating sandwiched between each and on the outside layers). Multi-layer PCBs provide much higher component density, because circuit traces on the inner layers would otherwise take up surface space between components. The rise in popularity of multilayer PCBs with more than two, and especially with more than four, copper planes was concurrent with the adoption of surface-mount technology. However, multilayer PCBs make repair, analysis, and field modification of circuits much more difficult and usually impractical.

The world market for bare PCBs exceeded US\$60.2 billion in 2014,^[3] and was estimated at \$80.33 billion in 2024, forecast to be \$96.57 billion for 2029, growing at 4.87% per annum.^[4]

https://en.wikipedia.org/wiki/Printed_circuit_board



1/18

Patent Owner Oura Ex. 2023, 0001

Ex. 2023
Paper 20 at 50-51

A **printed circuit board (PCB)**, also called **printed wiring board (PWB)**, is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto or between sheet layers of a non-conductive substrate.^[1] PCBs are used to connect

- Q. Okay. Just circling back, so your answer is that the '178's usage of PCB is consistent with the Wiki article you cited?
- A. It's consistent with both the Wiki and all the other references that I cite as well with how PCBs are constructed, both rigid and flexible.

Ex. 2020, 73:12-74:11; 76:14-20; Ex. 1002, ¶32 (n.1).

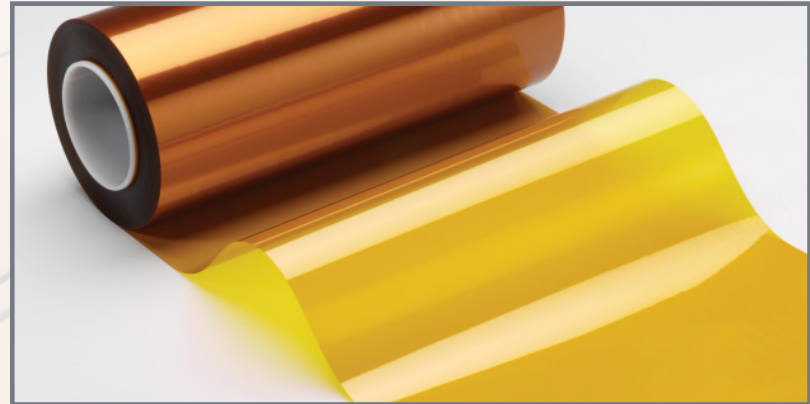
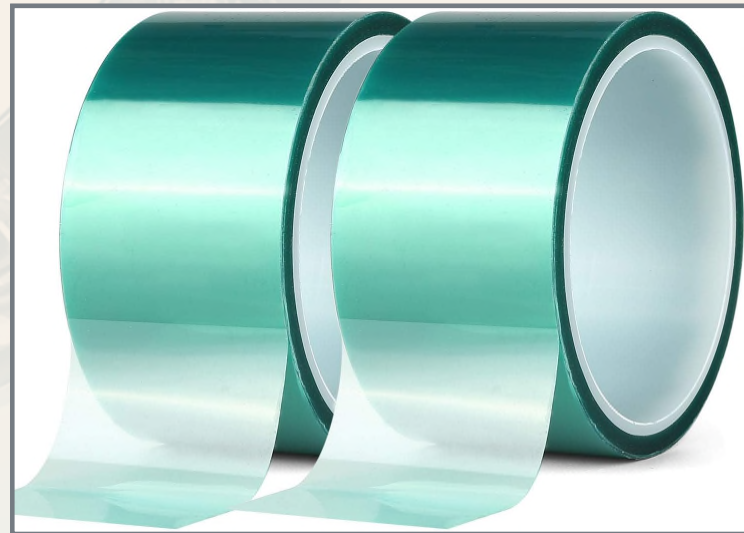
Schröder Fails To Disclose Limitations 1[d] and 1[e]

Q. PET, Kapton, et cetera, are carrier materials that would have been understood as materials that are used for a printed circuit board, correct?

A. They could be, but not necessarily so. Printed -- flexible printed circuit boards often use polyimide and other materials as well. But despite that, you know, there's things like Kapton tape that I've used in my own work that I don't use for printed circuit boards but just as thin, you know, substrates on which to place for items or stick things together, for example.

Q. Okay. But you don't disagree that PET and Kapton are materials that could be used for printed circuit boards, correct?

A. That's right. They could be used.



Ex. 1081, 80:22-81:10
Paper 39 at 14

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Claims 2 and 3

- 2 The finger-worn wearable ring device of claim 1, wherein the first portion of the cavity of the finger-worn wearable ring device is non-overlapping with the second portion of the cavity of the finger-worn wearable ring device.
- 3 The finger-worn wearable ring device of claim 1, wherein the first portion of the cavity of the finger-worn wearable ring device at least partially overlaps with the second portion of the cavity of the finger-worn wearable ring device.

EX-1001 at 45:9-19



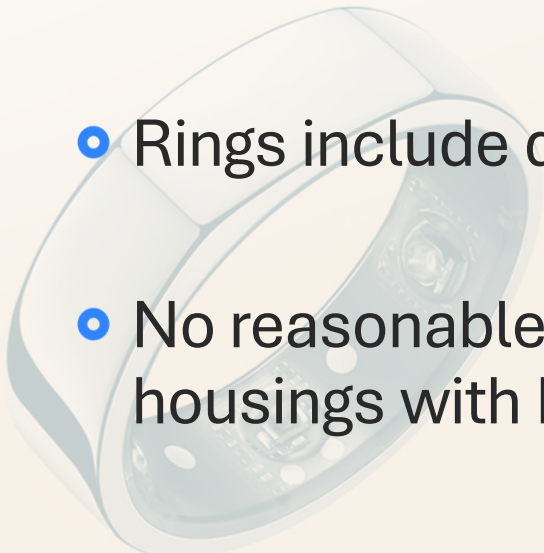
Deficiencies of Ground 2: Schröder + Niwa

PGR2024-00030



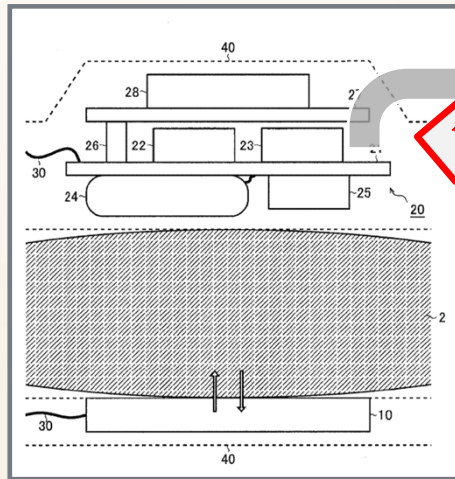
A POSITA Would Not Combine Schröder With Niwa

- Rings have different functions (plethysmography vs. security)
- Rings include different components (e.g., PPG vs. NFC)
- No reasonable expectation of success of using Schröder's housings with Niwa's ring.
- Niwa's components cannot fit in Schröder's inlay

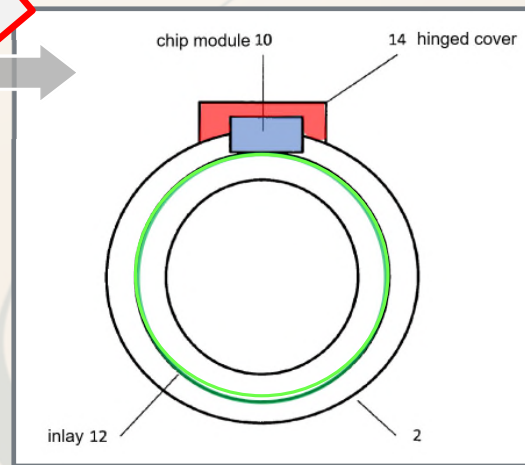


Paper 20 at 54-55
Paper 39 at 14-15

A POSITA Would Not Combine Schröder With Niwa



Ex. 1005, FIG. 28, [0219]

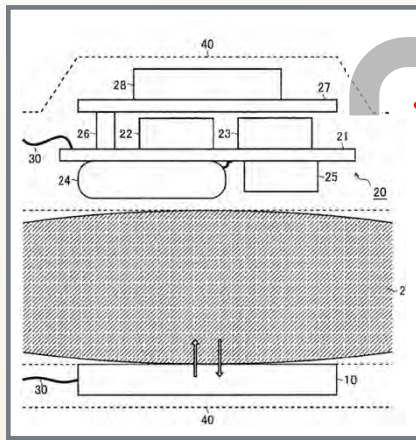


Ex. 1007, FIG. 3

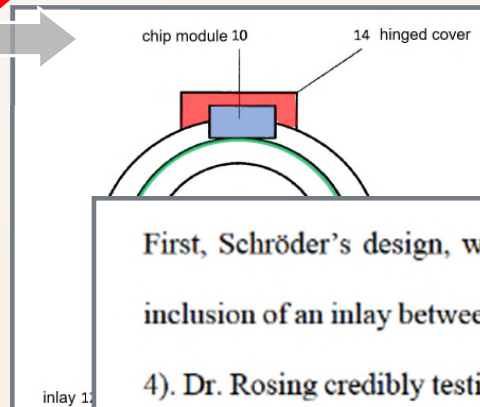
Paper 20 at 54-55, 59-60
Paper 39 at 14-15

- Niwa's second unit contains memory, battery, charging circuit, wireless communication circuit, and multiple substrates.
- Niwa discloses using "stack layer construction" to fit all these components within a ring. A POSITA would mount Niwa's components with chip module 10
- By contrast, a POSITA would recognize that the inlay in the rings of Schröder could be simple and thin, with as little as an antenna and chip module on top of the ring.
- A POSITA would not have considered fitting those components into a housing such as those disclosed in Schröder to have been a simple task.
 - No motivation to combine
 - No reasonable expectation of success

A POSITA Would Not Combine Schröder With Niwa



HINDSIGHT



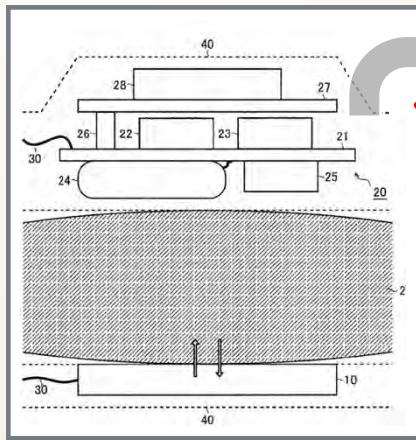
First, Schröder's design, while disclosing separate housing components, only contemplates the inclusion of an inlay between them. Schröder at 8:54–57 (regarding Fig. 3), 12:4–9 (regarding Fig. 4). Dr. Rosing credibly testified that one of skill would understand that the thickness of Schröder's inlay is on the order of 100 microns. Rosing Tr. at 1218:18–25. This stands in stark contrast to the battery in Niwa's sensor, which is between two and five mm, or at least 20 times the thickness of the inlay. See Niwa at [0201]. Respondents provide no logical reason why one of skill would modify Niwa's ring to accommodate Schröder's 100-micron inlay, when Niwa's components take up a much larger volume.

*Ex. 2116, at 101
Paper 39 at 15*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

51

A POSITA Would Not Combine Schröder With Niwa



HINDSIGHT

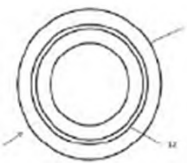
More problematically, Mr. Alarcon's testimony was improperly guided by hindsight. See *Apple Inc. v. MPH Technologies Oy*, 28 F.4th 254, 262–63 (Fed. Cir. 2022). Mr. Alarcon testified that one of skill would understand that the battery would be disposed in the inlay of Schröder's Fig. 4 because, "where else is it going to be?" Alarcon Tr. at 1090:9–13. This reasoning, however, is belied by Schröder itself, which only addresses a battery with respect to Fig. 3. Schröder at 11:45–67 (discussing battery in reference to embodiment of Fig. 3, where chip module 10 is disposed above the finger rather than on the inlay). That embodiment includes a compartment disposed on top of the ring, similar to the embodiment of Niwa's Fig. 22, as shown below. Schröder's Fig. 4, below to the right, does not:



Niwa, Fig. 22



Schröder, Fig. 3



Schröder, Fig. 4.

Ex. 2116, at 105-106
Paper 39 at 16

Schröder + Niwa does not render obvious limitation 1[d]

FIG.28

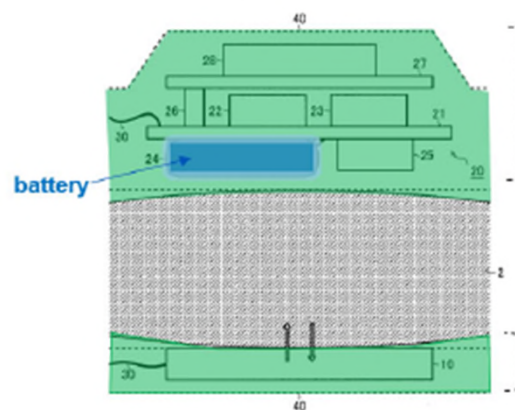
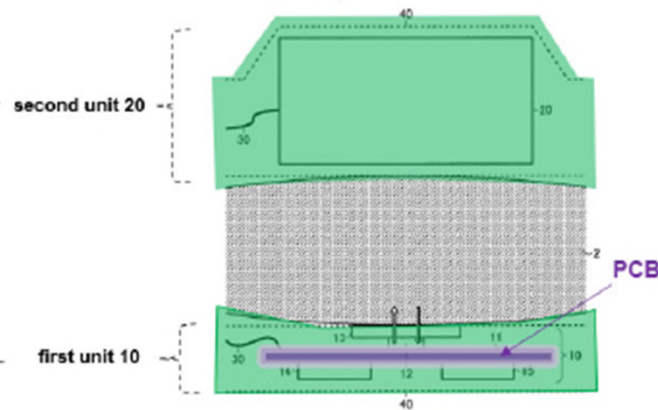


FIG.27

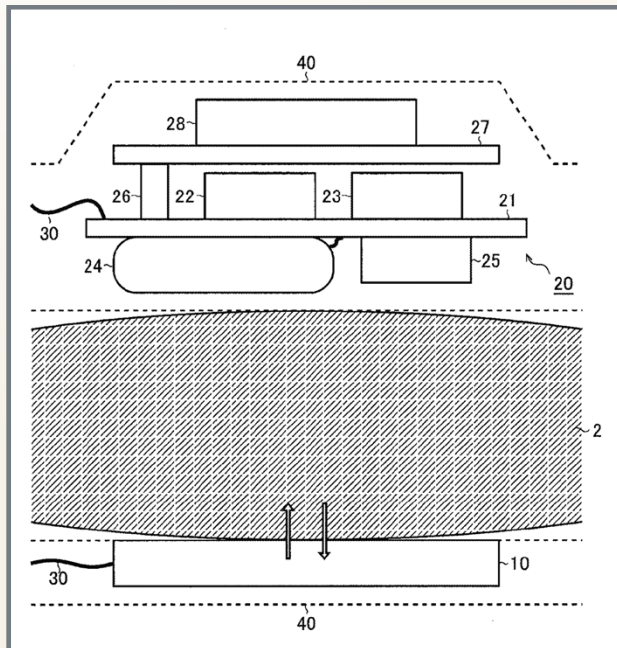
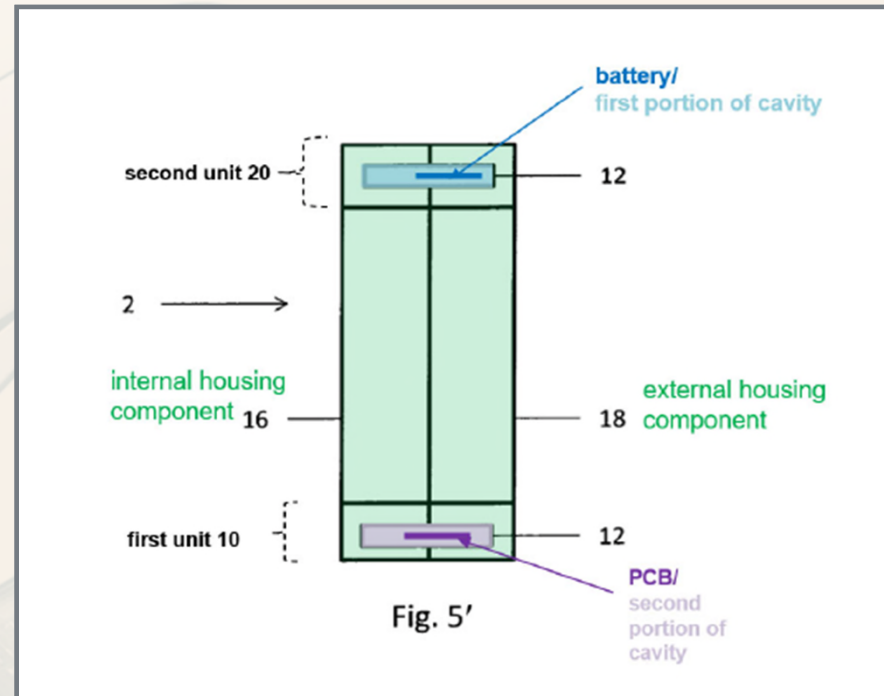


[0217] The battery 24 is a power supply source required to drive the plethysmogram sensor 1, a lithium ion secondary battery or an electrical double layer capacitor can be used appropriately. In this way, with respect to the plethysmogram sensor 1 of battery drive type, there is no need to connect a power supply cable from outside during the measurement of the plethysmogram. Measurement of the plethysmogram can be realized without restricting the behavior of the examinee. In addition, according to this construction, the battery 24 formed as highly flat is located right above the finger 2, it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2, furthermore, the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

Ex. 1005, FIG. 28, ¶ 0217

Paper 3 at 37

Schröder + Niwa does not render obvious limitation 1[d]



Ex. 1005, FIG. 28, ¶ 0219
Paper 3 at 38-39
Paper 20 at 56-57

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

54



Deficiencies of Ground 3: Schröder + Mestas

PGR2024-00030

A POSITA Would Not Combine Schröder With Mestas

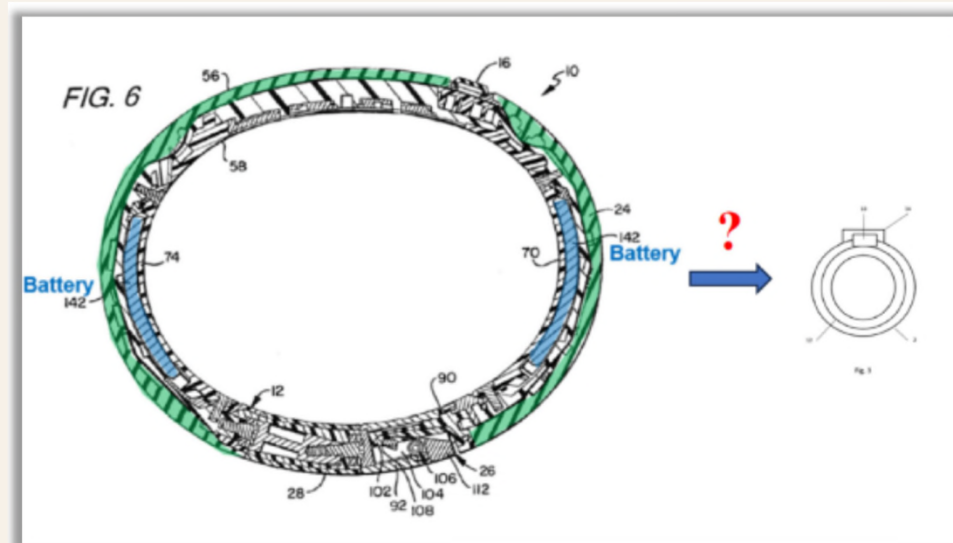
or thigh, and the like.” Ex-1010 (Mestas) ¶143. As miniaturization of electronic components improved, a POSITA would have found it trivial to implement Mestas’s teachings into a ring form like that of Schröder’s “finger-ring.” As I described in

Q. Doctor, I’m talking about the battery of Figure 6. How much smaller would you have to make it too have it fit in the ring? ... How big a scaling factor would you be comfortable that would require to—that would be required to fit that in a ring?

A. Some place between 5 and 10—with that not having calculated it.

Q. Have you in your work on this case attempted to find whether there was a battery available in 2013 that was appropriate to fit in Schröder as you've proposed?

A. I did not find it necessary to do that, no.



Ex. 1002, para 242

Ex. 1010, FIG. 6

Paper 20 at 64-69

Ex. 2021 at 312:16-313:12; 321:5-10

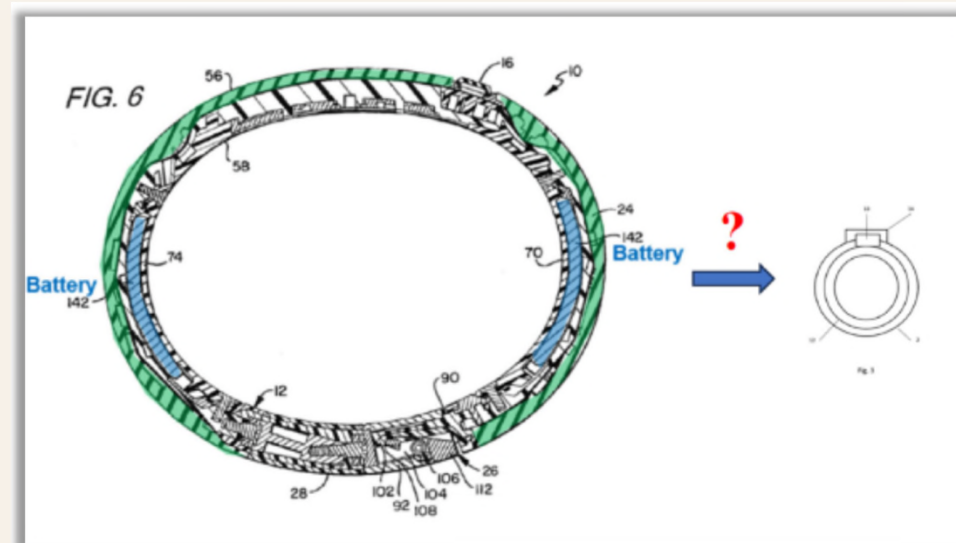
A POSITA Would Not Combine Schröder With Mestas

Q. In 2013 when you were working on this ring design, were you aware of any off-the-shelf curved batteries that would work for a ring form factor that you were designing?

A. There were curved cells, but I – to my recollection, there weren't any that would be drop-linked for our application.

Q. Could a curved cell for a wrist wearable work for a ring form factor?

A. If the ring was very, very, very big, but for our application, the sizes of the other wearables that were out there were nowhere near where we needed them to be. Capacity was great, but the size was just massive. There was no way it would work.



Ex. 1010, FIG. 6
Paper 20 at 67-68
Ex. 2024, 188:4-17

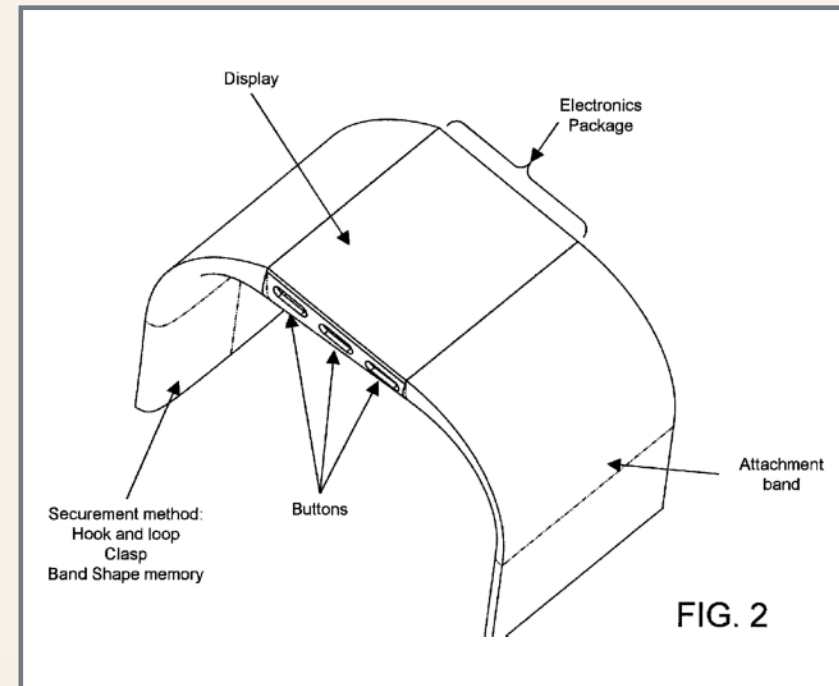


Deficiencies of Ground 4: Schröder + Yuen

PGR2024-00030

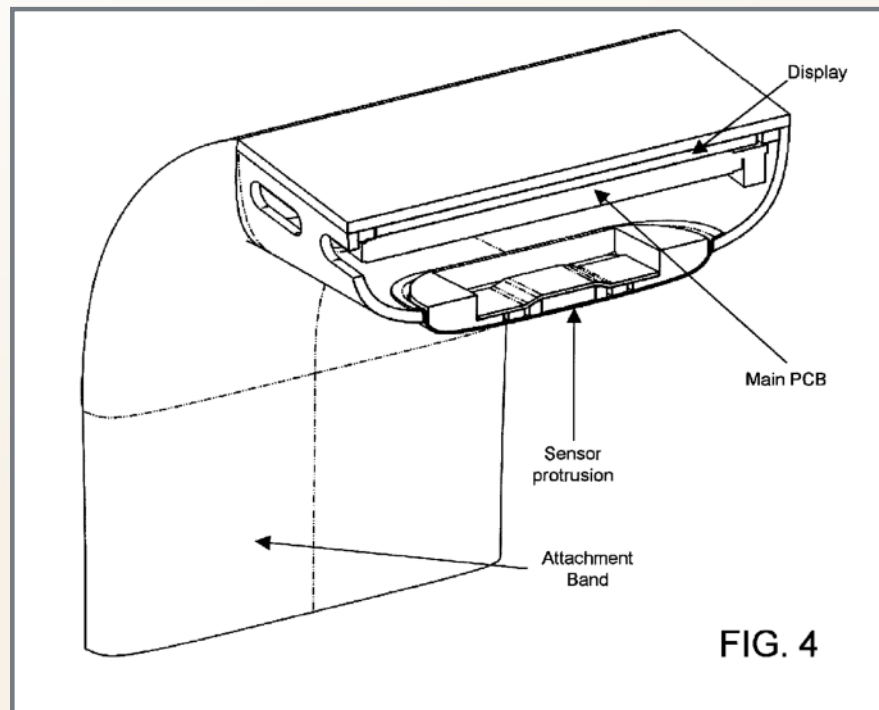
A POSITA Would Not Combine Schröder With Yuen

- Ring vs. wristband
- Form factor 5-10 times too large
- Electronics package is flat and planar
- Power requirements are incompatible



Ex. 1006, FIG. 2
Paper 20 at 71-74

Schröder + Yuen does not render obvious limitation 1[d]



50 The biometric monitoring device is adapted (for example, includes a size and shape) to be worn or carried on the body of a user (for example, arm, wrist, leg and/or ankle). In preferred embodiments including the optical heart rate monitor, the device may be a wrist-worn or arm-mounted accessory such as a watch or bracelet. (See, for example, FIGS. 2-13). In one embodiment, optical elements of the optical heart rate monitor are disposed or located on the interior or skin side of the biometric monitoring device, for example, facing the top of the wrist (i.e., the optical heart rate monitor is juxtaposed the
55 wrist) when the device is wrist mounted. (See, for example, FIGS. 2-7).
60

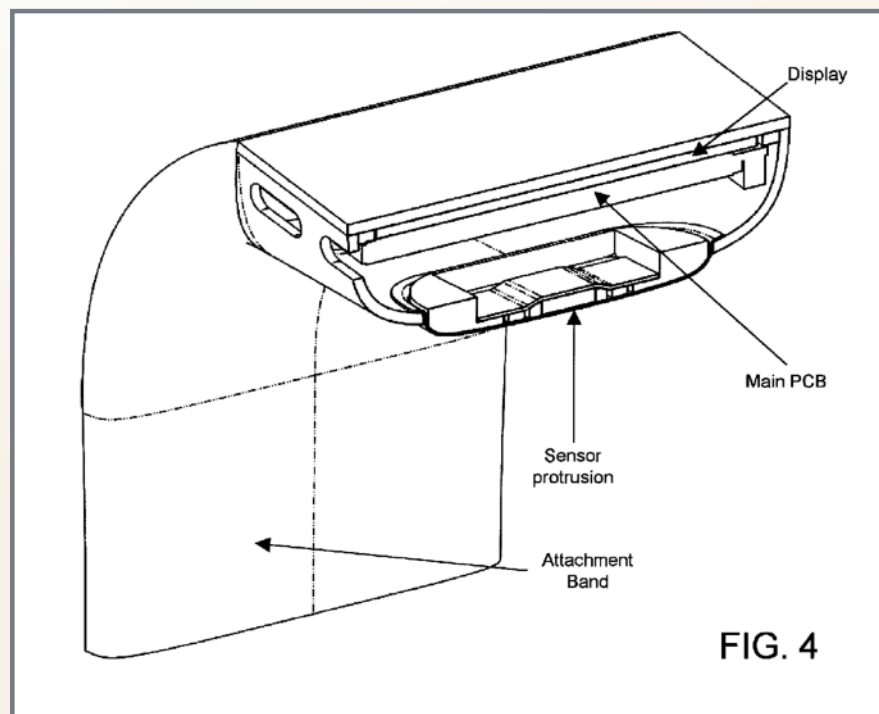
Paper 20 at 74-75

Ex. 1006, Fig. 4; 12:50-55

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

60

Schröder + Yuen does not render obvious limitation 1[d]



Ex. 1006, Fig. 4
Ex. 2018, ¶ 177
Paper 20 at 75-76

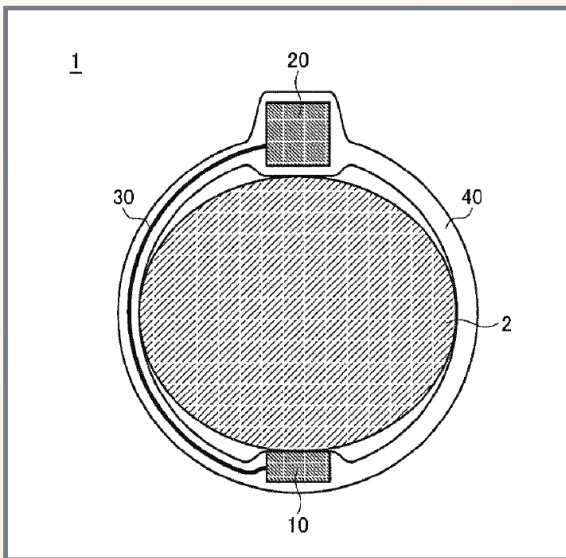
177. Petitioner's reasons for applying Yuen's PCB to Schröder is also lacking. No reason is given why Yuen's too large and planar PCB would offer any advantage over the inlay for the security application of Schröder. Petitioner argues that "PCBs are lightweight, save space, and are easier to assemble into curved constructions." Pet. at 55. The PCB taught by Yuen, however, certainly would not save any weight or space in Schröder's ring, nor does Petitioner point to any teaching as to how one would adapt the PCB of Yuen to an appropriate size and shape for a ring—especially given Yuen's statement that its device "is adapted" to a "size and shape" for much larger body parts. Ex-1006, 12:50-52. I see no advantage to attempting to adapt the PCB of Yuen to Schröder since Schröder already discloses inlay 12. Nor would a POSITA look to use the much too large PCB of Yuen in Schröder.



Deficiencies of Grounds 5/6: Niwa Niwa + Schröder

PGR2024-00030

Niwa does not render obvious limitations 1[a] and 1[b]



Ex. 1005, FIG. 23

addition, if focuses attention to the construction elements, the plethysmogram sensor 1 of this construction includes a first unit 10, a second unit 20, a cable 30, and a finger ring type housing 40.

Ex. 1005, at ¶ 0191

- Niwa does not detail construction of the “housing 40” and does not discuss any housing components.

Paper 20 at 78



Niwa – No Internal or External Housing Components

FIG.24

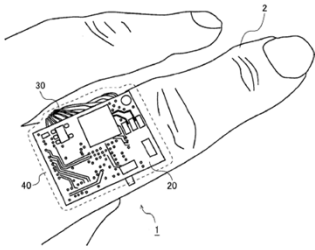


FIG.25

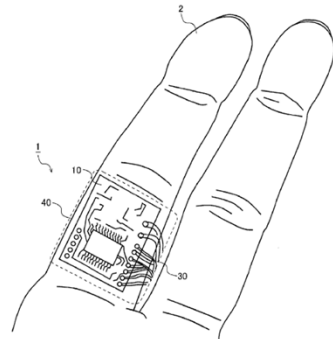
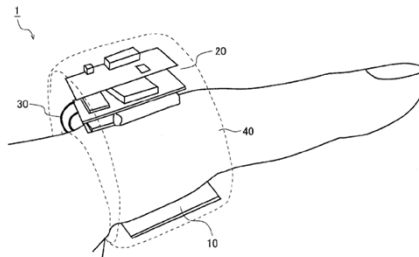


FIG.26



- Niwa ***strips away*** the “housing” in nearly every figure to show the internal components of the ring.

tively. In addition, FIG. 24 is a see through illustration to see the plethysmogram sensor 1 from the back side of the hand, FIG. 25 is a see through illustration to see the plethysmogram sensor 1 from the palm side of the hand, and FIG. 26 is a see through illustration to see the plethysmogram sensor 1 from the side. As illustrated in these diagrams, to not let the exam-

Ex. 1005, FIGS. 24-26; at ¶ 0205

Paper 20 at 77-78
Ex. 2020 at 251:4-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

64



Niwa – No Internal or External Housing Components

Q. Okay. Is it your testimony that housing 40 is two pieces somehow coupled together?

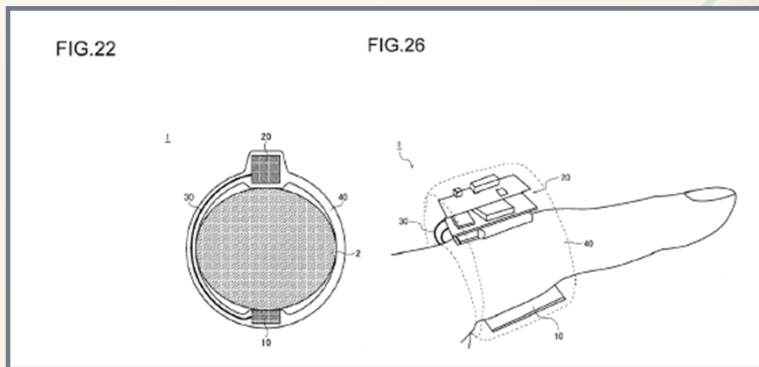
A. Again, as they highlight in paragraph 320, a POSITA would consider that as one of the options.

Q. Well, I'm asking you what Niwa says, not a POSITA.

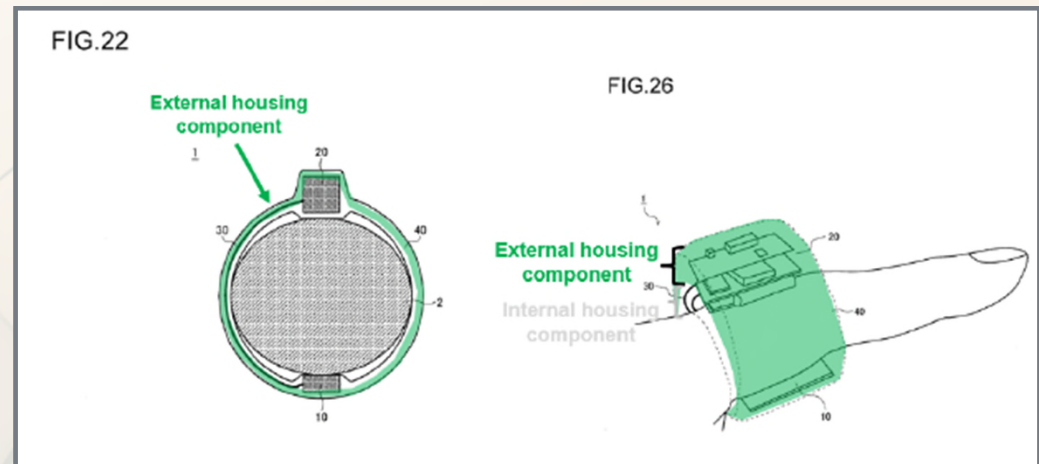
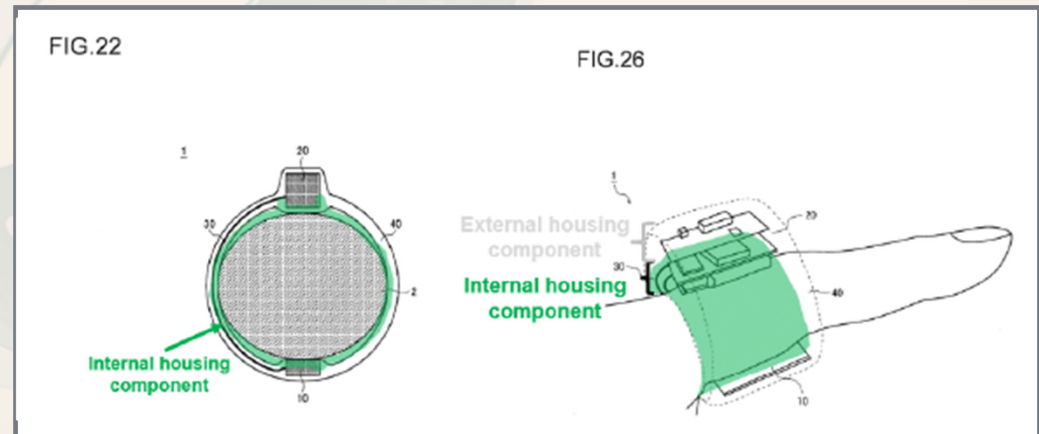
A. Well, Niwa is silent on it, I believe. A POSITA reading Niwa would, as I describe, understand that there are multiple ways, including having the two components structurally integrated and assembled.



Niwa – No Internal or External Housing Components



Ex. 1005, FIGS. 22, 26;
Paper 3 at 77-79
Paper 20 at 77-79



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Niwa does not render obvious limitations 1[a] and 1[b]

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of

CERTAIN SMART WEARABLE
DEVICES, SYSTEMS, AND
COMPONENTS THEREOF

Inv. No. 337-TA-1398

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND
RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Doris Johnson Hines

(April 18, 2025)

Appearances:

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For the Office of Unfair Import Investigations:

Margaret D. Macdonald, David O. Lloyd, and R. Whitney Winston, Washington, DC.

Patent Owner Oura Ex. 2116, 0001



Resp. Br. at 24, annotating Niwa at Fig. 26; *id.* at 30, annotating Niwa at Fig. 26.

limitations of claim 1. Instead, Niwa discloses a unitary housing 40 and does not disclose separate external and internal housing components. Niwa at [0191]. Adasa confirms that “each and every at 910. In Niwa, they are not. The evidence does not support that Niwa discloses the external and internal housing components “arranged or combined in the same way as in the claim.”

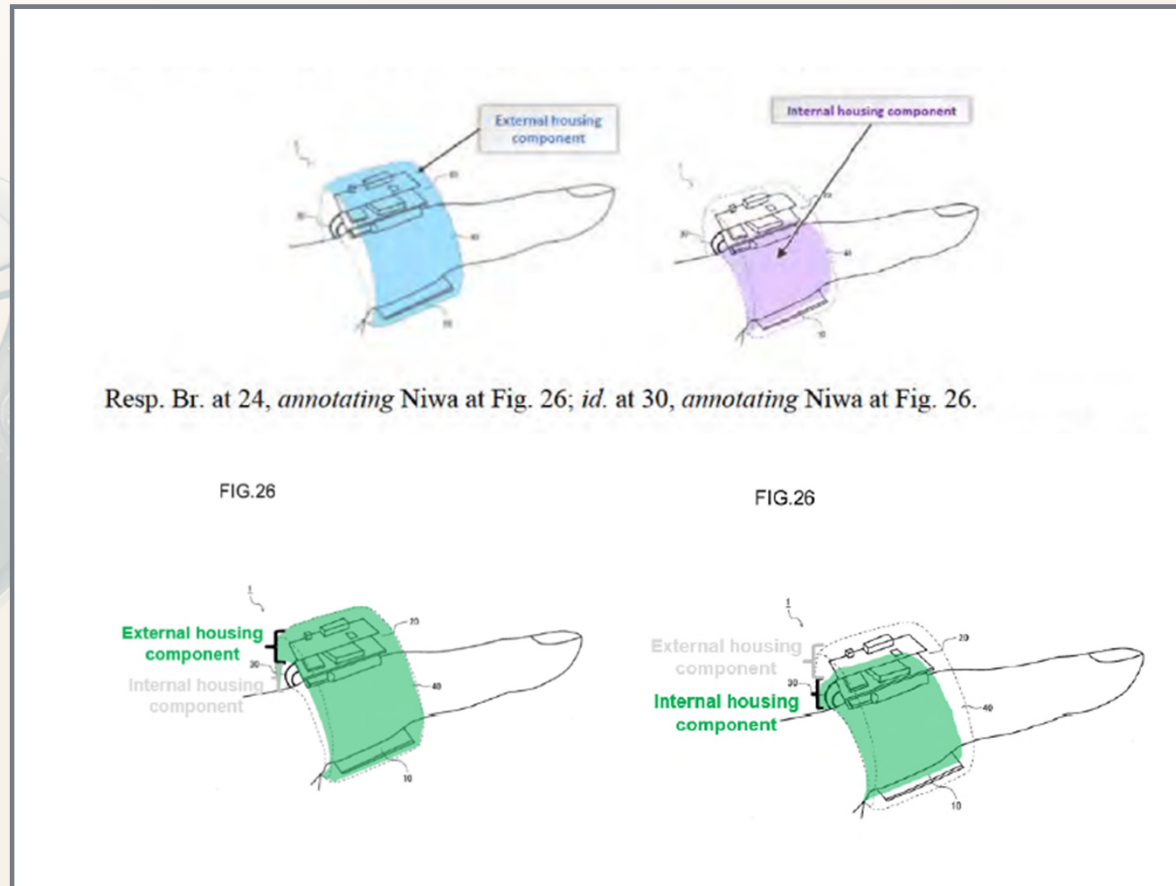
Ex. 2116 at 84
Paper 39 at 18-19

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

67

Patent Owner Oura Ex. 2119, 067

Niwa does not render obvious limitations 1[a] and 1[b]



Resp. Br. at 24, *annotating* Niwa at Fig. 26; *id.* at 30, *annotating* Niwa at Fig. 26.

Ex. 2116 at 84
Paper 3 at 77-79
Paper 39 at 18-19

Niwa does not render obvious limitation 1[c]

FIG.22

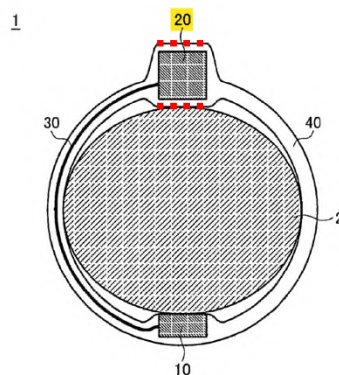
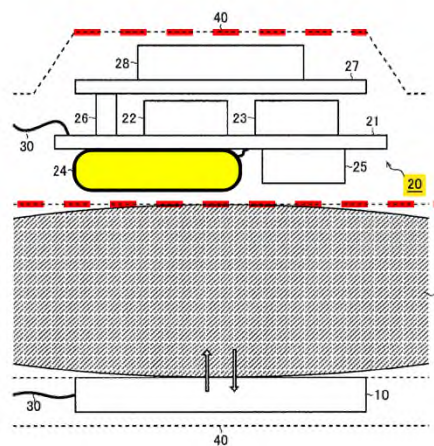


FIG.28

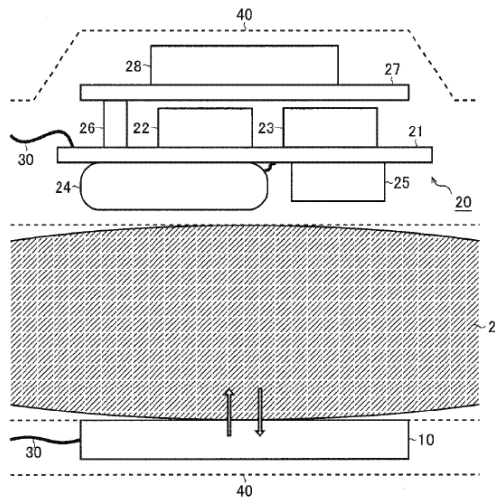


In addition, according to this construction, the battery 24 formed as highly flat is located right above the finger 2, it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2, furthermore, the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

Ex. 1005, at ¶ 0217
Paper 20 at 13, 20, 79-81

Niwa does not render obvious limitation 1[c]

FIG.28



Ex. 1005, FIG. 28

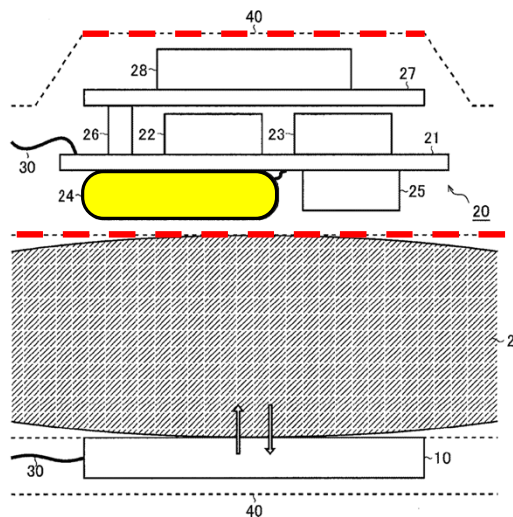
substrate 27 by means of the through hole and the via hole. In this way, according to an adoption of the stack layer construction formed with several substrates, compared to mounting all circuit elements on one substrate, each area of the first substrate 21 and the second substrate 22 is decreased. Therefore, the largeness of the second unit 20 can be restrained not to protrude from the third joint of the finger 2. Furthermore, a consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced. In addition, because the second unit 20 located at the back side of the finger 2 can be designed thicker than the first unit 10 located at the ball side of the finger 2, it is possible to adopt the stack layer construction formed with several substrates without any problem.

Ex. 1005, ¶ 0219

Paper 20 at 59

Niwa Battery is Not Positioned between Internal and External Housing Components

FIG.28



Ex. 1005, FIG. 28

a battery positioned within a cavity formed between the internal housing component and the external housing component, wherein the battery comprises a shape and size configured to fit within the cavity between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device;

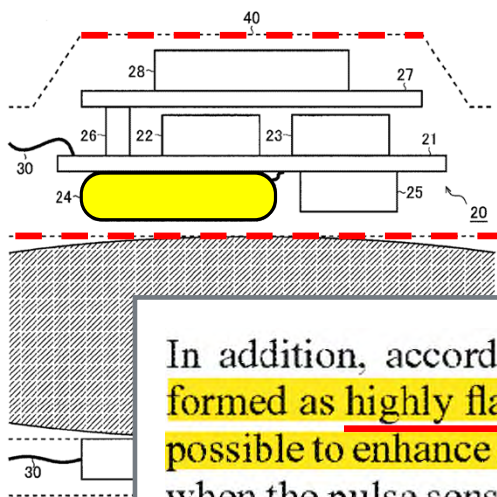
Ex. 1001

Paper 20 at 79-81

Niwa – No battery positioned between circumferential surfaces

No part of Niwa battery is positioned between two circumferential surfaces

FIG.28



a battery positioned within a cavity formed between the internal housing component and the external housing component, wherein the battery comprises a shape and size configured to fit within the cavity between the outer circumferential surface of the external housing component and the inner circumferential surface of the internal housing component, and wherein the battery extends through at least a first portion of the cavity of the finger-worn wearable ring device;

Ex. 1001

In addition, according to this construction, the battery 24 formed as highly flat is located right above the finger 2, it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2, furthermore, the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

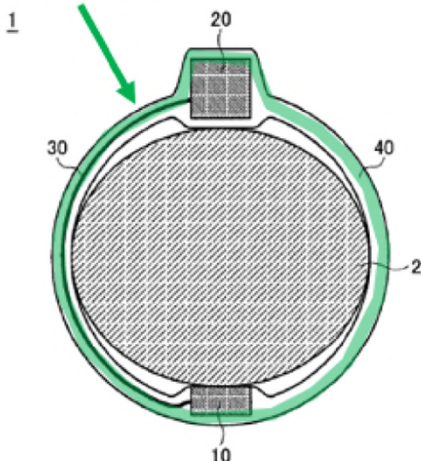
Ex. 1005, at ¶ 0217

Paper 20 at 13, 20, 79-81

Niwa does not render obvious limitation 1[c]

FIG.22

External housing
component

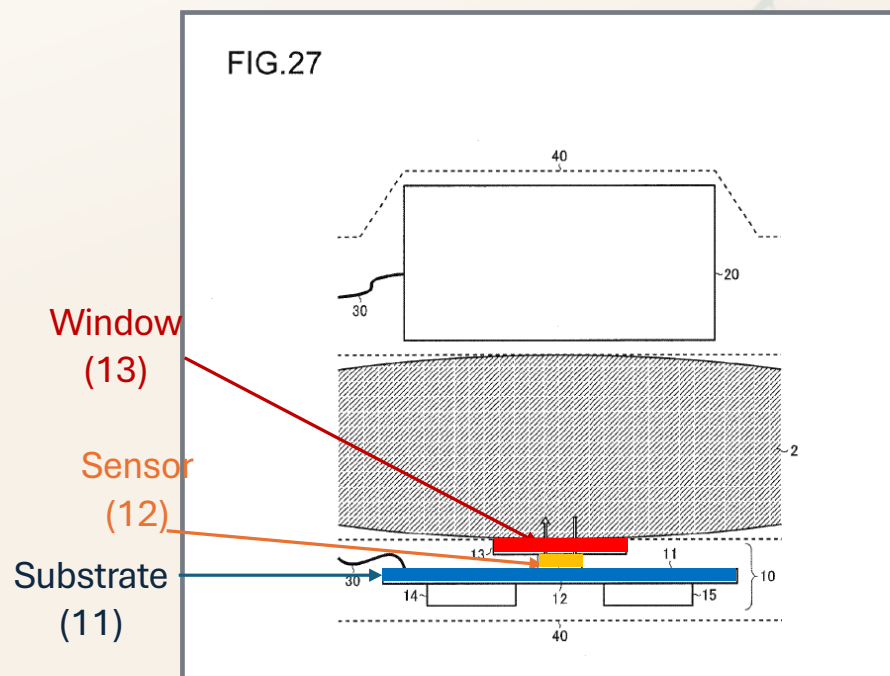
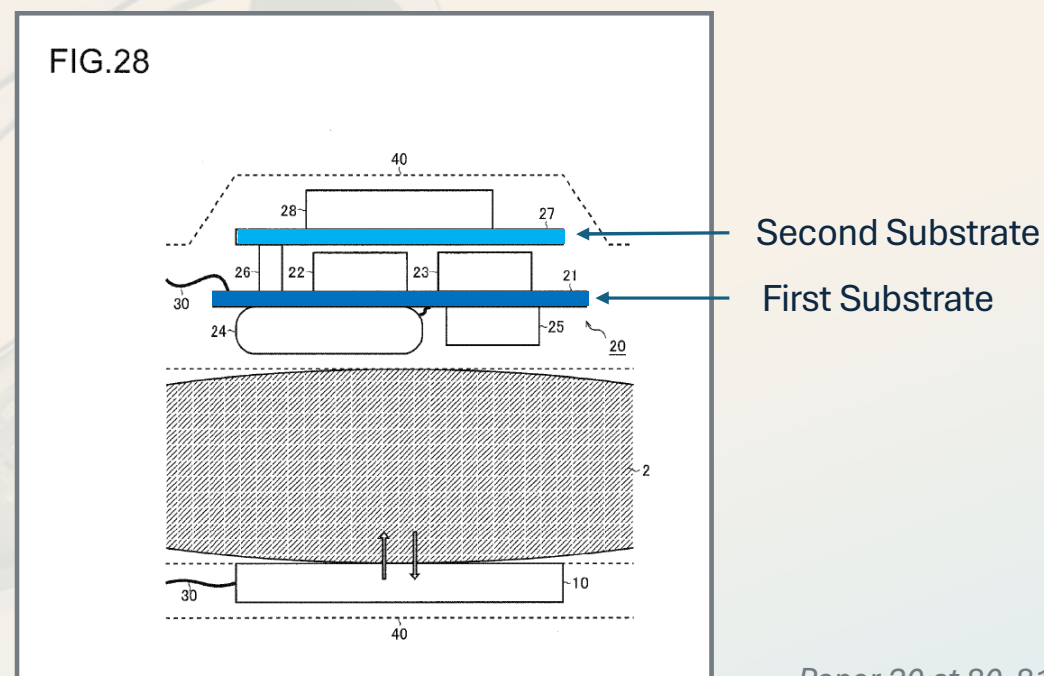


- Q. Okay. So staying with that, those annotated figures for a moment, you label Figure 22 the "external housing component" in green?
- A. Yes.
- Q. Okay. The top portion of -- above of the external housing component above unit 20, that's shown to be planar in this figure, isn't it?
- A. I'm sorry. Which is shown to be planar?
- Q. The top portion of the -- the portion of the external housing component above the unit 20.
- A. In that figure it appears to be planar.

*Ex. 2021, at 398:6-12
Paper 20 at 80-81*

Niwa does not render obvious limitation 1[d]

- PCB is not between the internal and external housing components

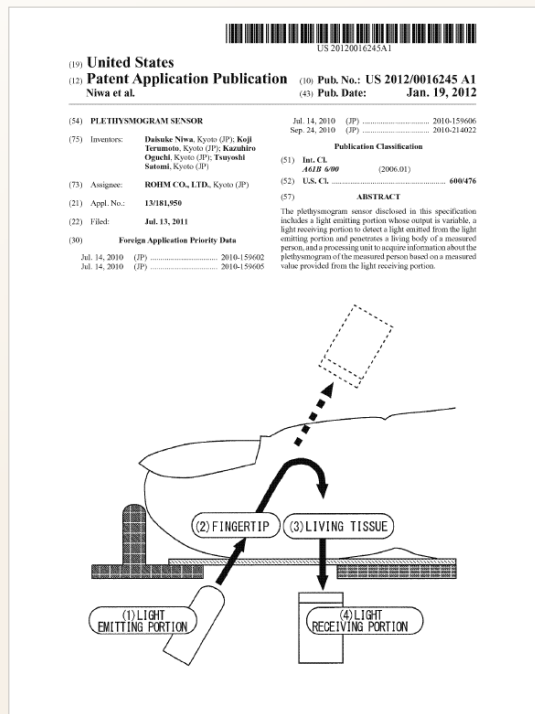


Paper 20 at 80-81

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

74

Niwa in view of Schröder Does Not Render Obvious Any Asserted Claim



Ex. 1005 (Niwa)



Ex. 1007 (Schröder)

- Niwa in view of Schröder does not render obvious any claim

Paper 20 at 82-85

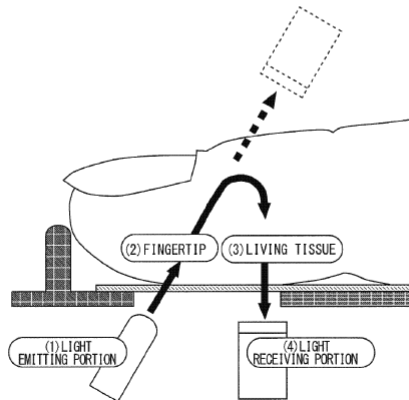
**Deficiencies of Grounds 7/8:
Niwa + Mestas
Niwa + Schröder + Mestas**

PGR2024-00030

Niwa in view of Mestas Does Not Render Obvious Dependent Claim 12

(19) United States
(12) Patent Application Publication (10) Pub. No.: US 2012/0016245 A1
Niwa et al. (43) Pub. Date: Jan. 19, 2012

(54) PLETHYSMOGRAM SENSOR Jul. 14, 2010 (JP) 2010-159606
(75) Inventors: Daihoku Niwa, Kyoto (JP); Koji Terumoto, Kyoto (JP); Kazuhiro Oguni, Kyoto (JP); Tsuyoshi Satomi, Kyoto (JP) Sep. 24, 2010 (JP) 2010-214022
(73) Assignor: ROHM CO., LTD., Kyoto (JP) Publication Classification
(21) Appl. No.: 13/181,950 (51) Int. Cl. A61B 6/00 (2006.01)
(22) Filed: Jul. 13, 2011 (52) U.S. Cl. 600/476
(30) Foreign Application Priority Data
Jul. 14, 2010 (JP) 2010-159602
Jul. 14, 2010 (JP) 2010-159605
(57) ABSTRACT
The plethysmogram sensor disclosed in this specification includes a light emitting portion whose output is variable, a light receiving portion to detect a light emitted from the light emitting portion and penetrates a living body of a measured person, and a processing unit to acquire information about the plethysmogram of the measured person based on a measured value provided from the light receiving portion.



Dependent Claim 12

12 The finger-worn wearable ring device of claim 1, wherein the battery comprises a curved battery, wherein an arc of the curved battery approximates a corresponding arc of the external housing component

Paper 20 at 86-87

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

77

[illegible]

Ex. 1005, FIG. 28

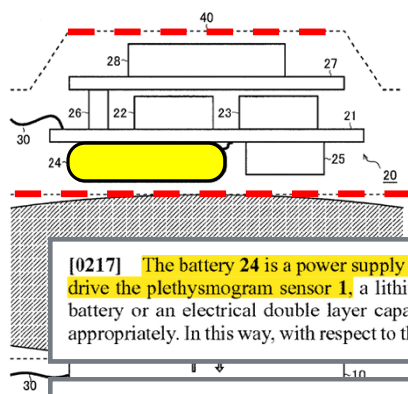
In addition, according to this construction, the battery 24 formed as highly flat is located right above the finger 2, it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2, furthermore, the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

Ex. 1005 at [0217]

- Niwa places the “highly flat” battery between flat surfaces of its ring.
- Niwa discloses the flat battery “enhances affinity of the sensor” and reduces “consciousness of the examinee for wearing” the ring.
- No reason to modify Niwa’s flat battery to a curved one.

Niwa – No Motivation to Include Curved Batteries

FIG. 28



[0217] The battery 24 is a power supply source required to drive the plethysmogram sensor 1, a lithium ion secondary battery or an electrical double layer capacitor can be used appropriately. In this way, with respect to the plethysmogram

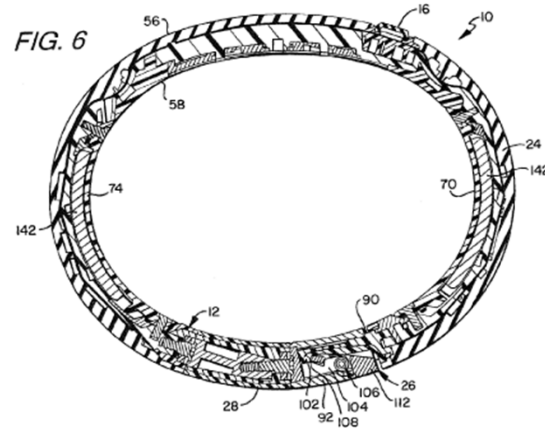
In addition, according to this construction, the battery 24 formed as highly flat is located right above the finger 2, it is possible to enhance an affinity of the plethysmogram sensor 1 when the pulse sensor 1 is worn on the finger 2; furthermore, the consciousness of the examinee for wearing the plethysmogram sensor 1 can be reduced.

Ex. 1005, FIG. 28; Ex. 1005 at [0217]

Paper 20 at 86-87



FIG. 6



- Prior art discloses curved batteries in devices significantly larger than a finger-worn ring.
 - Wristbands have larger flat circumferences, can be heavier, thicker, and wider than a finger-worn ring.
- No reason a POSITA would expect he or she could “shrink” wristband batteries to fit in a ring

Niwa in view of Schröder and Mestas Does Not Render Obvious Dependent Claim 12

Niwa “highly flat” battery teaches away from using curved batteries.

Schröder does not disclose any position, shape, or size of the battery. And any such battery would need to be included outside the ring along with the chip module.

Inlay of Schröder would not accommodate a battery, much less a curved battery

Paper 20 at 86-87

**Deficiencies of Grounds 9/10:
Niwa + Yuen
Niwa + Schröder + Yuen**

PGR2024-00030

OURA



Secondary Considerations

PGR2024-00030

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

82



Objective Indicia of Obviousness

Commercial Success

Copying

Long-Felt Need

Paper 20 at 88-114

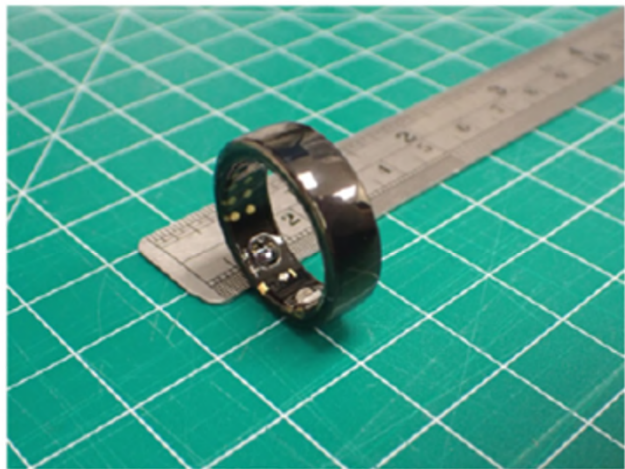
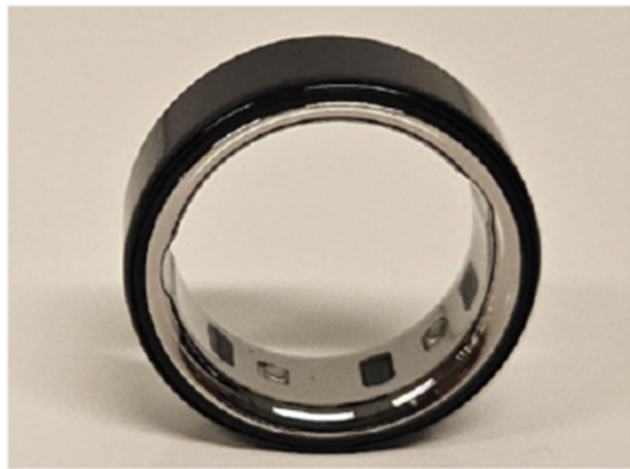
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

83



Nexus

Oura Ring Gen. 3 and 4 practice the Asserted Claims of the '178 Patent

Oura Ring Gen. 3	Oura Ring Gen. 4
 A photograph of an Oura Ring Gen. 3, a dark, metallic ring with a small sensor on the inside, resting on a green grid surface next to a wooden ruler.	 A photograph of an Oura Ring Gen. 4, a dark, metallic ring with a small sensor on the inside, shown from a side-on perspective.
Ex-2029	Ex-2030

Paper 20 at 89-98

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

84



Nexus

Petitioner does not dispute that Oura Ring embodies the challenged claims

Q. Do you dispute that Oura Ring Gen 3 Horizon is a commercial embodiment of the '178 Patent?

A. I do not dispute that the Gen 3 Horizon and the Oura Ring Gen 4 practice those claims.

*Ex. 2118, at 52:15-17
Paper 39 at 22*



Commercial Success

A. There are two products that comprise Oura Ring Gen 3, two debiting products. If by Gen 3 Ouraring you mean Oura Ring Heritage and Oura Ring Gen 3 Horizon together, then, **yes, there was some commercial success**, but the emphasis on "some."

* * *

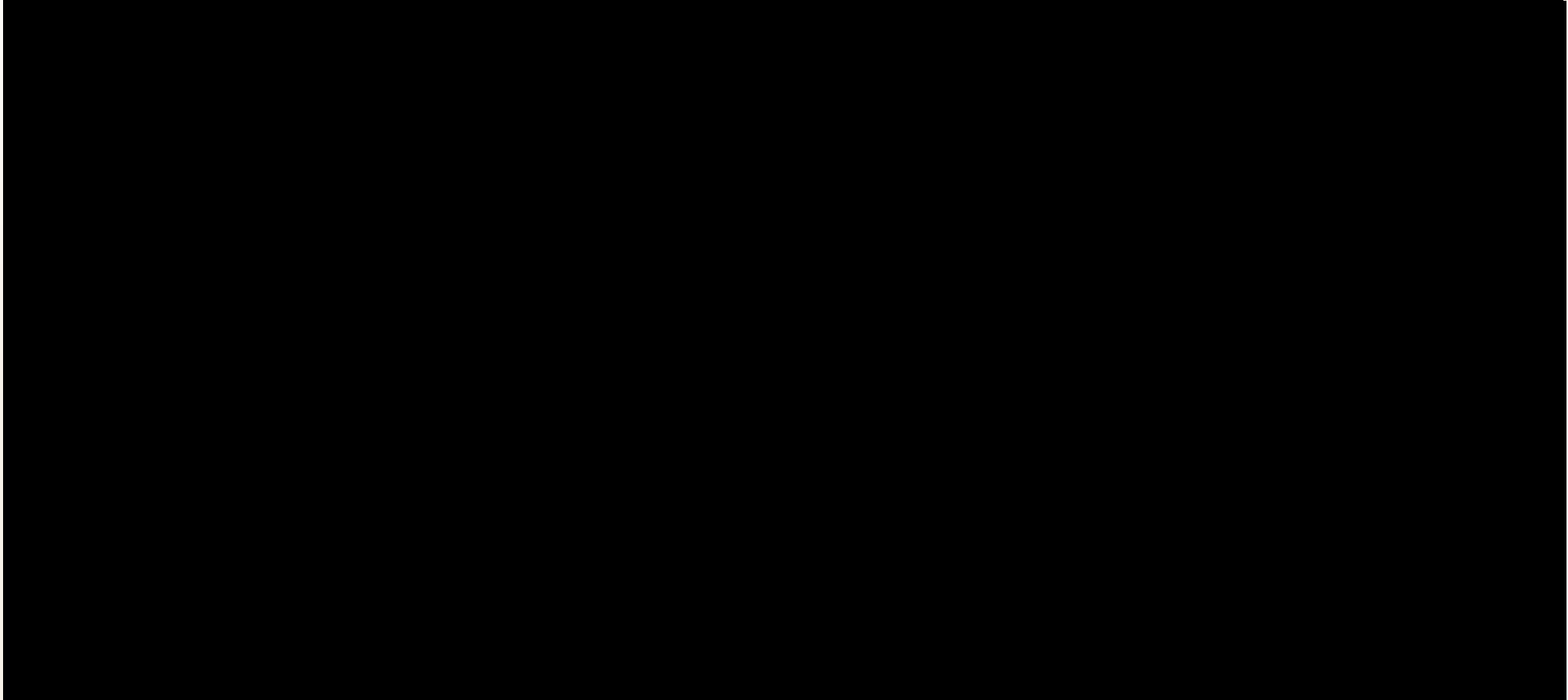
Q. So would you agree with me that Oura Ring Gen 4 had some commercial success?

A. **I would be unsurprised if it had at least some commercial success.** But, again, the fact that the sales conflate the data for different products means that it's difficult or impossible to tell the extent that it had.

*Ex. 2118, 15:13-17, 18:11-19
Paper 39 at 25-26*



Commercial Success

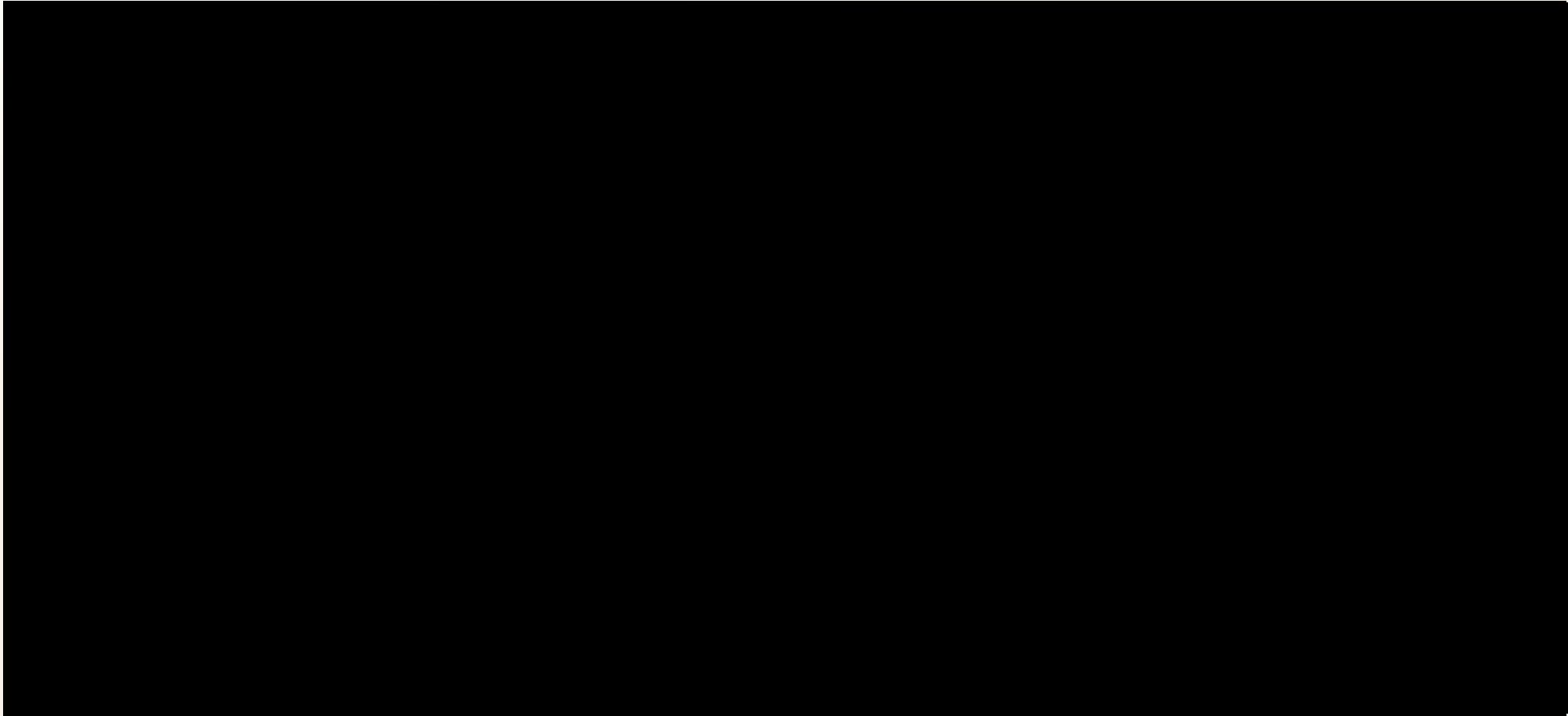


DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

87



Commercial Success

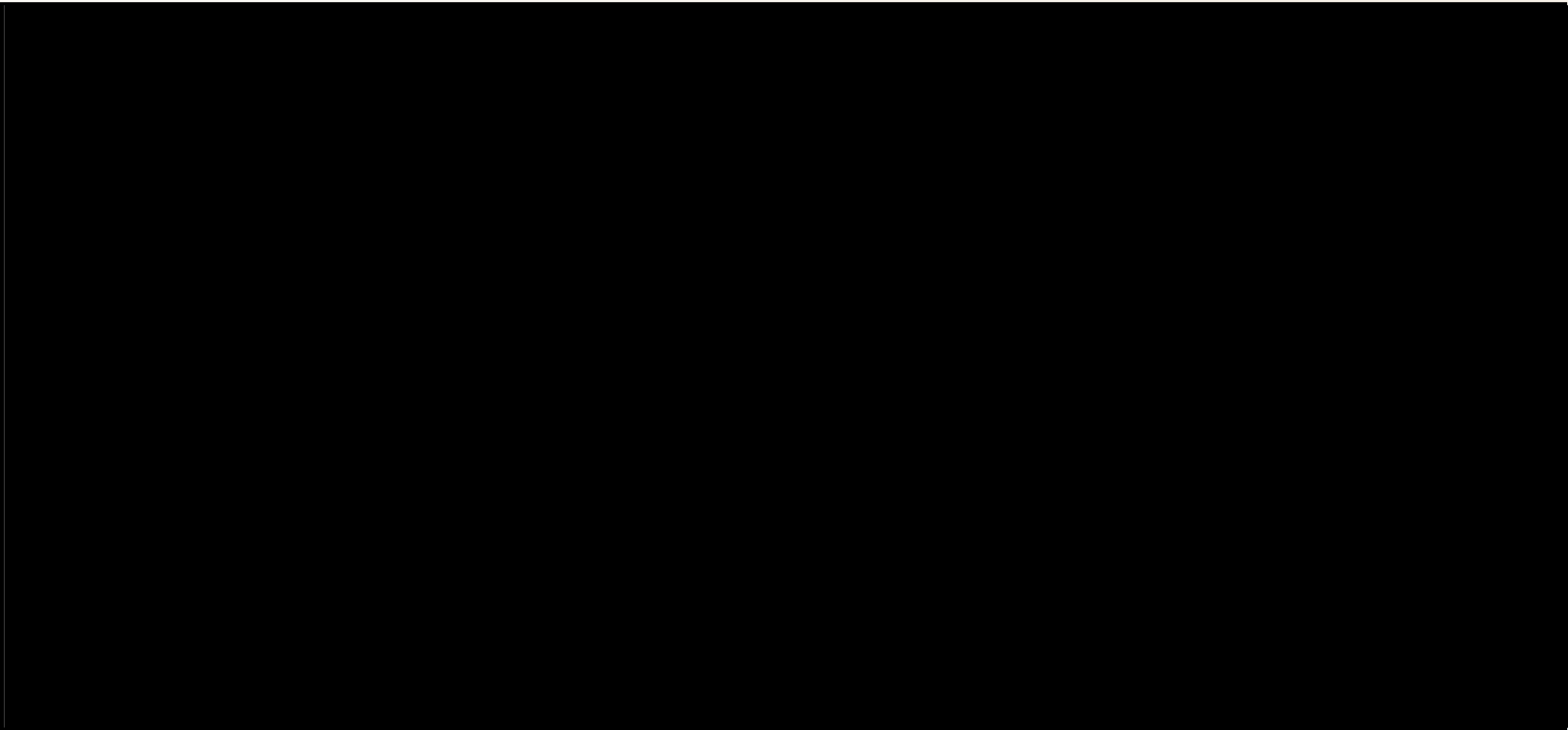


DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

88

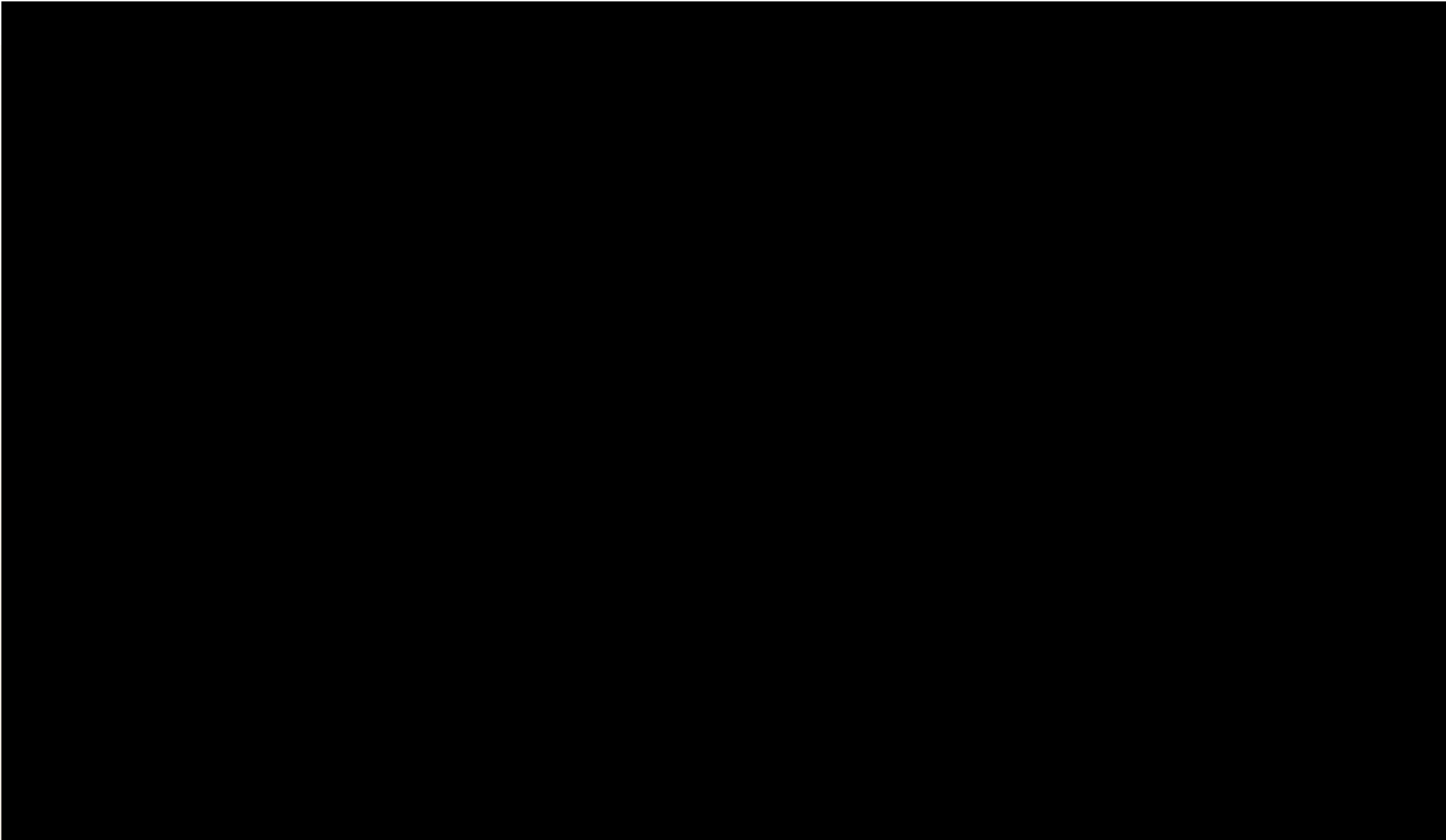


Commercial Success



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

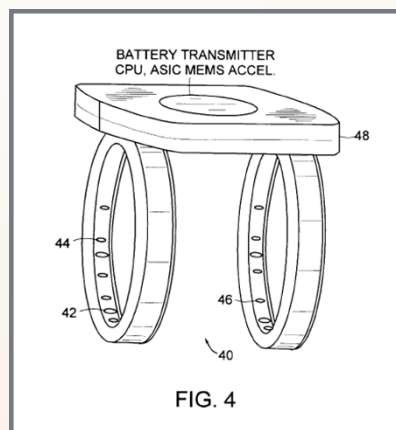
89



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

90

A Long-Felt Need Existed for Finger-Worn Ring Health Trackers



Ex. 2025, Fig. 4

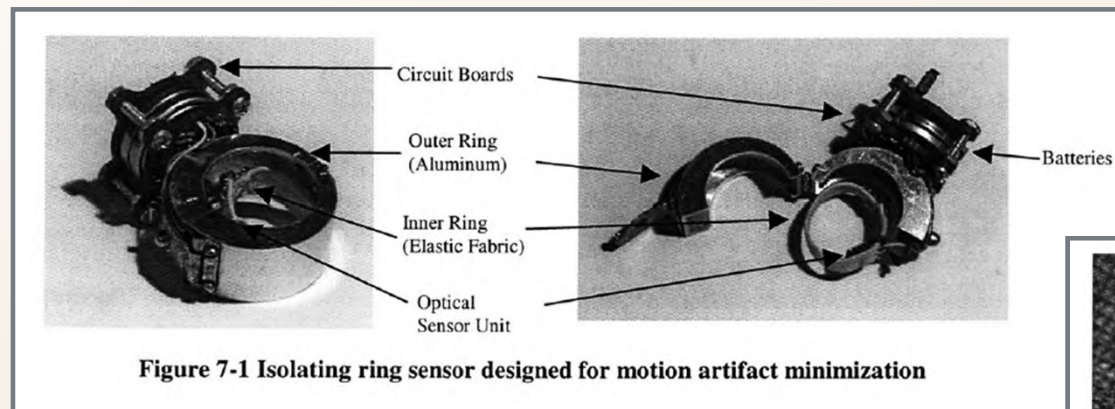


Figure 7-1 Isolating ring sensor designed for motion artifact minimization

Ex 1035, Figs. 7-1, 8-1.

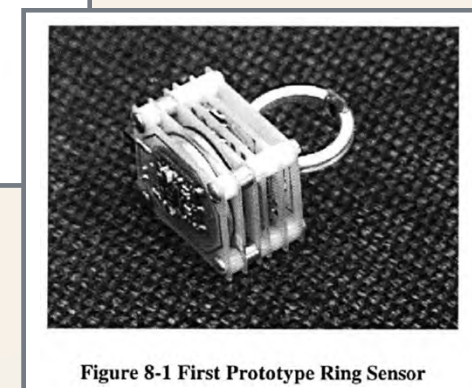


Figure 8-1 First Prototype Ring Sensor

Ex. 1005

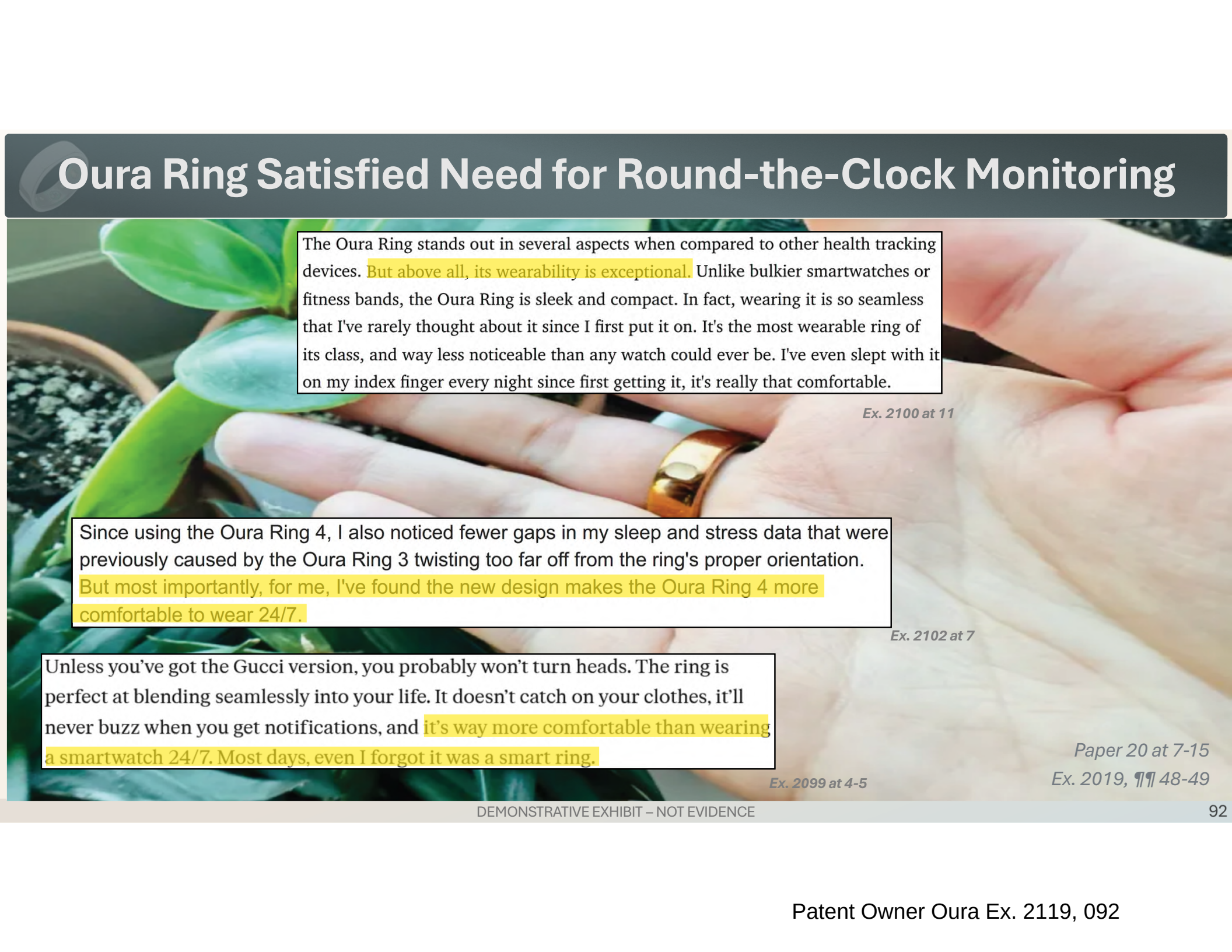
- Prior smart rings were bulky, located electronics and batteries on the back of the hand, etc.
- There was a need for a smart wearable that was more comfortable than prior wearables and could be worn around the clock.

Paper 20 at 7-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

91

Oura Ring Satisfied Need for Round-the-Clock Monitoring



The Oura Ring stands out in several aspects when compared to other health tracking devices. **But above all, its wearability is exceptional.** Unlike bulkier smartwatches or fitness bands, the Oura Ring is sleek and compact. In fact, wearing it is so seamless that I've rarely thought about it since I first put it on. It's the most wearable ring of its class, and way less noticeable than any watch could ever be. I've even slept with it on my index finger every night since first getting it, it's really that comfortable.

Ex. 2100 at 11

Since using the Oura Ring 4, I also noticed fewer gaps in my sleep and stress data that were previously caused by the Oura Ring 3 twisting too far off from the ring's proper orientation. **But most importantly, for me, I've found the new design makes the Oura Ring 4 more comfortable to wear 24/7.**

Ex. 2102 at 7

Unless you've got the Gucci version, you probably won't turn heads. The ring is perfect at blending seamlessly into your life. It doesn't catch on your clothes, it'll never buzz when you get notifications, and **it's way more comfortable than wearing a smartwatch 24/7. Most days, even I forgot it was a smart ring.**

Ex. 2099 at 4-5

*Paper 20 at 7-15
Ex. 2019, ¶¶ 48-49*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

92

Oura Ring Satisfied Need for Long Battery Life in Wearables

The Oura Ring 4 is hands-down the greatest smart ring for fitness tracking that money can buy. Between the comfortable fit, discreet functionality, nearly a week of battery life and a comprehensive Oura app experience, the Oura Ring 4 is a great alternative to a smartwatch or activity band. Although the monthly membership fee may deter some, the ever-growing collection of health and wellness features more than proves its worth.

Ex. 2102 at 1

Oura recently revealed the Oura Ring 4, the successor to its popular Oura Ring 3 which debuted in 2021. The new generation comes with smart sensing technology for a more accurate, thinner, less obtrusive, and longer wear with fewer gaps in data capture.

Ex. 2074 at 3

Paper 20 at 7-15, 102-103

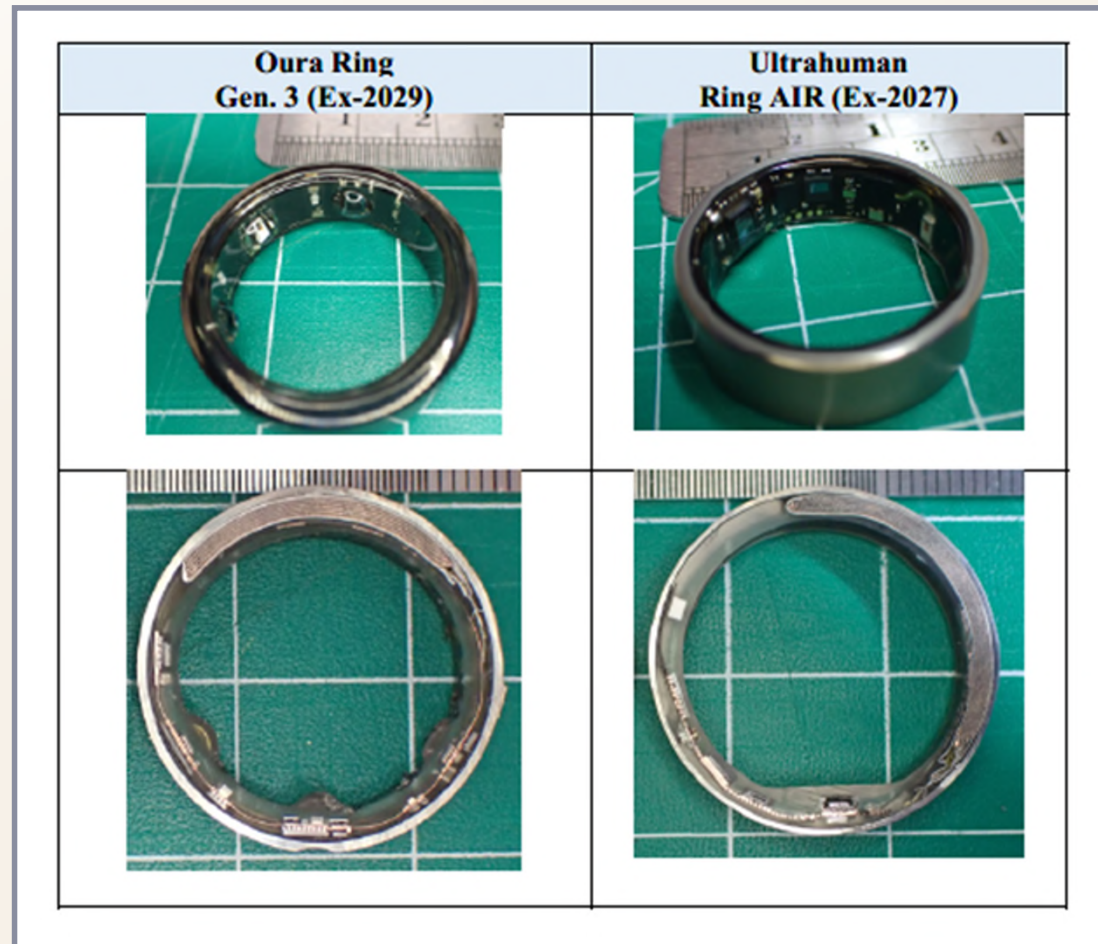
Ex. 2019, ¶¶ 18, 24, 49

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

93



Copying



Paper 20 at 106-110

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

94

Copying

The '178 Patent

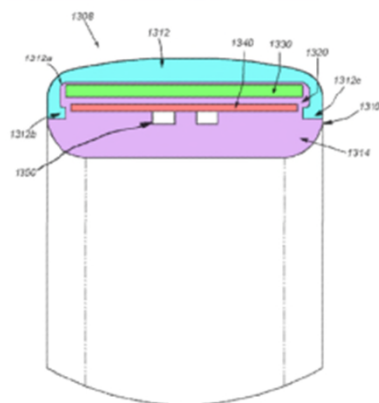
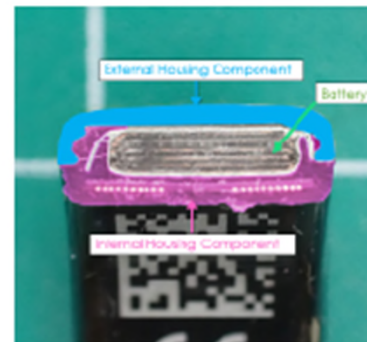


FIG. 13

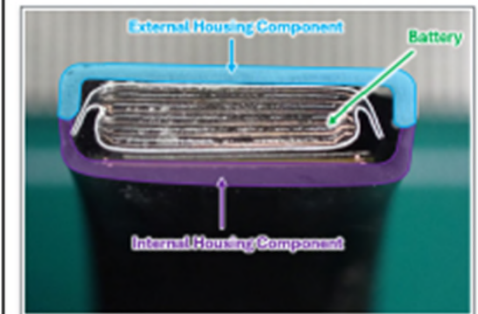
Ex-0001 at Fig. 13

Oura



Ex-2029

Ultrahuman



Ex-2027



Copying

A. And, lastly, you said everyone did it, but I want to make sure that you also testified that the hardware team at Ultrahuman analyzed the Oura Ring, correct?

A. The R&D team.

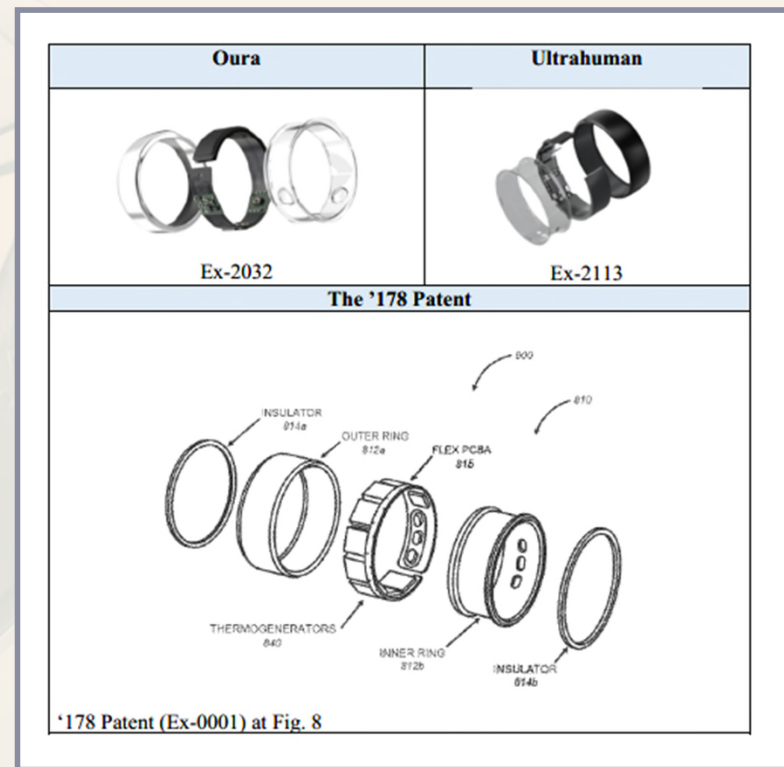
Q. I didn't ask about R&D. I just want to ask specifically about the hardware team. They were involved in the teardown of the Oura Ring product, correct?

A. Maybe hardware would mean R&D and production and everyone else as well, so I think that's why I specified it's R&D.

* * *

Q. So you wanted to figure out what the Oura Ring was made of, that's what you said, right? And you also wanted to figure out how large of a battery Oura used, correct?

A. Not specifically on the battery front, I would say, because we looked at the Oura Ring, there was a battery for sure, but there was a metallic shell as well. I think the core insight that I remember we were addressing was that it has two symmetric Rx coils attached to the PCB. That was the major insight.



Ex. 2024, 696-698; Paper 20 at 106-110

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

96

OURA



PGR2024-00039 Demonstratives

Samsung Electronics et al. v. Ouraring

PGR2024-00030; PGR2024-00039; IPR2024-00928

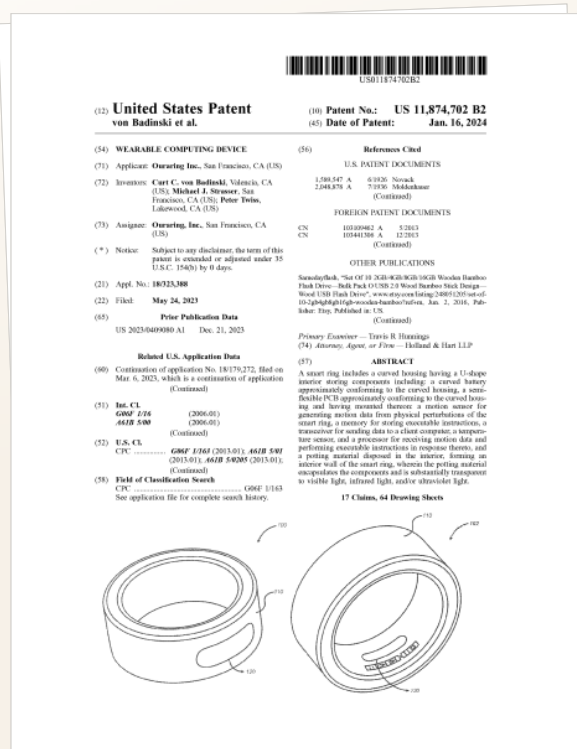
September 11, 2025

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Overview of the '702 Patent



Ex. 1001

- **Title:**
Wearable Computing Device
- **Priority Date:**
November 29, 2013
- **Challenged Claims:**
1-17

The '702 Patent Claim 1

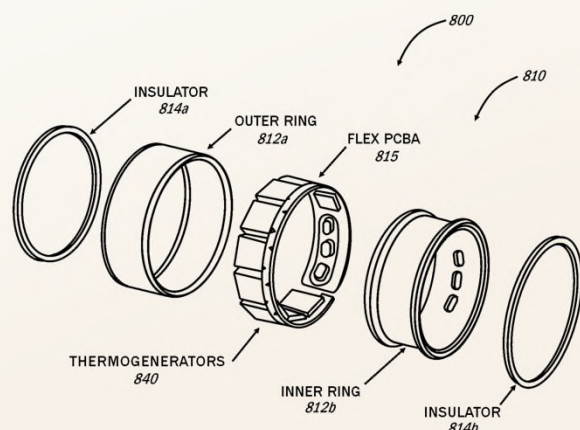


FIG. 8

- 1[pre] A finger-worn wearable ring device, comprising:
- 1[a] *an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;*
 - 1[b][i] *an internal housing component coupled to the external housing component, the internal housing component defining an inner circumferential surface of the finger-worn wearable ring device*
 - 1[b][ii] *wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;*
 - 1[c] *a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity;*
 - 1[d] *one or more light-emitting components electrically coupled with the printed circuit board, the one or more light-emitting components configured to emit light through the substantially transparent material of the internal housing component into a tissue of a user;*
 - 1[e] *one or more light-receiving components electrically coupled with the printed circuit board, the one or more light-receiving components configured to receive, through the substantially transparent material of the internal housing component, the light transmitted by the one or more light-emitting components;*
 - 1[f] *one or more processors configured to process data that is based at least in part on the light received by the one or more light-receiving components; and*
 - 1[g] *a communication module communicatively coupled with the one or more processors, the communication module configured to transmit the data processed by the one or more processors.*



The '702 Patent: Summary of Grounds

1	Schröder (Claims 1, 5, 7, 12-15)
2	Schröder/LeBoeuf (Claims 2-4, 6, 8-11)
3	Schröder/LeBoeuf/Niwa (Claims 8-11)
4	Schröder/Mestas (Claims 16-17)
5	LeBoeuf/Schröder (Claims 1-15)
6	LeBoeuf/Schröder/Niwa (Claim 8-11)
7	LeBoeuf/Schröder/Mestas (Claims 16-17)



Deficiencies of Ground 1: Schröder

PGR2024-00039

Schröder Does Not Render Claim 1 Obvious

1[pre] A finger-worn wearable ring device, comprising:

1[a] **an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;**

1[b][i] **an internal housing component coupled to the external housing component, the internal housing component defining an inner circumferential surface of the finger-worn wearable ring device**

1[b][ii] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;

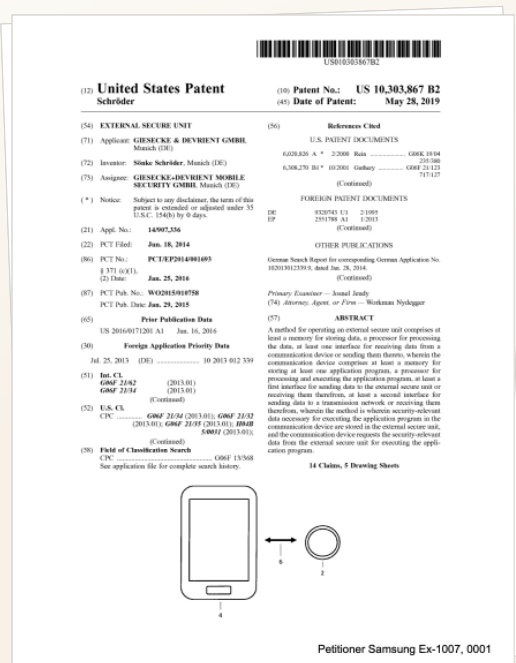
1[c] a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity;

1[d] one or more light-emitting components electrically coupled with the printed circuit board, the one or more light-emitting components configured to emit light through the substantially transparent material of the internal housing component into a tissue of a user;

1[e] one or more light-receiving components electrically coupled with the printed circuit board, the one or more light-receiving components configured to receive, through the substantially transparent material of the internal housing component, the light transmitted by the one or more light-emitting components;

1[f] one or more processors configured to process data that is based at least in part on the light received by the one or more light-receiving components; and

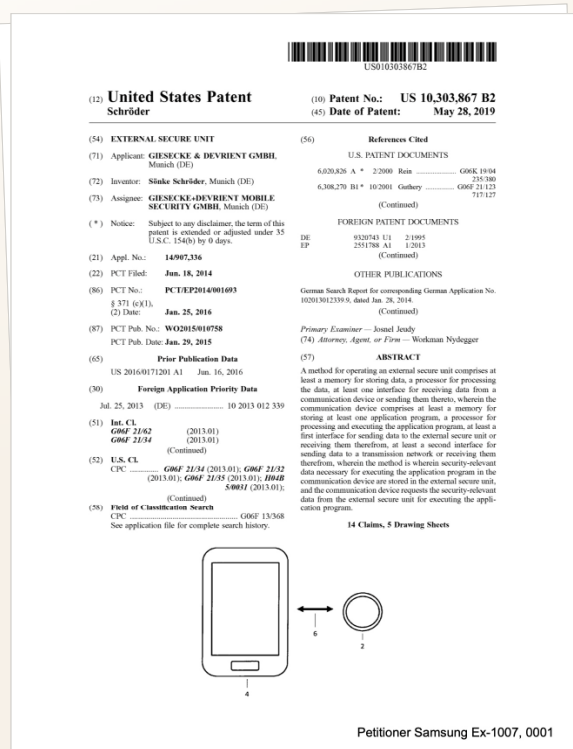
1[g] a communication module communicatively coupled with the one or more processors, the communication module configured to transmit the data processed by the one or more processors.



Paper 19 at 27-43
Ex. 1007 (Schröder)



Schröder



Ex. 1007 (Schröder)
Paper 19 at 15

(57)

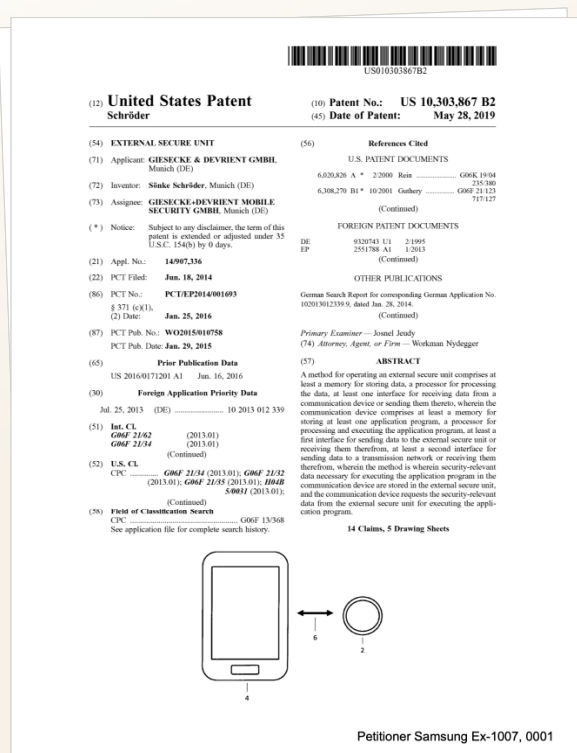
ABSTRACT

A method for operating an external secure unit comprises at

- Schröder's rings are directed to security applications – not health monitoring

Schröder Fails To Disclose Limitation 1[b.ii]

1[b][ii] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;



Paper 19 at 27-29
Ex. 1007 (Schröder)

“Substantially Transparent Material that Enables Light”



1[b][ii] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;

Petitioner asserts that Schröder’s “transparent regions, e.g. windows” are “incorporated into the internal housing component to capture ‘a partial vein image in the finger.’” Pet. 21 (citing Ex. 1007, 9:28–34, 9:62–10:4). On the current record, we agree with Patent Owner that these “transparent regions” are “security elements” or “security features” disposed “on an outer area” of the finger ring, not on an internal housing component with an inner circumferential surface, as recited in claim element 1[b]. Prelim. Resp. 27;

Paper 8, at 20-21

In a further embodiment example, the external secure unit 2 has at least one security feature as protection against forgery. The external secure unit 2, e.g. a finger-ring 2, has security elements for example incorporated into the surface, applied thereto or integrated therein, 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. Depending on the

Ex. 1007 at 9:28-34

Paper 19 at 27-29; Paper 37 at 1-2

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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“Substantially Transparent Material that Enables Light”

Q. Okay. Just to be clear. If, for example, a window was transmissive in the infrared but not transmissive in a visible ultraviolet range, in your opinion, that would not be substantially transparent as claimed?

A. I think that's fair. I think, you know, the claim term specifically refers to substantially transparent material that enables light to pass through the internal housing component. Normally, in the art, if we're referring to non-visible light, we would specify if it were non-visible light. And in this case, it doesn't. So I would assume that substantially transparent would enable light to -- visible light to pass through -- or, I mean, in this case, it just says light to pass through. So if there were a material that only allowed IR, or infrared light, to pass through, I'm not sure it would meet this definition.

1 [b][iii] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;

Ex. 1082 at 179:19-180:10

Paper 19 at 27-29; Paper 37 at 1-2.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder's Windows are on the *Outer Surface*

Q. You would agree, though, that this is generally teaching what it says there: Transparent regions and windows, correct?

* * *

A. So to answer your question, yes, Schroder is referring to windows. But, again, in this context he's referring to windows on the outer area of the secure external unit for the purpose of displaying something like a hologram.

1[b][iii] wherein the internal housing component comprises a substantially transparent material that enables light to pass through the internal housing component;

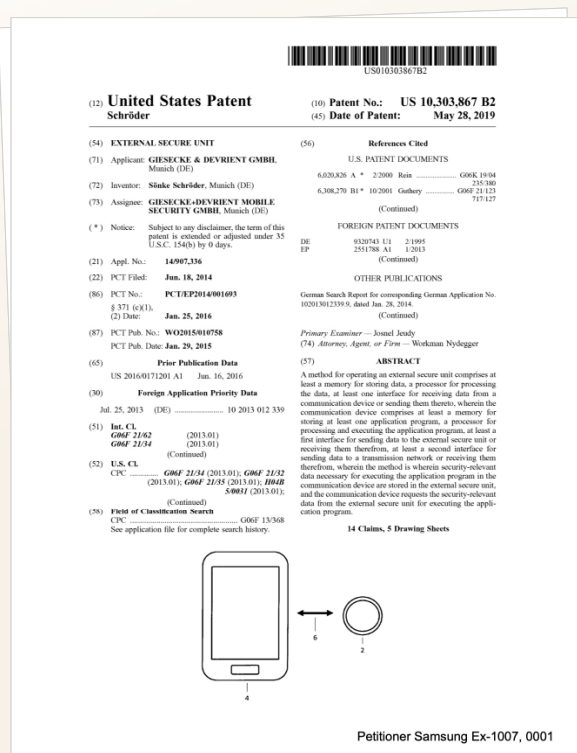
Ex. 1082 at 194:1-18

Paper 19 at 27-29; Paper 37 at 1-2.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Limitation 1[c]



Ex. 1007 (Schröder)

- 1[a] an external housing component defining an outer circumferential surface of the finger-worn wearable ring device;
- 1[b][i] an internal housing component coupled to the external housing component, the internal housing component defining an inner circumferential surface of the finger-worn wearable ring device
- 1[c] a printed circuit board disposed within a cavity defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to conform to arc within the cavity;

Paper 19 at 30-34; Paper 37 at 3-11.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

108



Schröder's "Ring Halves"

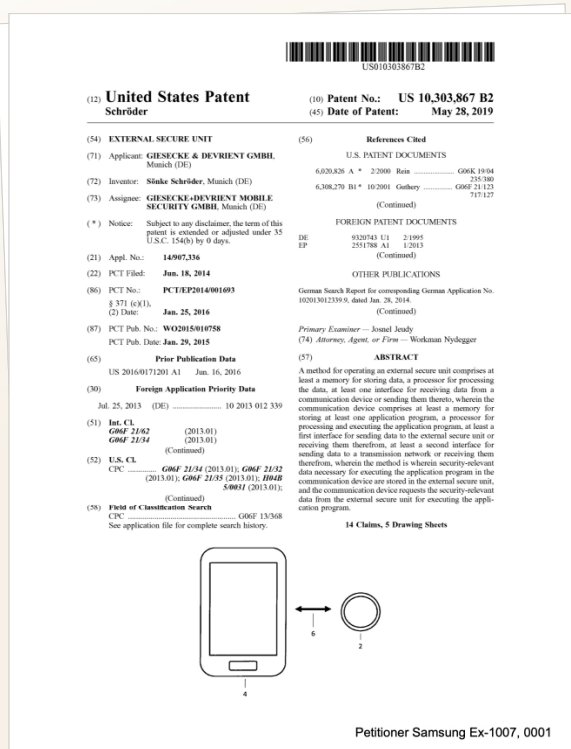
FIG. 3 shows a finger-ring according to the invention having an insertable chip module with a cover.

FIG. 4 shows a longitudinal section through a finger-ring as an example of an external secure unit.

FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring.

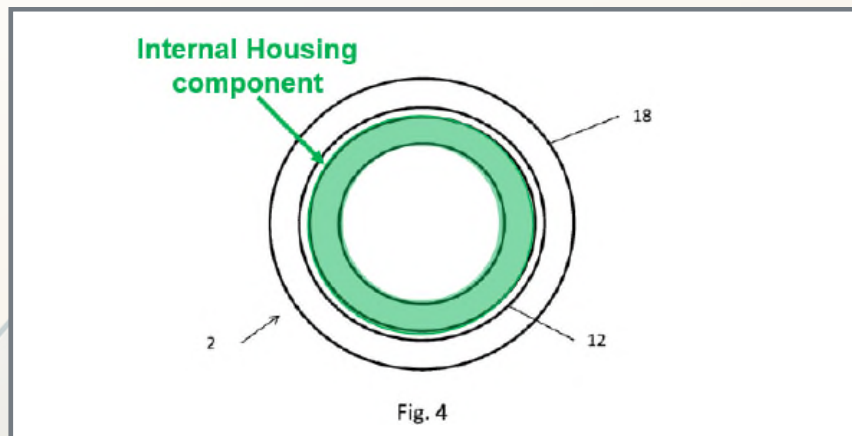
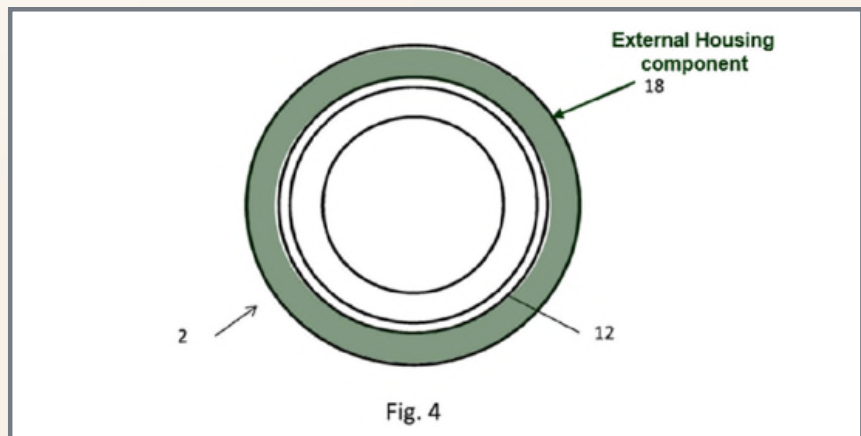
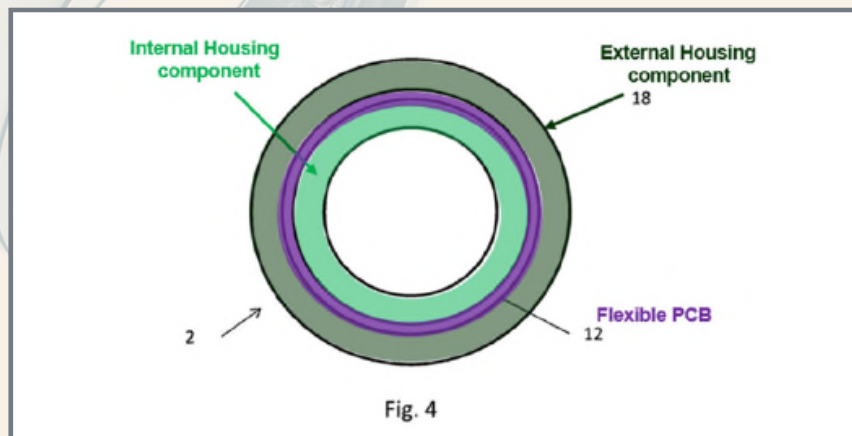
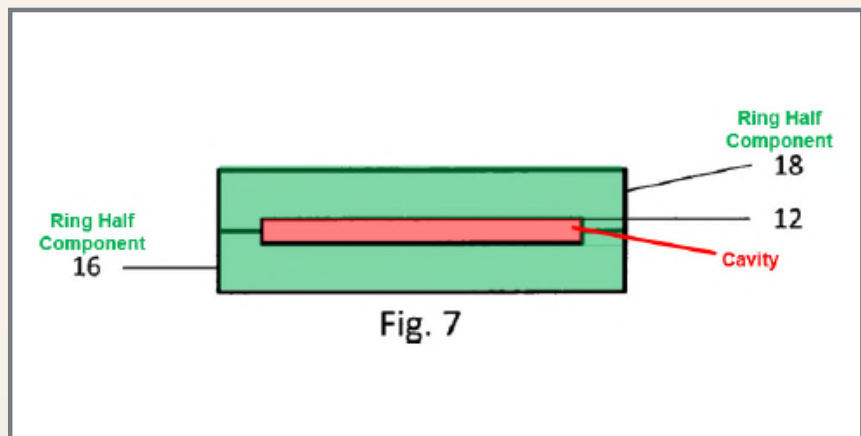
FIGS. 6 to 10 show different cross sections through a finger-ring.

FIGS. 6 to 10 show different cross sections through a finger-ring 2, consisting of ring-shaped components 16, 18 of the finger-ring 2 and of an inlay 12. FIG. 6 shows a cross section with the components 14 and 16 having an L-shaped profile. Between the two L-shaped components 16 and 18 an inlay 12 is arranged. FIG. 7 accordingly shows two U-shaped components 16 and 18 between which an inlay 12 is arranged. FIG. 8 shows a U-shaped component 18 and an even component 16, with the inlay 12 being arranged between the components 16 and 18. FIG. 9 shows two even components 16 and 18 between which the inlay 12 is arranged. FIG. 10 shows an L-shaped component 18 and an even component 16 between which the inlay 12 is arranged.



Paper 19 at 30, Paper 37 at 5-8.
Ex. 1007(Schröder) at 3:45-52, 12:43-51.

Schröder's "Ring Halves" According to Petition



Paper 3 at 9, 19, 21, 24
Paper 37, 3-8

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

110



Schröder's "Ring Halves"

A. And a good analogy for this would be thinking like a bagel. The normal dimension that you would cut a bagel is in half. You would open up the bagel. To complete the analogy, maybe you'd use your finger and dig a little trench into one half of the bagel or possibly both sides of the bagel, put some cream cheese in here, which would correspond in this analogy to the inlay, and then take those two halves and bring them back together. That's my interpretation of the ring halves of figure 4.

Q. I think that's what's shown here in figure 5. This is kind of the bagel interpretation.

A. Exactly.

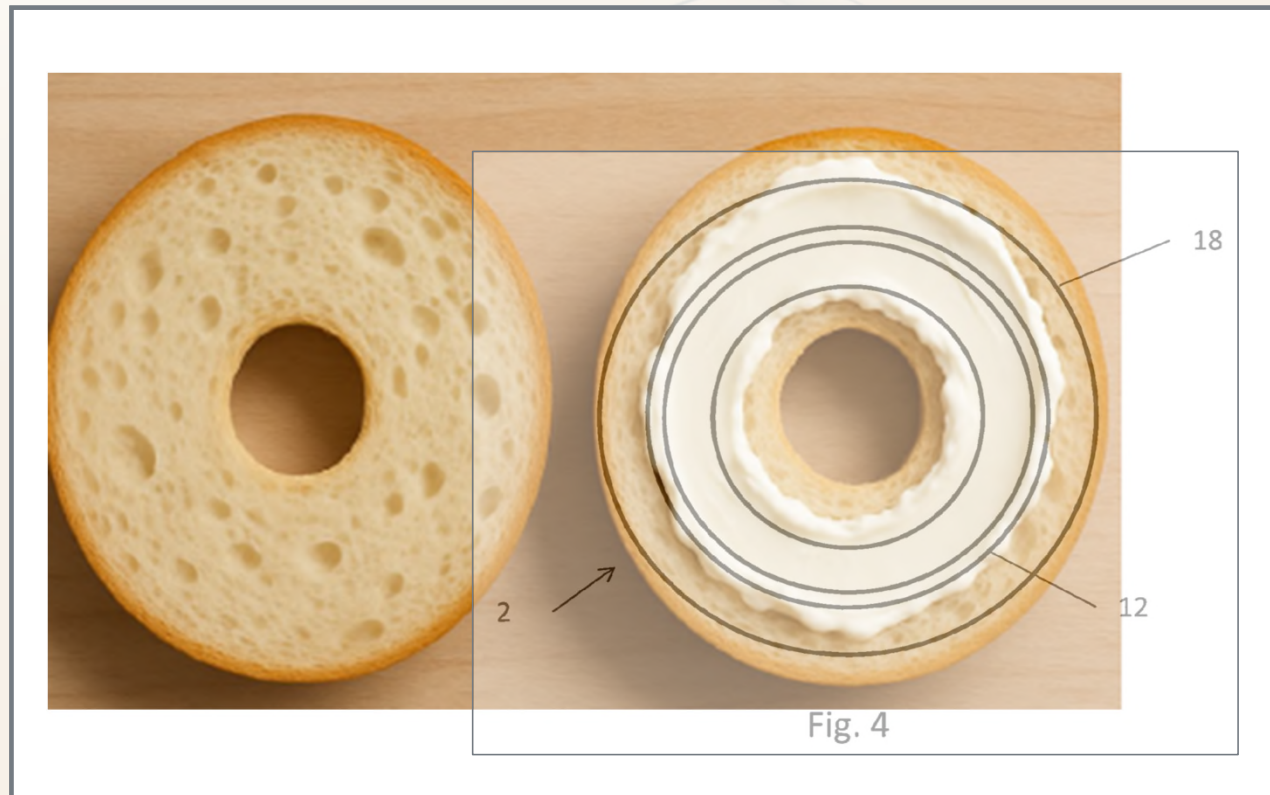
*Ex. 1081 at 83:2-14
Paper 37 at 3-8*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

111



Schröder's "Ring Halves"



Ex. 1007 at Fig. 4; Paper 37 at 6.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

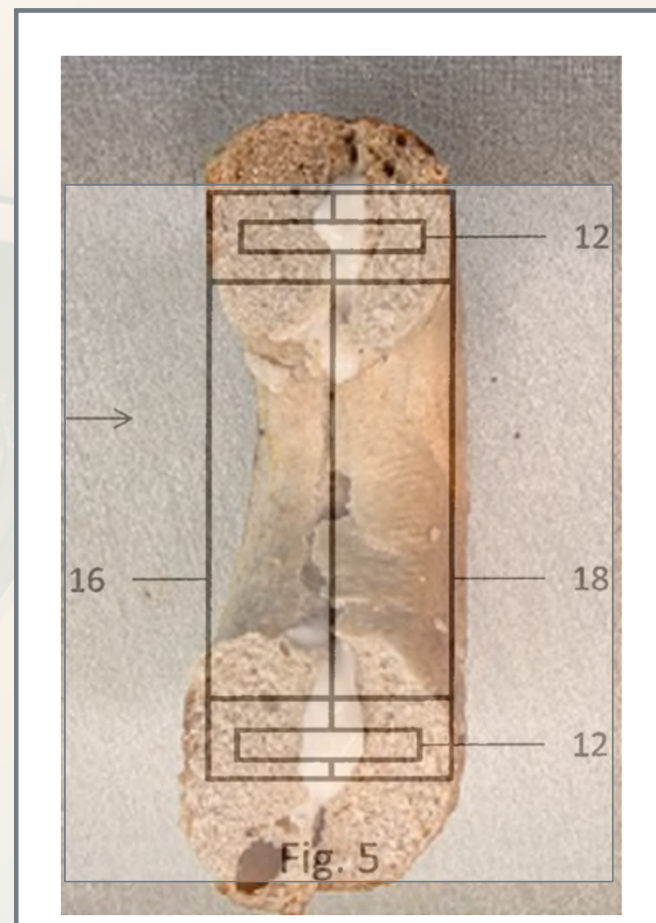
112

Patent Owner Oura Ex. 2119, 112



Schröder's "Ring Halves"

FIG. 4 shows a longitudinal section through a finger-ring 2. Here, an inlay 12 is inserted into one half 18 of the finger-ring 2. FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring 2. The finger-ring 2 consists of two ring halves 16 and 18. The two ring halves 16 and 18 respectively have a recess into which the inlay 12 is inserted.



Ex. 1007 at Fig. 5; Paper 37 at 7.

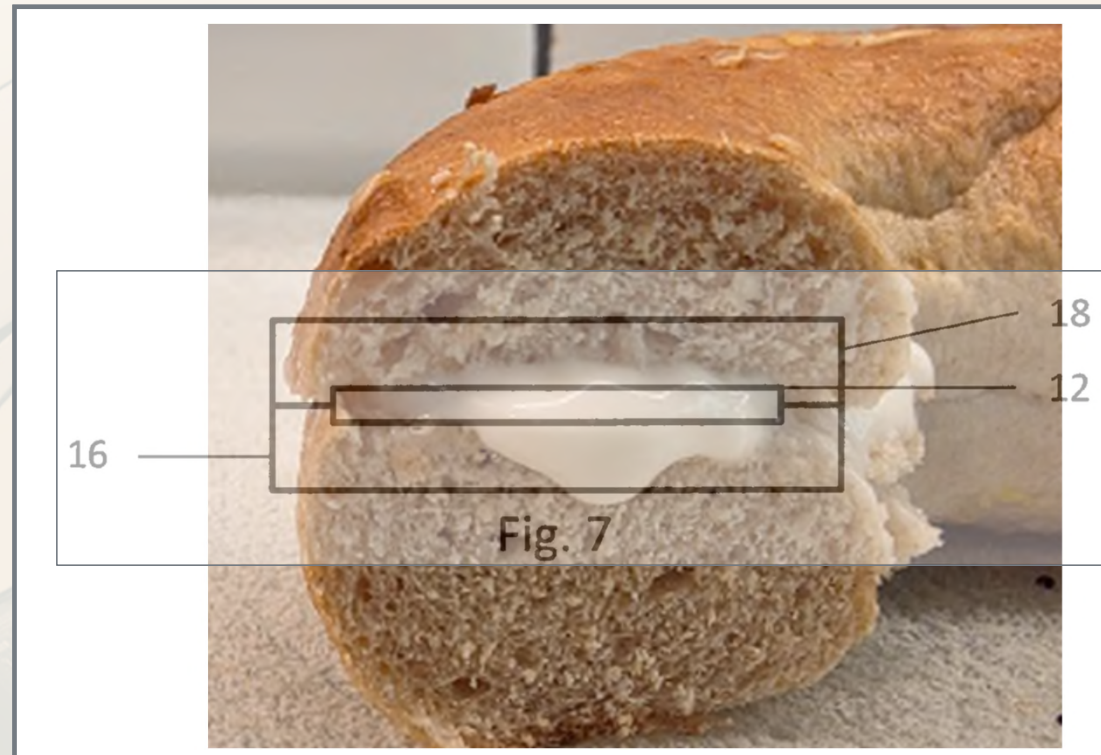


Schröder's "Ring Halves"

Q. And so would you agree that, at least in figure 7, what's shown as element 18 would correspond to an outer half and what's shown in element 16 would correspond to an inner half?

A. No, I wouldn't agree with that. I think element 18 and 16 in figure 7 are the same as element 18 and 16 in figure 5. And they're the two halves of the bagel. And so, you know, in the context of the '178 patent, we have an external surface and internal surface which is very clearly defined in that patent.

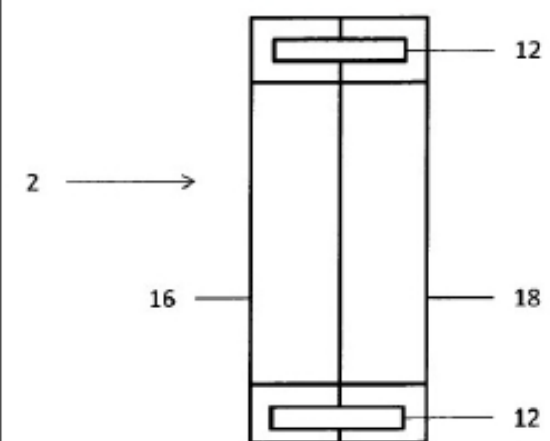
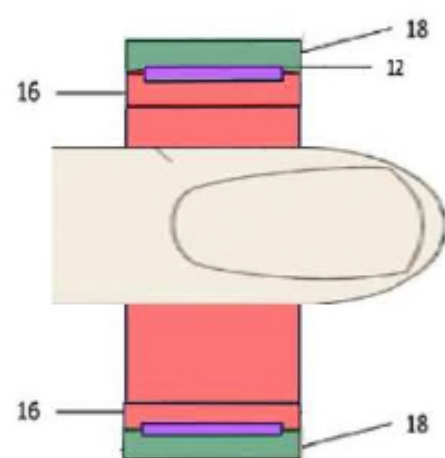
And here, it's my opinion that figure 7 is simply just showing figure 5 rotated by 90 degrees and with a different cross section through the ring. So it's actually showing the two ring halves with the carrier foil in between them.



*Ex. 1007 at Fig. 7; Paper 37 at 8.
Ex. 1081, 85:13-23*

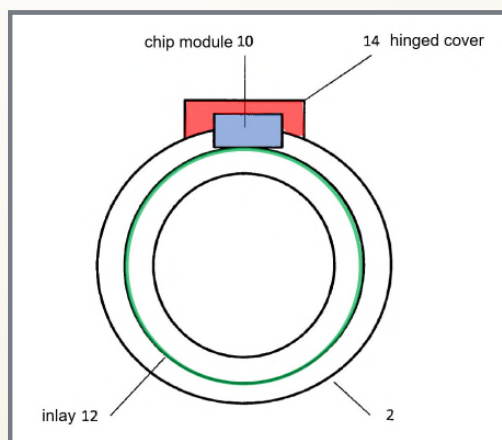
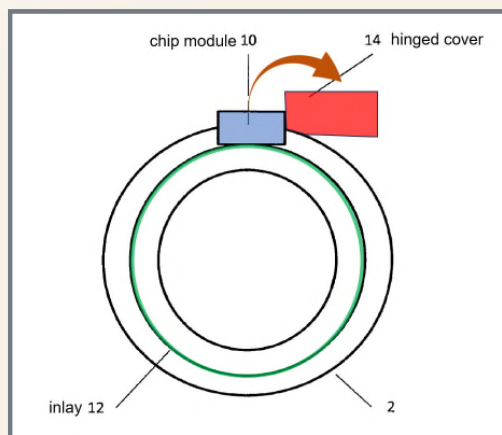


Petitioner's Modification of Schröder

Schröder	Petitioner's Reply
 <p>Fig. 5</p> <p>Ex-1007, Fig. 5.</p>	 <p>Fig. 5'</p> <p>Reply, 4.</p>

Ex. 1007 at Fig. 5; Paper 27 at 4; Paper 37 at 4

Schröder Fails To Disclose Limitation 1[c]



Ex. 1007 at Fig. 3 (modified)

- Schröder's rings chip module is located *outside* and above the ring so it can be replaced

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

Ex. 1007 at 8:54-56

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

Ex. 1007 at 8:60-63

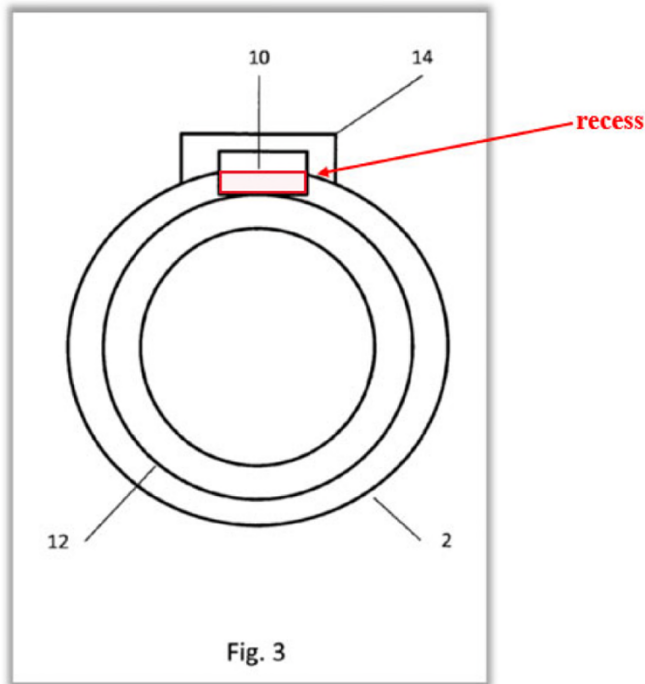
Paper 19 at 30-34, Paper 37 at 12-14

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Limitation 1[c]

- Schröder's chip module is located *outside* and above the ring so it can be replaced



antenna coil 8. The chip module 10 is inserted into a recess of the finger-ring 2. The position of the recess on the

Ex. 1007 at 8:58-59

*Ex 1007, Fig. 3
Paper 19 at 33.*

Paper 19 at 30-34, Paper 37 at 12-14

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

117

Schröder Fails To Disclose Limitation 1[c]

United States Patent
Schröder

(10) Patent No.: US 10,303,867 B2
(45) Date of Patent: May 28, 2019

(54) EXTERNAL SECURE UNIT
(71) Applicant: GIESECKE & DEVRIENT GMBH, Munich (DE)
(72) Inventor: Steffen Schröder, Munich (DE)
(73) Assignee: GIESECKE-DEVRIENT MOBILE SECURITY GMBH, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/907,336
(22) PCT Filed: Jan. 18, 2014
(86) PCT No.: PCT/EP2014/001693
§ 371 (c)(1),
(2) Date: Jan. 25, 2016
(87) PCT Pub. No.: WO2015/010758
PCT Pub. Date: Jan. 29, 2015
(65) Prior Publication Data
US 2016/0171280 A1 Jan. 16, 2016
(30) Foreign Application Priority Data
Jul. 25, 2013 (DE) 10 2013 012 339
(51) Int. Cl. G06F 21/62 (2013.01)
G06F 21/34 (2013.01)
(52) U.S. Cl. CPC: G06F 21/34 (2013.01); G06F 21/32 (2013.01); G06F 21/35 (2013.01); H04B 5/0011 (2013.01);
(58) Field of Classification Search CPC: G06F 13/368
See application file for complete search history.

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U.S. PATENT DOCUMENTS
6,030,828 A * 2/2000 Rein G06K 19/04 252-380
6,308,270 B4 * 10/2001 Gauthier G06F 21/123 717-127
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FOREIGN PATENT DOCUMENTS
DE 8320743 U1 2/1995
2517188 A1 1/2013
(Continued)
OTHER PUBLICATIONS
German Search Report for corresponding German Application No. 102013012339-9, dated Jan. 28, 2014.
(Continued)
Primary Examiner—Isabel Jeady
(74) Attorney, Agent, or Firm—Workman Nydegger
(57) ABSTRACT
A method for operating an external secure unit comprises at least a memory for storing data, a processor for processing the data, at least one interface for receiving data from a communication device or sending them thereto, wherein the communication device comprises at least a memory for storing at least one application program, a processor for processing and executing the application program, at least a first interface for sending data to the external secure unit or receiving them therefrom, at least a second interface for sending data to a transmission network or receiving them therefrom, wherein the method is wherein security-relevant data necessary for executing the application program in the communication device are stored in the external secure unit, and the communication device requests the security-relevant data from the external secure unit for executing the application program.

14 Claims, 5 Drawing Sheets

The diagram shows a mobile device (1) with a screen and a button. An external secure unit (2) is connected to the device via a cable (3). The secure unit (2) is a small, circular component with a pin (4) extending from it.

Petitioner Samsung Ex-1007, 0001

Ex. 1007 at 12:61-65.

1[c] a printed circuit board disposed **within a cavity** defined by the external housing component and the internal housing component, wherein the printed circuit board is configured to **conform to arc within the cavity**;

In the finger-ring 2 as an external secure unit 2 there can be arranged at least one inlay 12. The inlay 12 can have at least one chip module 10 with at least one antenna coil 8, with at least one further electronic device, e.g. a display, optionally being arranged on the inlay 12.

Paper 19 at 30-34, Paper 37 at 8-9

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner Oura Ex. 2119, 118

Schröder Fails To Disclose Limitation 1[c]

U.S. Patent No. 11,874,702
Petition for Post-Grant Review

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

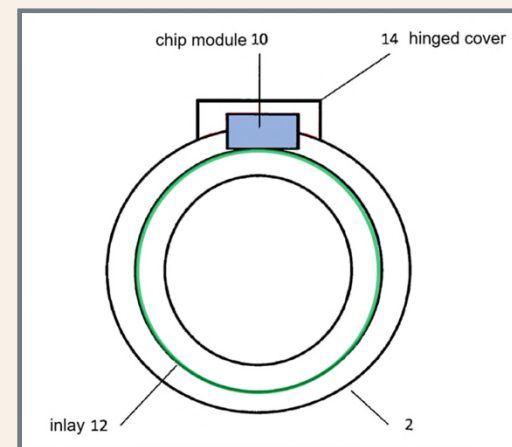
Case No. PGR2024-00039
U.S. Patent No. 11,874,702

PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,874,702

Paper 3 at 23

Inlay 12 consists of “flexible carrier material” like PET and Kapton, which are commonly understood to be printed circuit board materials. Ex-1007, 12:28-29; Ex-1002 ¶157. Inlay 12 carrier provides the substrate for chip module 10, antenna coil 8, and at least one electronic component. Ex-1007, 12:35-42. As shown below in Figure 4, inlay 12 (purple; the claimed printed circuit board) is “configured to conform to arc within the cavity” because it is disposed in the cavity defined by the circular internal and external housing components. Ex-1002 ¶¶157-159.

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



Ex. 1007 at Fig. 3; Paper 19 at 33

EX1007, 8:54-61



Schröder Fails To Disclose Limitation 1[c]

Q. The question is, that citation is describing Figure 3, is it not, of Schröder?

A. It is describing column 8, 58, 60 is with respect to Figure 3.

Q. And you're not relying on -- you've stated that you're not relying on Figure 3?

A. I'm not. That's a mistake because what I'm highlighting is the description 12 where the inlay is inserted in the cavity between 16 and 18.

Q. So that's another mistake in your report?

A. That is.

Ex. 2020 at 190:3-14.

Schröder Fails To Disclose Limitation 1[c]

Q. Where does the rectangle tell them to put the battery relative to the printed circuit board relative to the antenna coil relative to the sensors, relative to any communication module, relative to any power regulation circuitry? Where does the rectangle tell the POSITA where to put all that stuff and how to arrange it?

* * *

A. Right. And as I was going through my declaration pointing out it's Schröder with the knowledge of a POSITA, and I subsequently started to describe the various arrangements of components inside of that cavity. So knowledge of POSITA in addition to what's disclosed in Schröder gives them the guidance in how to arrange this.

Q. So Schröder doesn't tell them, but the knowledge of the POSITA fills in all those blanks?

A. Yes. And I described that in the subsequent parts of my declaration, for example, on pages 120, 121, 122, 123 and beyond.

*Paper 19 at 38
Ex. 2020 at 208:5-209:15*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Limitation 1[c]

We have considered Patent Owner’s argument that Schröder’s inlay 12 “is merely a substance for holding the coil in place, not a printed circuit board,” as well as Patent Owner’s argument contrasting Schröder’s description of inlay 12 with the express disclosure of “a circuit on a circuit board” elsewhere in the reference. Prelim. Resp. 29–30 (emphasis omitted; citing Ex. 1007, 8:57–59, 22:48–50; Ex. 2011⁹). These arguments raise a serious issue about whether a POSITA would have understood Schröder’s inlay 12 as teaching a printed circuit board. This issue would benefit from further development at trial.

We have also considered Patent Owner’s argument that Schröder’s chip module 10 “is located ‘on’ the carrier” and that locating it “within inlay 12 is at cross purposes with the disclosure of Schröder and therefore not obvious.” Prelim. Resp. 31. For claim element 1[c], Petitioner contends that inlay 12 “provides the substrate for chip module 10.” Pet. 23. Petitioner’s contention is supported by Schröder’s disclosure that “inlay 12 can have at least one chip module 10 . . . arranged on the inlay 12.” Ex. 1007, 12:62–65. For claim element 1[d], Petitioner contends that chip module 10 “is in inlay 12.” Pet. 26. On this record, it is unclear whether the location of Schröder’s chip module 10 “on” versus “in” inlay 12 makes a difference as it relates to the alleged obviousness of the challenged claims.

Paper 8 at 23-24

Schröder Fails To Disclose Limitations 1[c]

2/24/25, 7:34 AM

Printed circuit board - Wikipedia



Printed circuit board

A **printed circuit board** (PCB), also called **printed wiring board** (PWB), is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto or between sheet layers of a non-conductive substrate.^[1] PCBs are used to connect or "wire" components to one another in an electronic circuit. Electrical components may be fixed to conductive pads on the outer layers, generally by soldering, which both electrically connects and mechanically fastens the components to the board. Another manufacturing process adds *vias*, metal-lined drilled holes that enable electrical interconnections between conductive layers, to boards with more than a single side.



Printed circuit board of a DVD player

Printed circuit boards are used in nearly all electronic products today. Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Electronic design automation software is available to do much of the work of layout. Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout has to be done only once. PCBs can also be made manually in small quantities, with reduced benefits.^[2]



Part of a 1984 Sinclair ZX Spectrum computer board, a printed circuit board, showing the conductive traces, the through-hole paths to the other surfaces, and some electronic components mounted using through-hole mounting

PCBs can be single-sided (one copper layer), double-sided (two copper layers on both sides of one substrate layer), or multi-layer (stacked layers of substrate with copper plating sandwiched between each and on the outside layers). Multi-layer PCBs provide much higher component density, because circuit traces on the inner layers would otherwise take up surface space between components. The rise in popularity of multilayer PCBs with more than two, and especially with more than four, copper planes was concurrent with the adoption of *surface-mount technology*. However, multilayer PCBs make repair, analysis, and field modification of circuits much more difficult and usually impractical.

The world market for bare PCBs exceeded US\$60.2 billion in 2014,^[3] and was estimated at \$80.33 billion in 2024, forecast to be \$96.57 billion for 2029, growing at 4.87% per annum.^[4]

https://en.wikipedia.org/wiki/Printed_circuit_board

Patent Owner Oura Ex. 2023, 0001



1/18

Ex. 2023
Paper 20 at 50-51

A **printed circuit board** (PCB), also called **printed wiring board** (PWB), is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto or between sheet layers of a non-conductive substrate.^[1] PCBs are used to connect

- Q. Okay. Just circling back, so your answer is that the '178's usage of PCB is consistent with the Wiki article you cited?
- A. It's consistent with both the Wiki and all the other references that I cite as well with how PCBs are constructed, both rigid and flexible.

Ex. 2020, 73:12-74:11; 76:14-20; Ex. 1002, ¶32 (n.1).

Schröder Fails To Disclose Limitations 1[c]

2/04/25, 7:34 AM

Printed circuit board - Wikipedia



Printed circuit board

A **printed circuit board** (PCB), also called **printed wiring board** (PWB), is a laminated sandwich structure of conductive and insulating layers, each with a pattern of traces, planes and other features (similar to wires on a flat surface) etched from one or more sheet layers of copper laminated onto or between sheet layers of a non-conductive substrate.^[1] PCBs are used to connect or "wire" components to one another in an electronic circuit. Electrical components may be fixed to conductive pads on the outer layers, generally by soldering, which both electrically connects and mechanically fastens the components to the board. Another manufacturing process adds *vias*, metal-lined drilled holes that enable electrical interconnections between conductive layers, to boards with more than a single side.



Printed circuit board of a DVD player



Part of a 1984 Sinclair ZX Spectrum computer board, a printed circuit board, showing the conductive traces, the through-hole paths to the other surfaces, and some electronic components mounted using through-hole mounting

Printed circuit boards are used in nearly all electronic products today. Alternatives to PCBs include wire wrap and point-to-point construction, both once popular but now rarely used. PCBs require additional design effort to lay out the circuit, but manufacturing and assembly can be automated. Electronic design automation software is available to do much of the work of layout. Mass-producing circuits with PCBs is cheaper and faster than with other wiring methods, as components are mounted and wired in one operation. Large numbers of PCBs can be fabricated at the same time, and the layout has to be done only once. PCBs can also be made manually in small quantities, with reduced benefits.^[2]

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https://en.wikipedia.org/wiki/Printed_circuit_board

Patent Owner Oura Ex. 2023, 0001



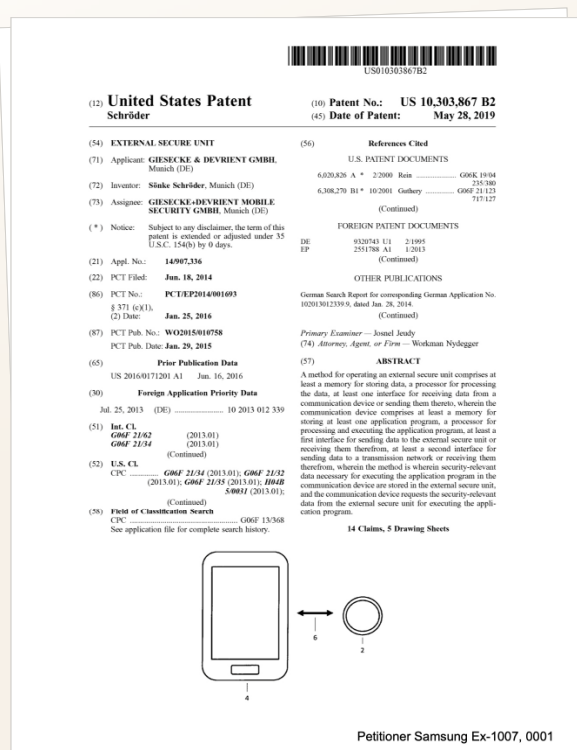
1/18

Ex 2023

- Q. PET, Kapton, et cetera, are carrier materials that would have been understood as materials that are used for a printed circuit board, correct?
- A. They could be, but not necessarily so. Printed -- flexible printed circuit boards often use polyimide and other materials as well. But despite that, you know, there's things like Kapton tape that I've used in my own work that I don't use for printed circuit boards but just as thin, you know, substrates on which to place for items or stick things together, for example.
- Q. Okay. But you don't disagree that PET and Kapton are materials that could be used for printed circuit boards, correct?
- A. That's right. They could be used.

Paper 37 at 10
Ex. 1081 at 80:8-81:10

Schröder Fails To Disclose Claim 12 and 13



Ex. 1007 (Schröder)

12. The finger-worn wearable ring device of claim 1, further comprising:

a power management module disposed **within the cavity between the inner circumferential surface and the outer circumferential surface**, the power management module configured to wirelessly transfer energy from an external energy source to a battery of the finger-worn wearable ring device through the inner circumferential surface, the outer circumferential surface, or both.

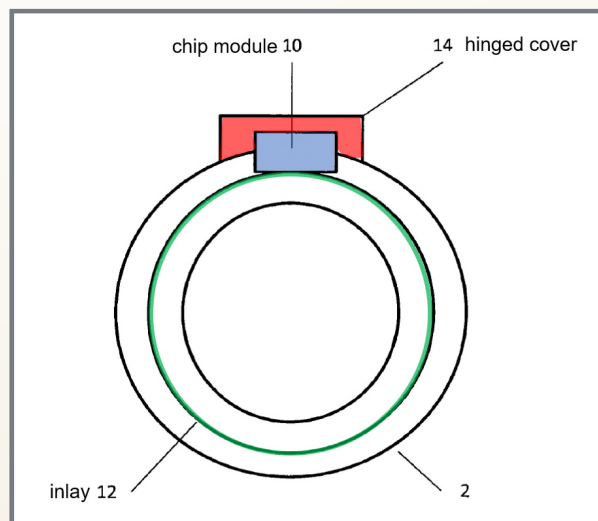
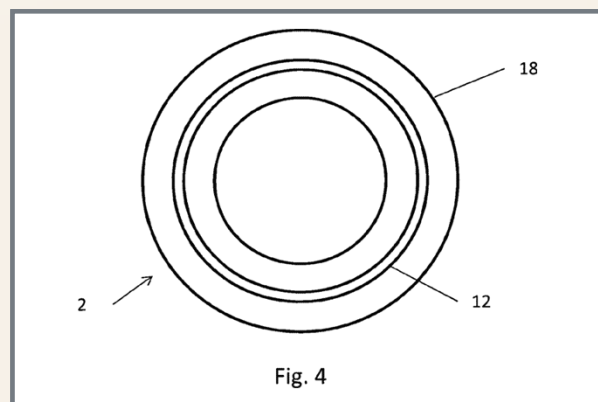
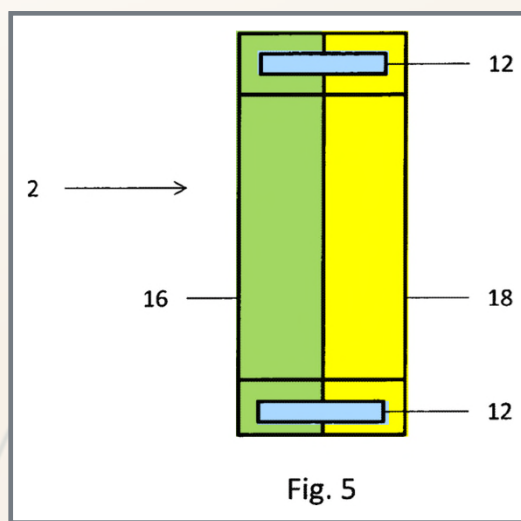
13. The finger-worn wearable ring device of claim 12, wherein the power management module comprises an inductive charging component configured to transfer energy from the external energy source to the battery via an inductive charging process.

Paper 19 at 35-43, Paper 37 at 11-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Claims 12 and 13



- Schröder does not disclose *any position* of a battery, or what such a battery would look like, and fails to disclose any other structural elements of a power management module.
- “Patent Owner is correct that a battery is not shown in any of Schröder’s figures, and there **is no express description of any position, size, or shape of a battery.**”

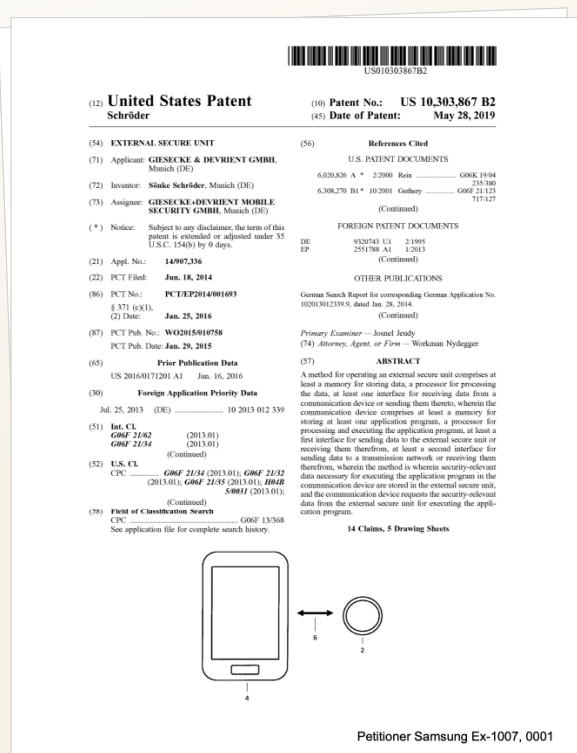
PGR2024-00030 Paper 9 at 20

Ex. 1007 at FIGS. 3-5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Claims 12 and 13

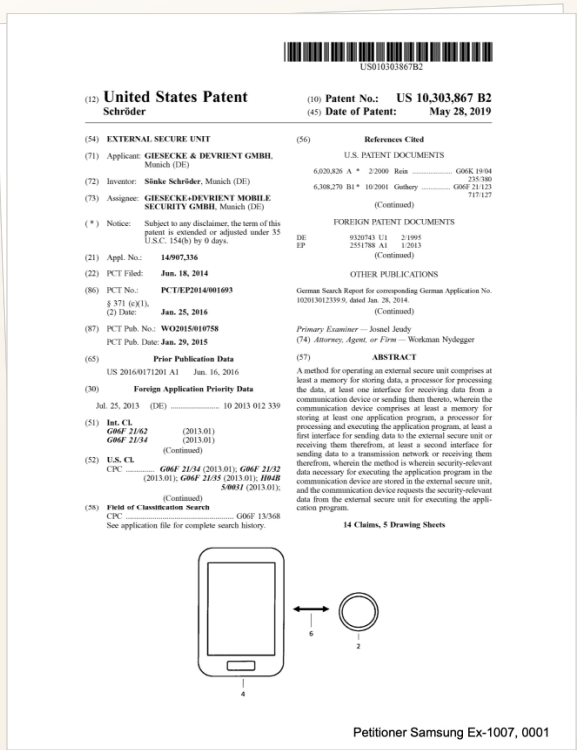


Ex. 1007 at 4:63-5:9

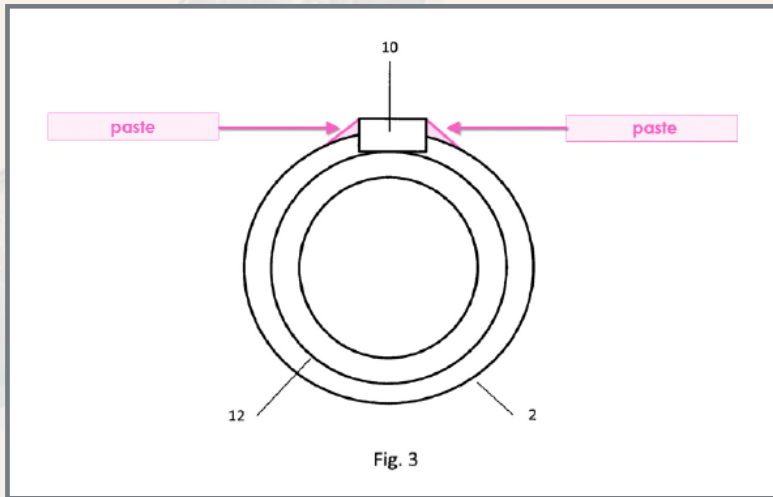
Smart cards can generally be easily forgotten or lost, and are a nuisance to a user due to their increasing number. Known finger-rings or wristbands with an RFID function are employed merely for identification, and not connected to further services. RFID wristbands and corresponding watches can be poorly employed for authentication with a communication device, since they are usually outside the range of an NFC reader. RFID rings or RFID tags with a conventional ring-shaped antenna can hardly be employed, since the coupling position of the antennas is very unfavorable between an RFID finger-ring and an RFID reader when employing a communication device, since the arrangement is orthogonal when the user holds the communication device in his hand.

Schröder Fails To Disclose Limitation Claims 12 and 13

Ideally, a ring blank has a uniform thickness over its total length, in order to avoid later steps or shoulders. Should steps or shoulders nevertheless arise e.g through the chip module **10**, said steps or shoulders can be compensated by applying a paste which is e.g. thermally or UV-curing.

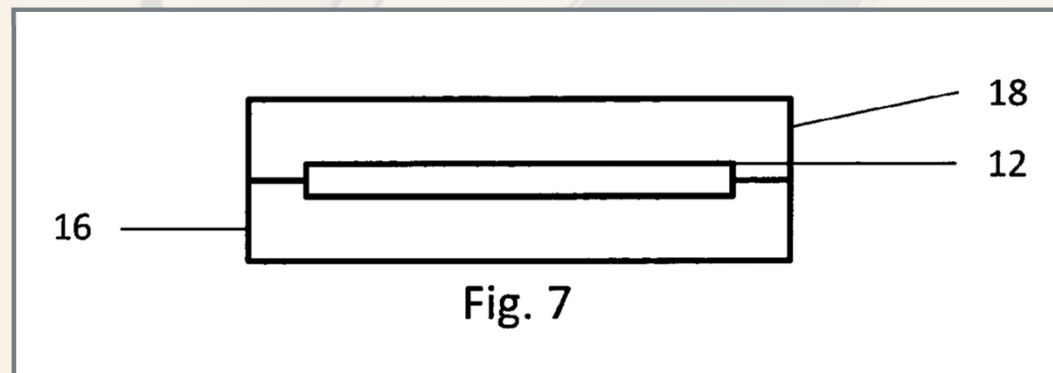


Ex. 1007 at Fig. 3 (modified), 14:9-13



Schröder Fails To Disclose Limitation Claims 12 and 13

- Q. So how big is the battery or what's the size of the battery that's occupying the second half of the rectangle in Figure 7? Would a POSITA know that?
- A. A POSITA would size the battery appropriately for the function that they were trying to accomplish.



*Paper 19 at 39-40
Ex. 2020 at 214:7-13; Ex. 1007 at Fig. 7.*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Limitation Claims 12 and 13

- Q. Reading Schröder, can you draw any conclusion about what size battery -- I'll say what size and capacity of battery you would need to accomplish the functions described in Schröder?
- A. Well, again, it's silent on the particular capacity. But in an embodiment, for example, that uses a battery, it would depend on how long you wanted that device to maintain charge and function in those active situations.

*Paper 19 at 40
Ex. 2020 at 162:14-22.*

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Claims 12 and 13

Q. Have you in your work on this case attempted to find whether there was a battery available in 2013 that was appropriate to fit in Schröder as you've proposed?

A. I did not find it necessary to do that, no.

*Paper 19 at 39, 50-52
Ex. 2021, 321:5-10*

Schröder Fails To Disclose Limitation Claims 12 and 13

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

OURARING, INC.,
Patent Owner.

Case PGR2024-00039
U.S. Patent No. 11,874,702

DECLARATION OF DR. PATRICK MERCIER

Patent Owner Oura Ex. 2018, 0001

Ex. 2018 at ¶ 113.

113. But without knowing the size of the battery, it is entirely conclusory of Dr. Anthony to suggest that the skilled artisan would place the battery, power management module, and all associated circuitry, which according to Dr. Anthony, included a rectifier, chip module 10, a battery, *and* the antenna, within half of the cavity. Ex. 2021 at 428:13-18; 426:10-429:12. Beyond the passive RFID authentication functionalities of Schröder, the additional proposed functionalities of Schröder would add significant power requirements and thus impact the size of the power management module, and in turn impact the placement of these components on the ring. Dr. Anthony agrees. Ex. 2020 at 162:14-163:11 (“[Schröder is] silent on the particular capacity . . . you start talking about these further embodiments that are taught, power requirements build up.”); *Id.*, at 166:11-19 (“as is envisioned in Schröder there are embodiments that include very power hungry things like display units.”).

Paper 19 at 39-40

POSITA Would Apply Teachings Of Prior Art



Figure 8-1 First Prototype Ring Sensor

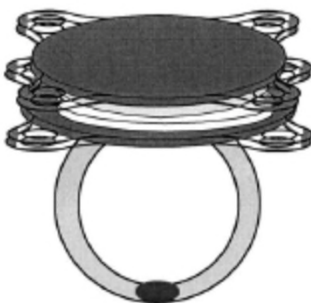


Figure 8-2 Ring Sensor with One or Two Circuit Boards

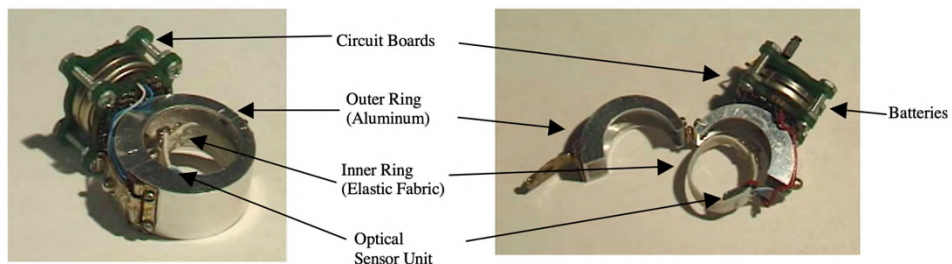


Figure 1 : Isolating ring sensor designed for motion artifact minimization

Ex. 1002, ¶ 67 (Citing Ex. 1035)

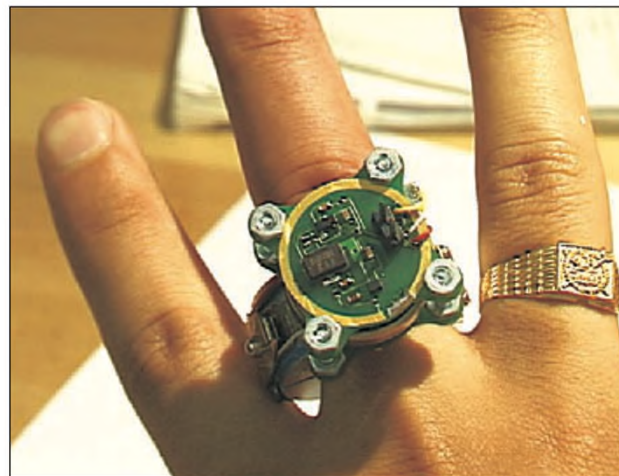


Fig. 9. First prototype ring sensor with RF transmitter powered by a coin-size cell battery.

Ex. 2018, ¶¶ 63-65

Paper 19 at 40-41

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

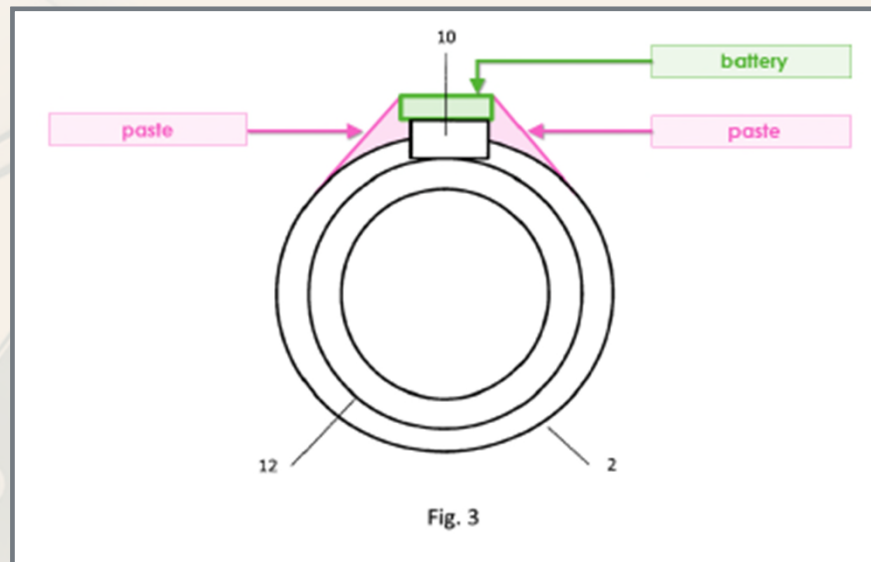
133

POSITA Would Apply Teachings Of Prior Art

- A. And in the 2012-2013 time frame, as I was beginning to launch the center, we were looking at all sorts of different types of wearable device form factors. I was aware of smart ring designs, including, you know, the designs by Professor Harry Asada at MIT, in part because that's where I went to grad school, and I met with him there.

And when I was trying to look at different types of wearables I could potentially make within my center, I had considered designing a wearable smart ring, and I had done some exploration on what would need to go into, you know, the design of such a ring to make it small and comfortable and so on for a user to wear.

And I very quickly concluded that the most logical way to build such a device was to follow the prior art, including Professor Asada's and the other art that I found in the literature on this topic, and place the battery at the top of the device, as all the other prior art did, simply because there's just not enough room in kind of the body, if you will, of the ring that goes around the sides and the bottom of the finger, while making the user comfortable.



Ex. 1081 at 35:16-36:12
Paper 19 at 43



Deficiencies of Ground 2: Schröder + LeBoeuf

PGR2024-00039

A POSITA Would Not Combine Schröder With LeBoeuf

Devices have different functions (physiological sensing vs. security)

Schröder is a Ring, LeBoeuf's main embodiment is an earbud, one figure depicts a ring

It would require a major redesign to Schröder's housings to incorporate LeBoeuf's light guiding region. There is no space to fit LeBoeuf's additional emitters, larger battery required due to increased power draw, and associated circuitry.

No evidence LeBoeuf's light guiding region would improve vein pattern detection

Petitioner's arguments that LeBoeuf's flat circuit board is compatible with Schröder's ring (Page 27 at 15-16) was not included in the petition (See Grounds 2 and 5 motivation to combine Schröder and LeBoeuf. Paper 3 at 35-36, 63-66)

Paper 19 at 44-45; Paper 37 at 15-16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Deficiencies of Ground 3: Schröder + LeBoeuf + Niwa

PGR2024-00039



A POSITA Would Not Combine Schröder + LeBoeuf With Niwa

Rings have different functions (plethysmography vs. security)

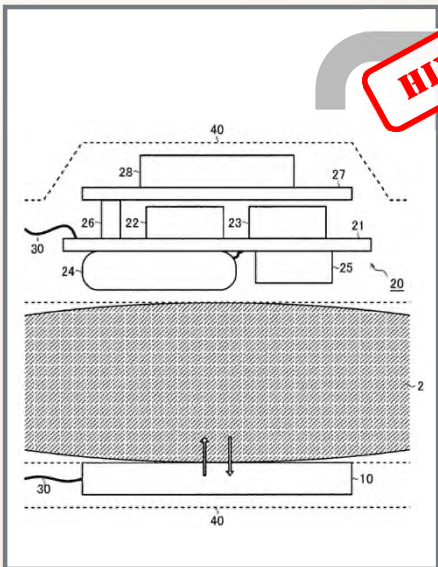
Rings include different components (e.g., PPG vs. NFC)

No reasonable expectation of success of using Schröder's housings with Niwa's ring.

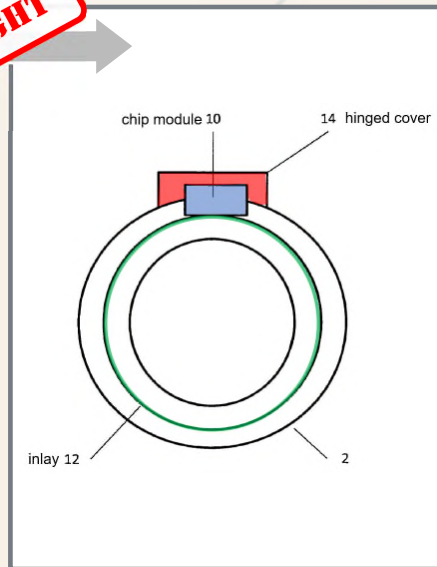
Niwa's components cannot fit in Schröder's inlay

A POSITA Would Not Combine Schröder With Niwa

HINDSIGHT



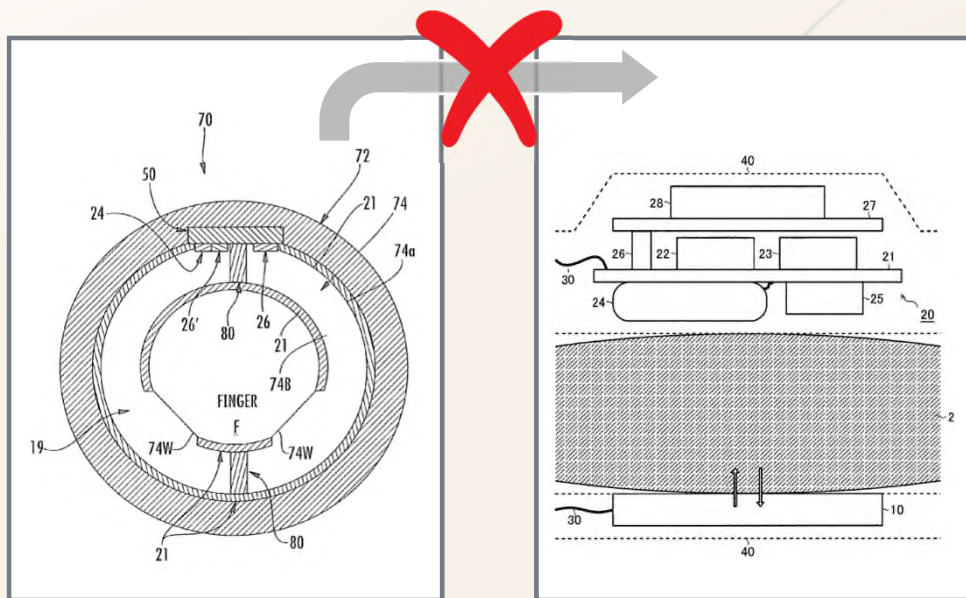
Ex. 1005 (Niwa), FIG. 28, [0219]



Ex. 1007 at FIG. 3

- Niwa's second unit contains memory, battery, charging circuit, wireless communication circuit, and multiple substrates.
- Niwa discloses using "stack layer construction" to fit all these components within a ring. A POSITA would mount Niwa's components with chip module 10
- By contrast, a POSITA would recognize that the inlay in the rings of Schröder could be simple and thin, with as little as an antenna and chip module on top of the ring.
- A POSITA would not have considered fitting those components into a housing such as those disclosed in Schröder to have been a simple task.
 - No motivation to combine
 - No reasonable expectation of success

A POSITA Would Not Combine LeBoeuf With Niwa



Ex. 1012 (LeBoeuf) FIG. 22B

Ex. 1005 (Niwa), FIG. 28, [0219]

- LeBoeuf teaches the use of a light guiding region that directs light through channels to a window.) (“The inspection light 111 generated by the optical emitter 24 passes isotropically into the light guiding region 19 through the windows 16w.”)
- Petitioner argues that Niwa’s window should be added to the Schröder + LeBoeuf combination so that the window contacts and covers the light emitting elements.
- A POSITA would not redesign the Schröder + LeBoeuf combination to remove LeBoeuf’s light guide, its most prominent feature.
 - LeBoeuf, is titled “Light-Guiding Devices and Monitoring Devices Incorporating Same.”
 - All of LeBoeuf’s embodiments employ a light guiding feature



Deficiencies of Ground 4: Schröder + Mestas

PGR2024-00039



A POSITA Would Not Combine Schröder With Mestas

Devices have different functions (physiological vs. security)

Devices include different components and different power requirements

Mestas' device is worn on the wrist. Mestas only considers deploying the device on large parts of the body. (chest, arm, head, ankle, or thigh)

Mestas' components cannot fit in Schröder's inlay

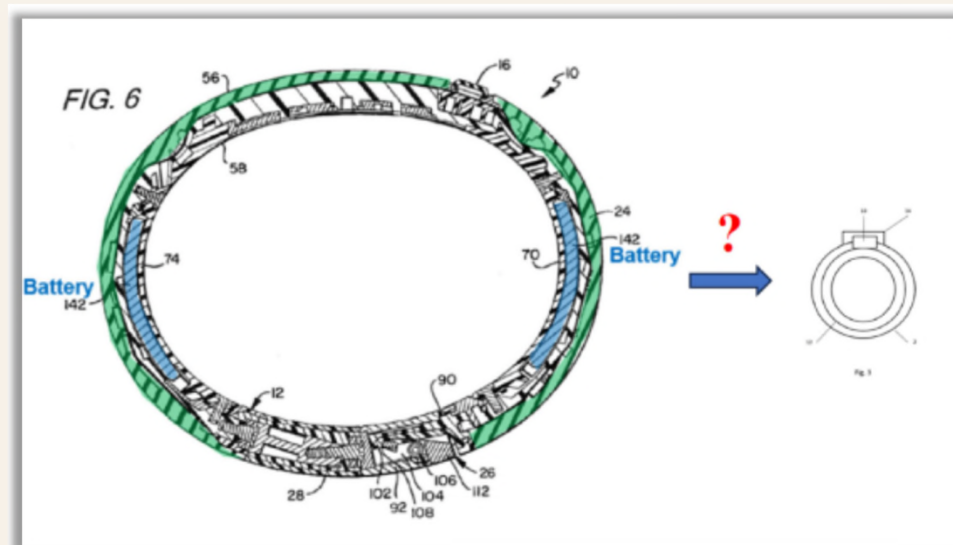
A POSITA Would Not Combine Schröder With Mestas

Q. Doctor, I'm talking about the battery of Figure 6. How much smaller would you have to make it too have it fit in the ring? ... How big a scaling factor would you be comfortable that would require to—that would be required to fit that in a ring?

A. Some place between 5 and 10 – with that not having calculated it.

Q. Have you in your work on this case attempted to find whether there was a battery available in 2013 that was appropriate to fit in Schröder as you've proposed?

A. I did not find it necessary to do that, no.



Ex. 1010, FIG. 6

Paper 19 at 49-54

Ex. 2021 at 312:16-313:12; 321:5-10

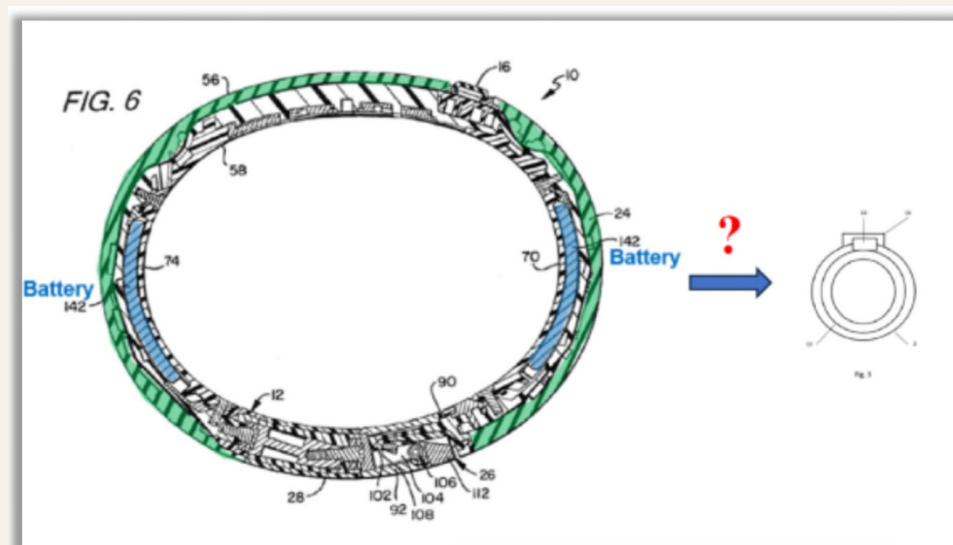
A POSITA Would Not Combine Schröder With Mestas

Q. In 2013 when you were working on this ring design, were you aware of any off-the-shelf curved batteries that would work for a ring form factor that you were designing?

A. There were curved cells, but I – to my recollection, there weren't any that would be drop-linked for our application.

Q. Could a curved cell for a wrist wearable work for a ring form factor?

A. If the ring was very, very, very big, but for our application, the sizes of the other wearables that were out there were nowhere near where we needed them to be. Capacity was great, but the size was just massive. There was no way it would work.



Ex. 1010, FIG. 6
Paper 19 at 49-54
Ex. 2024, 188:4-17



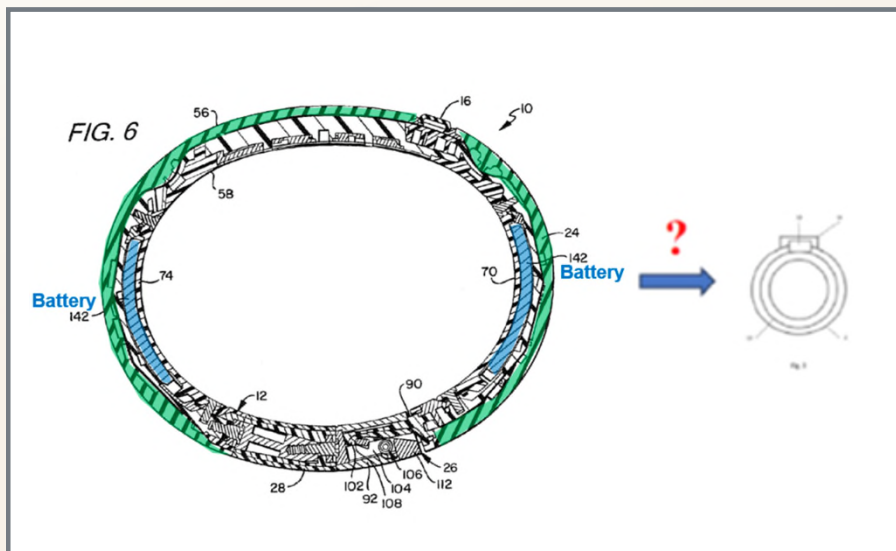
A POSITA Would Not Be Able to Miniaturize Mestas

141. The power requirements of Schröder and Mestas would also be different, given that Mestas is constantly monitoring health conditions and Schröder only takes vein pattern images in a security validation event. Given the typically low power requirements of Schröder's intended RFID and NFC applications, and its description of the battery as optional, a POSITA would not be motivated to combine the references, or have a reasonable expectation of success in doing so. Indeed, as

142. Dr. Anthony also neglects to address the fact that unlike coin or button cells, flexible or curved batteries include flexible packaging materials such as aluminum laminated films that house the electrodes and electrolyte. Ex. 2026. Thus even if the battery itself could be miniaturized—and there is no evidence in the record that such miniaturized batteries with the required power requirements existed—a curved cell would have required a POSITA to separately address the issue of battery packaging that also requires real estate which is already limited when designing a finger-worn wearable ring device.

Ex. 2018, (Dr. Mercier) at ¶¶ 141-142

Schröder + Mestas Does not Teach Claims 16 and 17



Ex. 1010 at Fig. 6; Ex. 1007 at Fig. 3.

- Fitting Mestas's battery, that is 5-10 times to large for Schröder, would require a complete redesign of both prior art references.
- Patent Owner argued during prosecution that there is no teaching within Weast (same figures and battery as Mestas) to combine it with a ring form factor. Ex. 2008. The Examiner withdrew the rejection.

**Deficiencies of Grounds 5-7:
LeBoeuf + Schröder
LeBoeuf + Schröder + Niwa
LeBoeuf + Schröder + Mestas**

PGR2024-00039



A POSITA Would Not Combine Schröder With LeBoeuf

Devices have different functions (physiological sensing vs. security)

Schröder is a Ring, LeBoeuf's main embodiment is an earbud, one figure depicts a ring

It would require a major redesign to Schröder's housings to incorporate LeBoeuf's light guiding region. There is no space to fit LeBoeuf's additional emitters, larger battery required due to increased power draw, and associated circuitry.

No evidence LeBoeuf's light guiding region would improve vein pattern detection

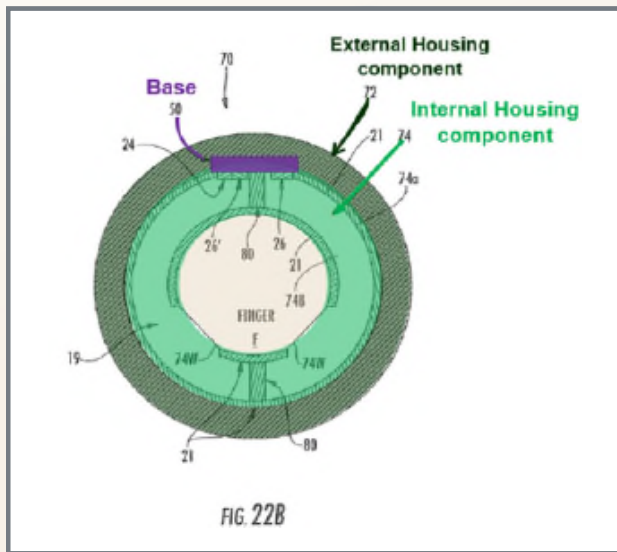
Petitioner's arguments that LeBoeuf's flat circuit board is compatible with Schröder's ring (Page 27 at 15-16) was not included in the petition (See Grounds 2 and 5 motivation to combine Schröder and LeBouef. Paper 3 at 35-36, 63-66)

Paper 19 at 44-45, 56-57; Paper 37 at 15-16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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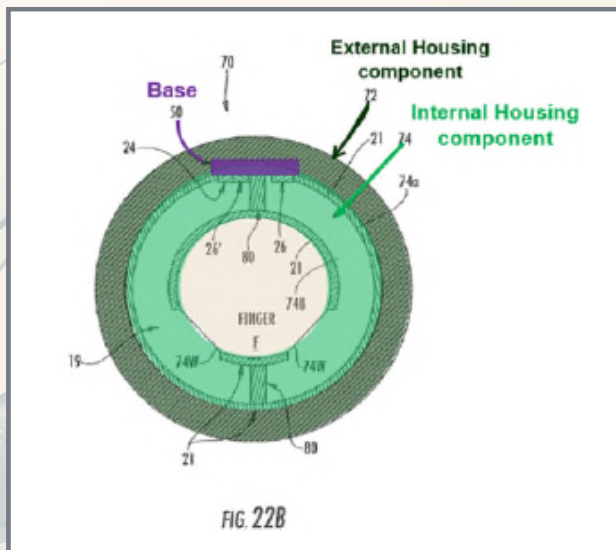
LeBoeuf + Schröder does not render obvious limitation 1[b] and 1[c]



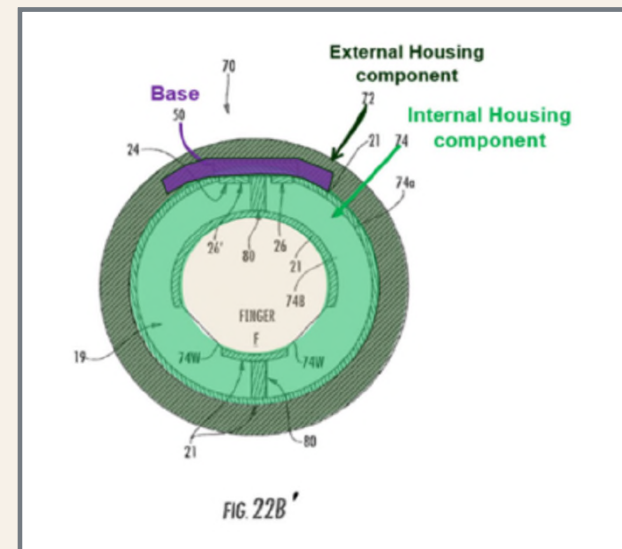
Ex. 1012 at Fig. 22B (modified)

- LeBoeuf does not have a cavity between the internal and external housing portions.
- If Base 50 is construed to be a cavity between the internal and external portions it is flat and does not conform to an arc.
- A POSITA would not look to Schröder's PET strip carrier foil as a reason to curve LeBoeuf's PCB

LeBoeuf + Schröder does not render obvious limitation 1[b] and 1[c]



Ex. 1012 at Fig. 22B (modified)



Ex. 1012 at Fig. 22B' (modified)

A 3D illustration of an Oura ring, shown from a side-on perspective, highlighting its sleek, metallic design and the internal components visible through the band.

IPR2024-00928 Demonstratives

Samsung Electronics et al. v. Ouraring

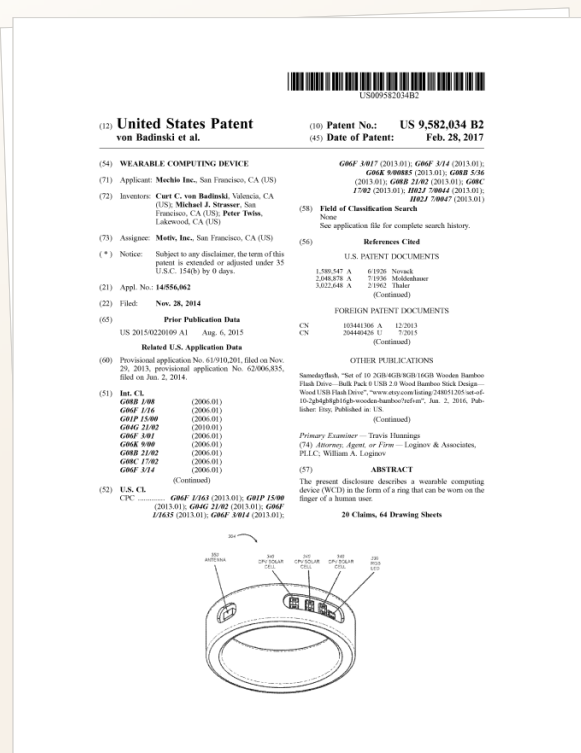
PGR2024-00030; PGR2024-00039; IPR2024-00928

September 11, 2025

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Overview of the '034 Patent



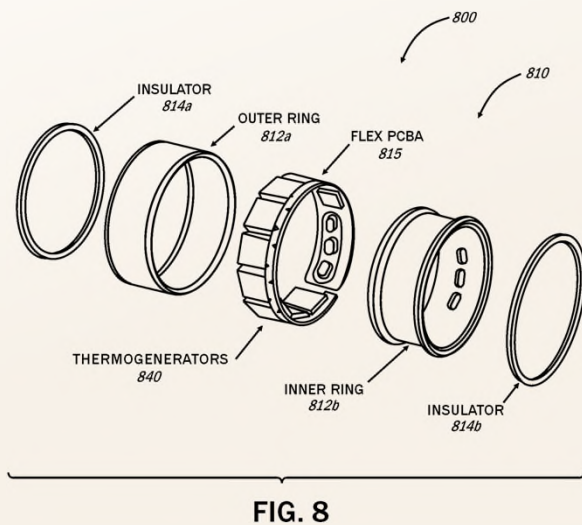
Ex. 1001

- **Title:**
Wearable Computing Device
- **Priority Date:**
November 29, 2013
- **Challenged Claims:**
1-5, 11-13, 16-18

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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The '034 Patent Claims 11-13



Ex. 1001 at Fig. 8

11. A wearable computing device, comprising:
 - an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user;
 - a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing;
 - at least one component disposed on the flexible printed circuit board; and
 - an external housing portion defining a second enclosing structure, the external 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 housing.
12. The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.
13. The wearable computing device of claim 12, wherein the at least one component comprises at least one LED configured to emit at least one of visible light, infrared radiation, and ultraviolet radiation through the external potting.

Paper 15 at 21-28; Paper 23 at 14-15



The '034 Patent: Summary of Grounds

1	Schröder (Claims 1-5, 11-13 16-18)
2	Schröder/Yuen (Claims 1-5, 11-13 16-18)
3	LeBoeuf (Claims 1, 2, 11, 16-18)
4	LeBoeuf/Wissmar (Claims 4, 5)



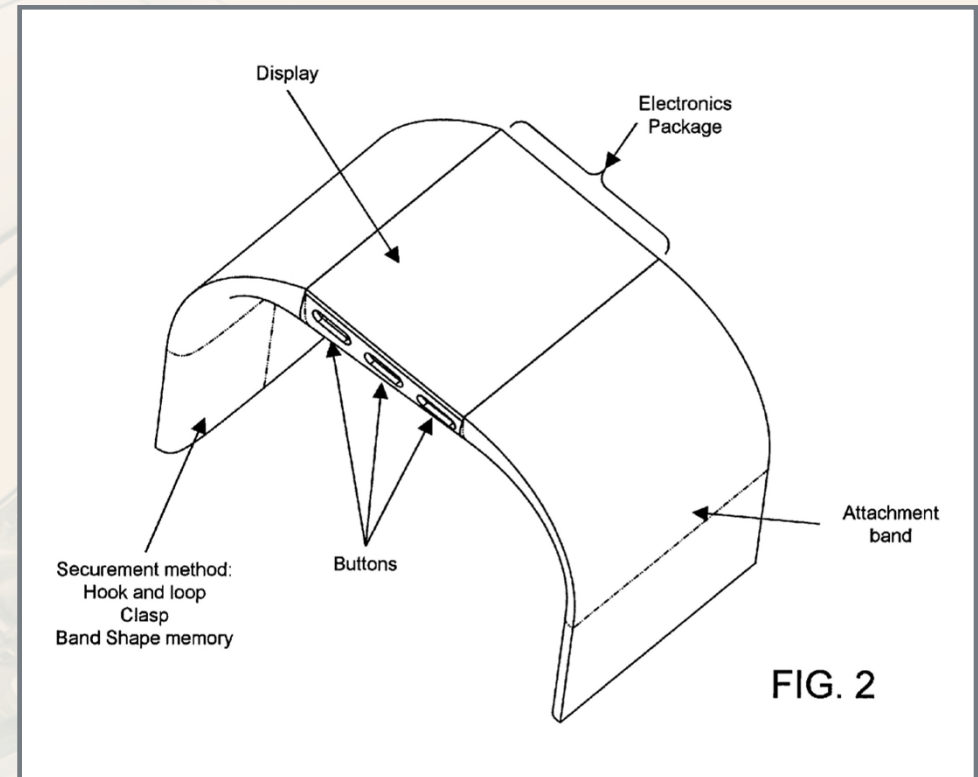
Deficiencies of Ground 1/2: Schröder Schröder/Yuen

IPR2024-00928



A POSITA Would Not Combine Schröder With Yuen

- Ring vs. wristband
- Form factor 5-10 times too large
- Electronics package is flat and planar
- Power requirements are incompatible



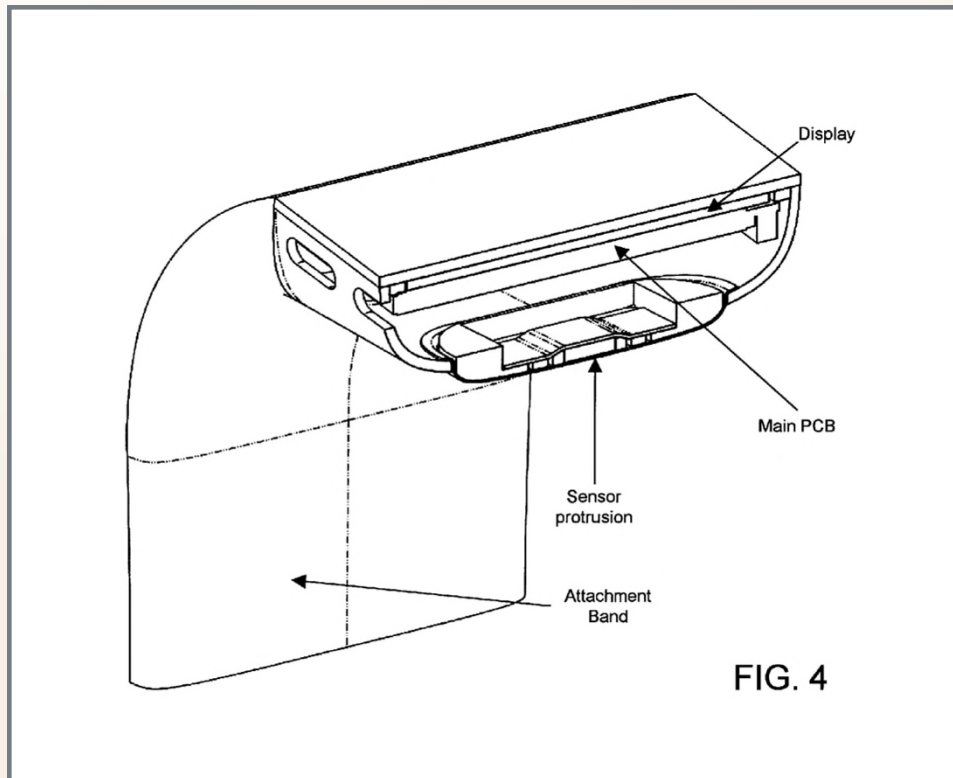
Ex. 1006 at Fig. 2

Paper 15 at 17-20; Paper 23 at 12-13

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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A POSITA Would Not Combine Schröder With Yuen



Ex. 1006 at Fig. 4

177. Petitioner's reasons for applying Yuen's PCB to Schröder is also lacking. No reason is given why Yuen's too large and planar PCB would offer any advantage over the inlay for the security application of Schröder. Petitioner argues that "PCBs are lightweight, save space, and are easier to assemble into curved constructions." Pet. at 55. The PCB taught by Yuen, however, certainly would not save any weight or space in Schröder's ring, nor does Petitioner point to any teaching as to how one would adapt the PCB of Yuen to an appropriate size and shape for a ring—especially given Yuen's statement that its device "is adapted" to a "size and shape" for much larger body parts. Ex-1006, 12:50-52. I see no advantage to attempting to adapt the PCB of Yuen to Schröder since Schröder already discloses inlay 12. Nor would a POSITA look to use the much too large PCB of Yuen in Schröder.

Paper 15 at 17-20; Paper 23 at 12-13

Schröder + Yuen Fail To Disclose Limitation 11[d]

- Petitioner defines each of Schröder's ring halves to have an internal housing portion and an external housing portion. In other words, there are two identical enclosing structures that are each defined by internal housing portions and external housing portions.
- But, 11[a] requires the internal housing portion to define a first enclosing structure, and 11[d] requires the external housing portion to define a second enclosing structure

11. A wearable computing device, comprising:

an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user;

a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing;

at least one component disposed on the flexible printed circuit board; and

an external housing portion defining a second enclosing structure, the external 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 housing.
12. The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.
13. The wearable computing device of claim 12, wherein the at least one component comprises at least one LED configured to emit at least one of visible light, infrared radiation, and ultraviolet radiation through the external potting.

Paper 15 at 21-28; Paper 23 at 14-15



Schröder's "Ring Halves"

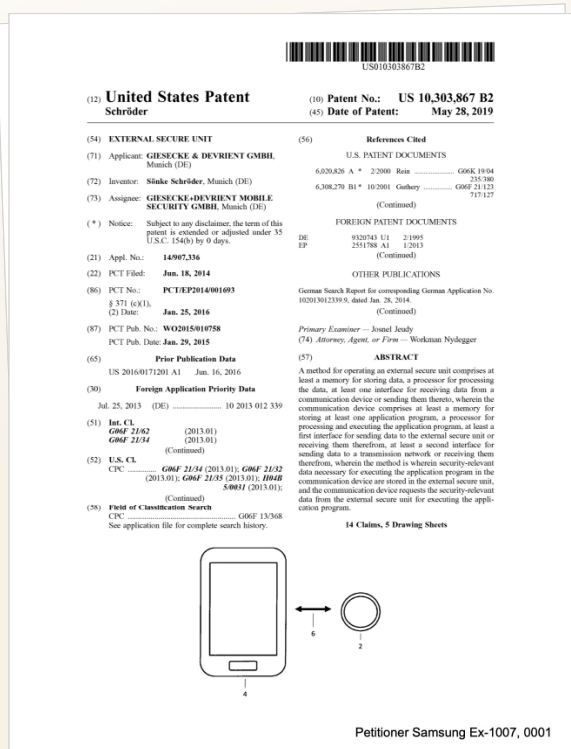
FIG. 3 shows a finger-ring according to the invention having an insertable chip module with a cover.

FIG. 4 shows a longitudinal section through a finger-ring as an example of an external secure unit.

FIG. 5 shows a cross section, corresponding to FIG. 4, of the finger-ring.

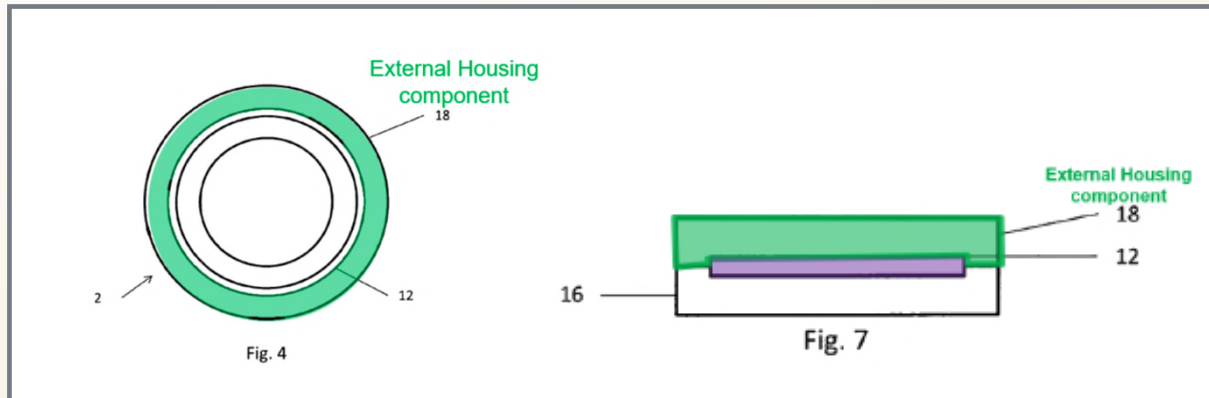
FIGS. 6 to 10 show different cross sections through a finger-ring.

FIGS. 6 to 10 show different cross sections through a finger-ring 2, consisting of ring-shaped components 16, 18 of the finger-ring 2 and of an inlay 12. FIG. 6 shows a cross section with the components 14 and 16 having an L-shaped profile. Between the two L-shaped components 16 and 18 an inlay 12 is arranged. FIG. 7 accordingly shows two U-shaped components 16 and 18 between which an inlay 12 is arranged. FIG. 8 shows a U-shaped component 18 and an even component 16, with the inlay 12 being arranged between the components 16 and 18. FIG. 9 shows two even components 16 and 18 between which the inlay 12 is arranged. FIG. 10 shows an L-shaped component 18 and an even component 16 between which the inlay 12 is arranged.

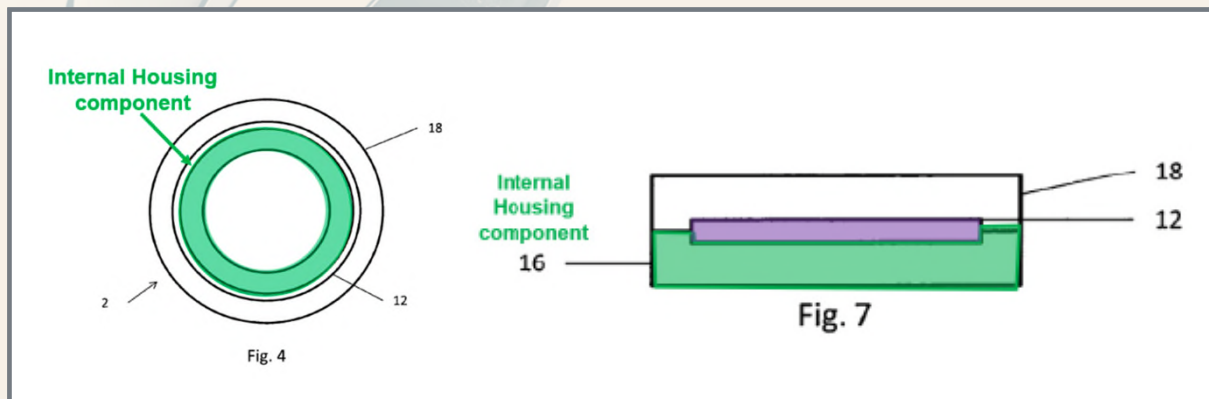


Paper 23 at 6-10
Ex. 1007, 3:45-52; 12:43-55

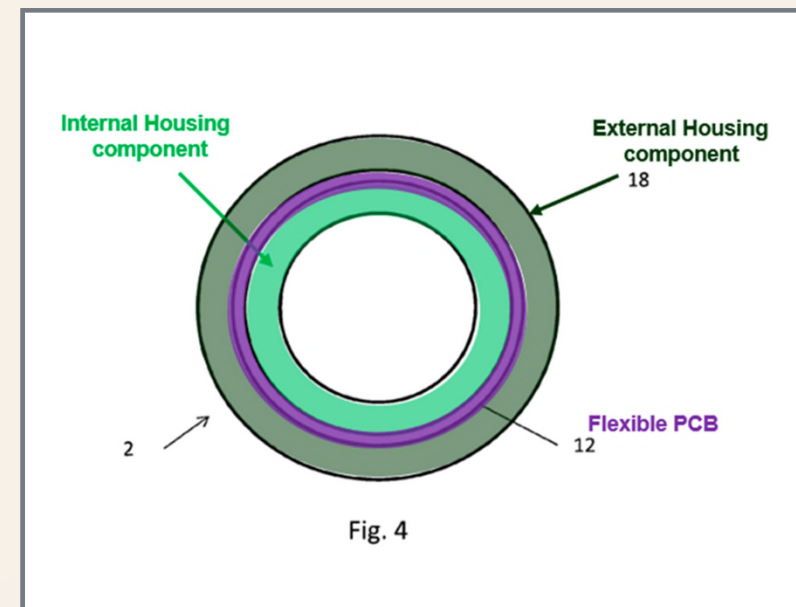
Schröder's "Ring Halves" According to Petition



Paper 3 at 23



Paper 3 at 21



Paper 3 at 24

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder's "Ring Halves"

A. And a good analogy for this would be thinking like a bagel. The normal dimension that you would cut a bagel is in half. You would open up the bagel. To complete the analogy, maybe you'd use your finger and dig a little trench into one half of the bagel or possibly both sides of the bagel, put some cream cheese in here, which would correspond in this analogy to the inlay, and then take those two halves and bring them back together. That's my interpretation of the ring halves of figure 4.

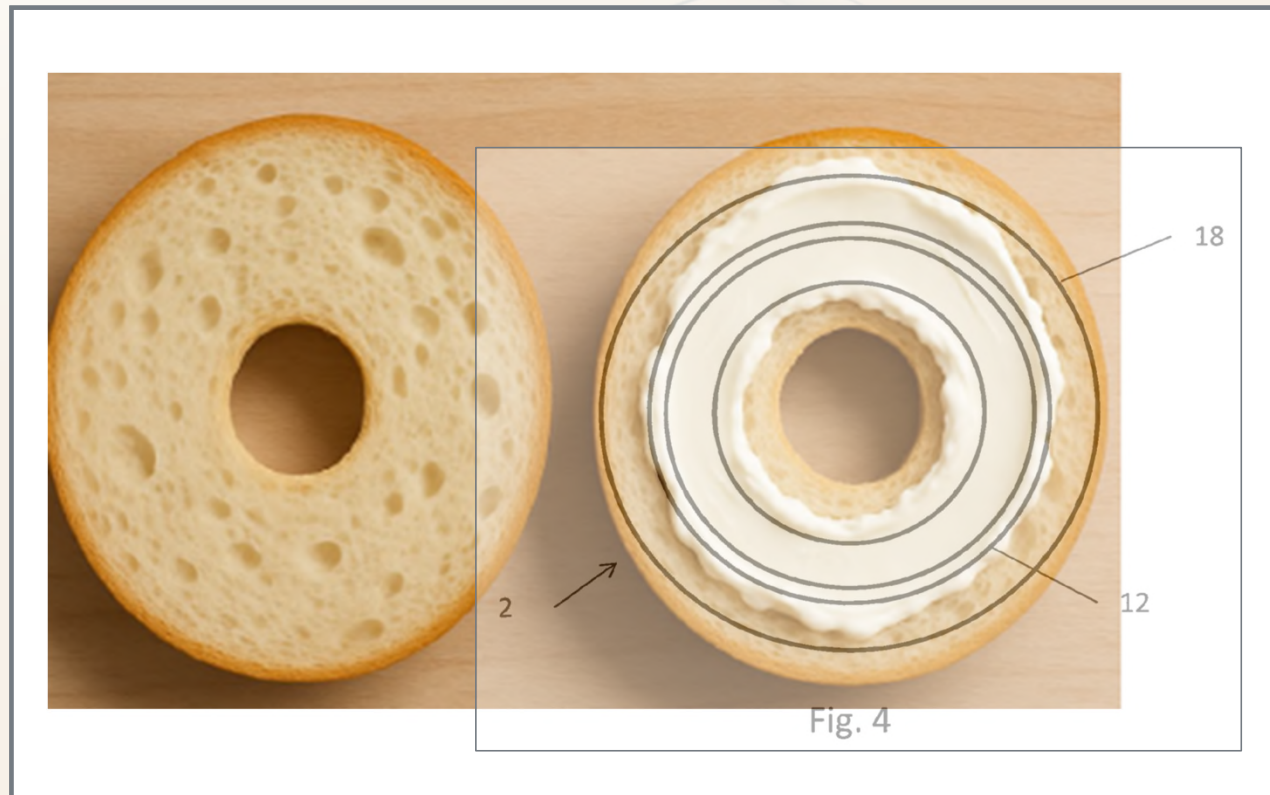
Q. I think that's what's shown here in figure 5. This is kind of the bagel interpretation.

A. Exactly.

*Paper 23 at 7-8
Ex. 1081 at 83:2-14*



Schröder's "Ring Halves"



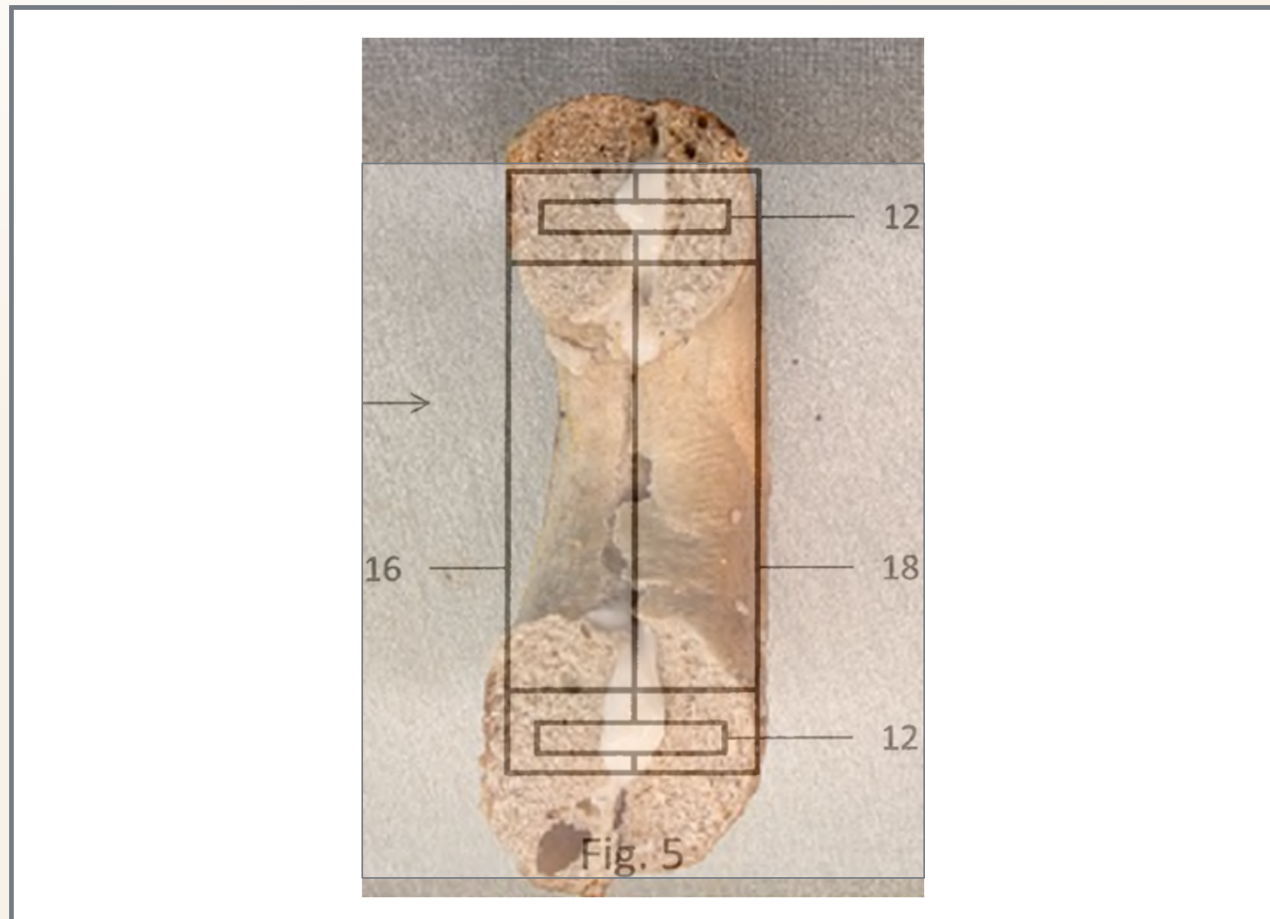
Paper 23 at 6-10; Ex.1007 at Fig. 4

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder's "Ring Halves"



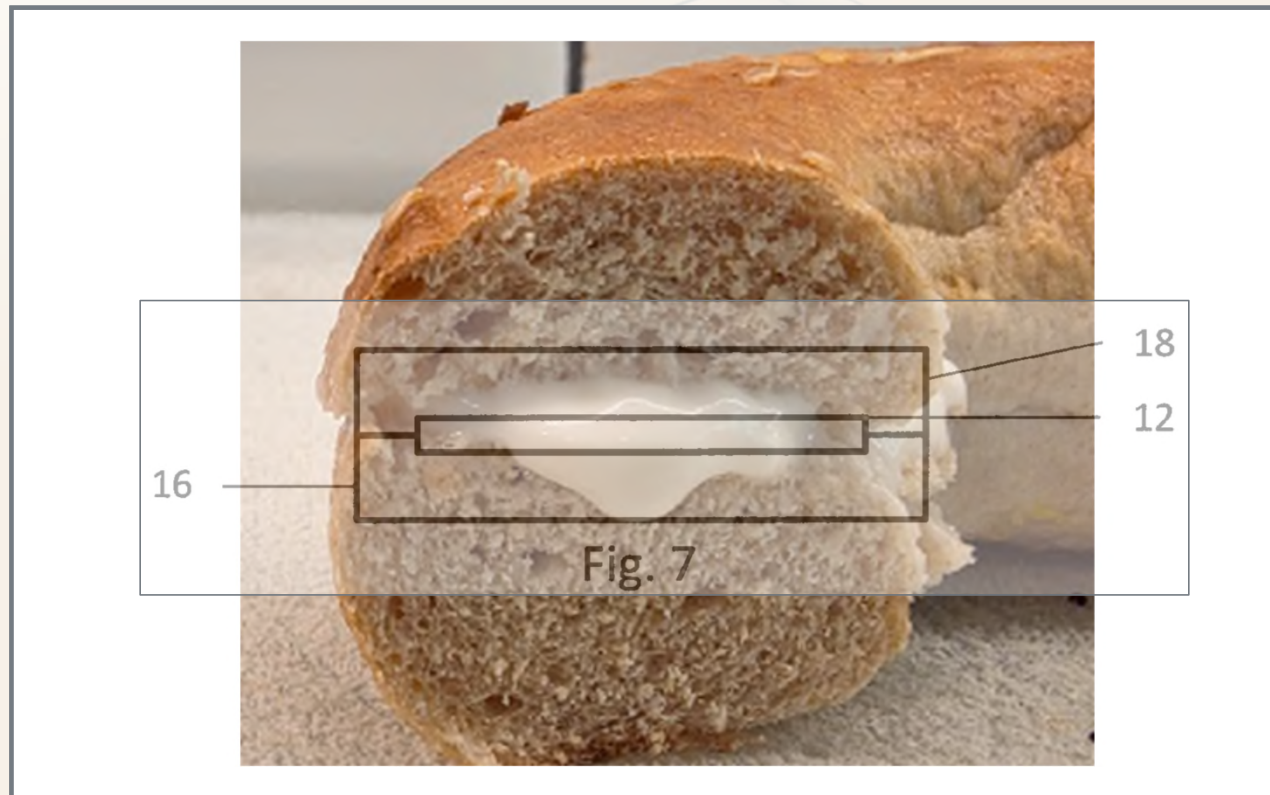
Paper 23 at 6-10; Ex. 1007 at Fig. 5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder's "Ring Halves"



Paper 23 at 6-10; Ex. 1007 at Fig. 7

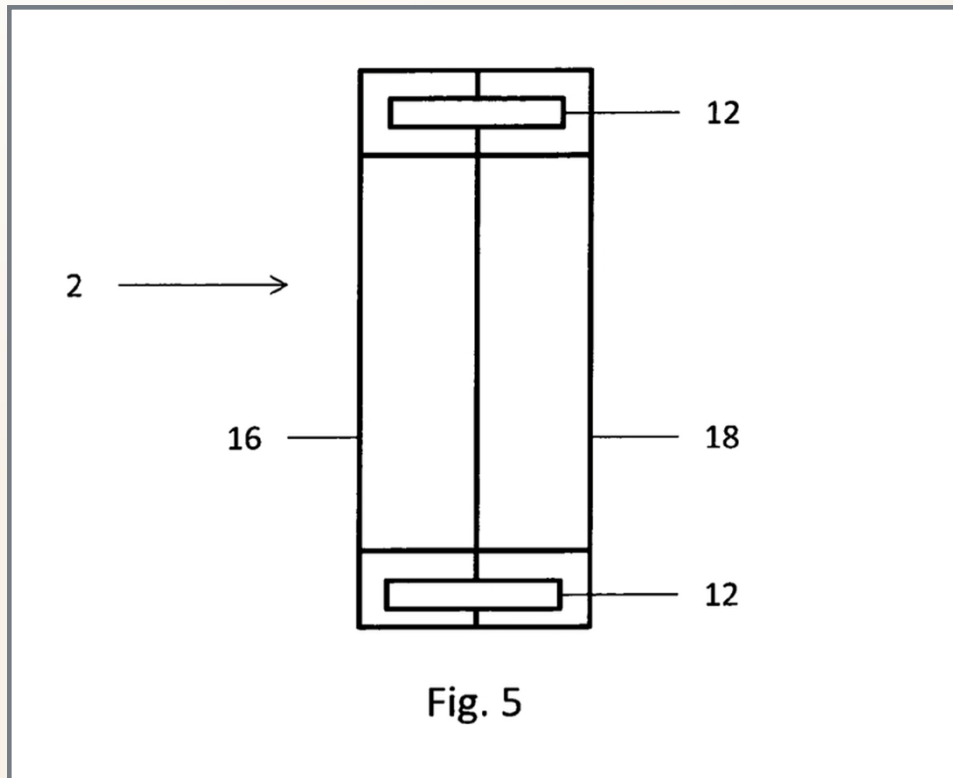
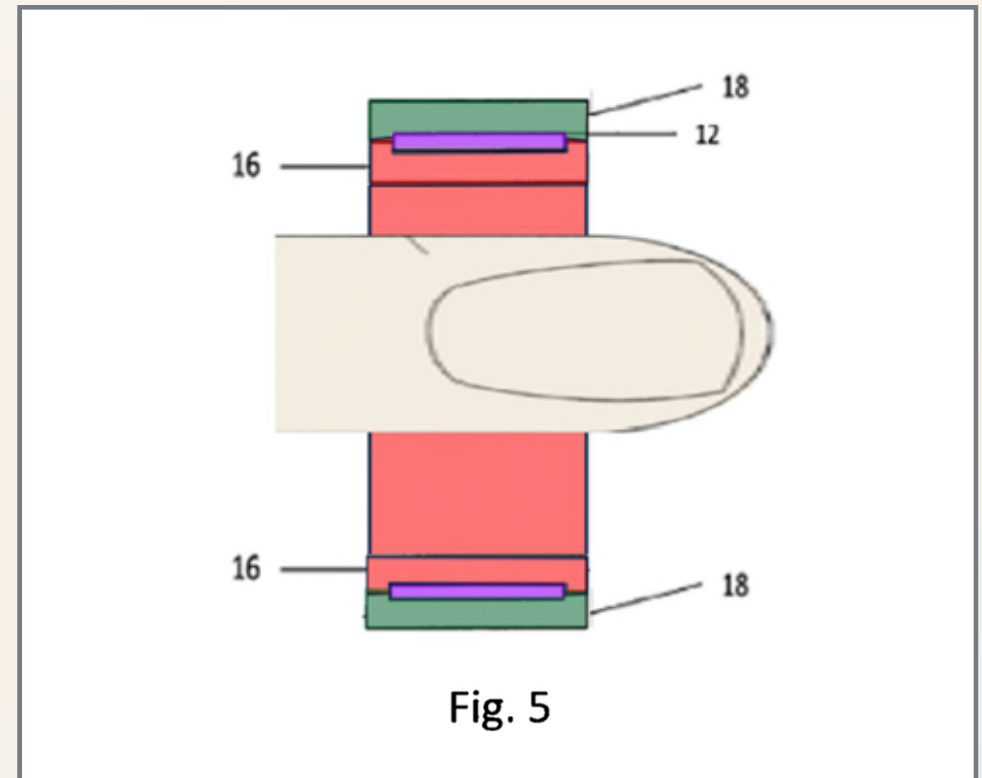
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner Oura Ex. 2119, 164



Petitioner's Modification of Schröder



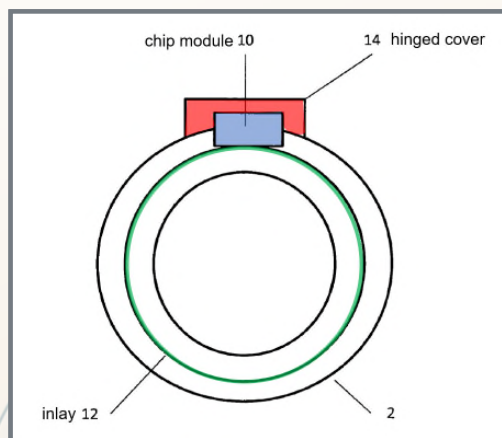
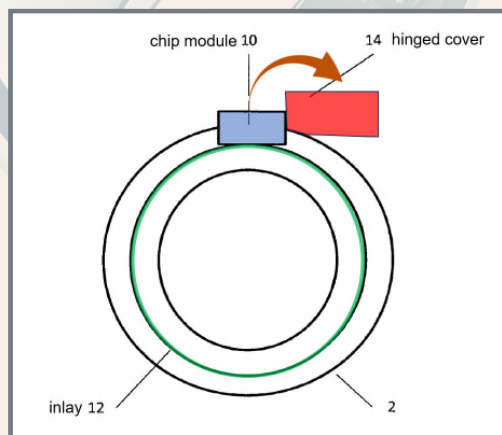
Ex. 1007 at Fig 5; Paper 19 at 3

Schröder + Yuen Fail To Disclose Limitation 11[d]

11. A wearable computing device, comprising:
 - an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user;
 - a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing;
 - at least one component disposed on the flexible printed circuit board; and
 - an external housing portion defining a second enclosing structure, the external 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 housing*.
12. The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.
13. The wearable computing device of claim 12, wherein the at least one component comprises at least one LED configured to emit at least one of visible light, infrared radiation, and ultraviolet radiation through the external potting.

Paper 15 at 26-28; Paper 23 at 13-15

Schröder Fails To Disclose Limitation 11[d]



Ex. 1007 at Fig. 3 (modified)

- Schröder's rings chip module is located *outside* and above the ring so it can be replaced

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

Ex. 1007 at 8:54-56

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

Paper 15 at 26-27

Ex. 1007 at 8:60-63

Schröder Fails To Disclose Limitation 11[d]

U.S. Patent No. 9,582,034
Petition for *Inter Partes* Review

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

OURARING, INC.
Patent Owner.

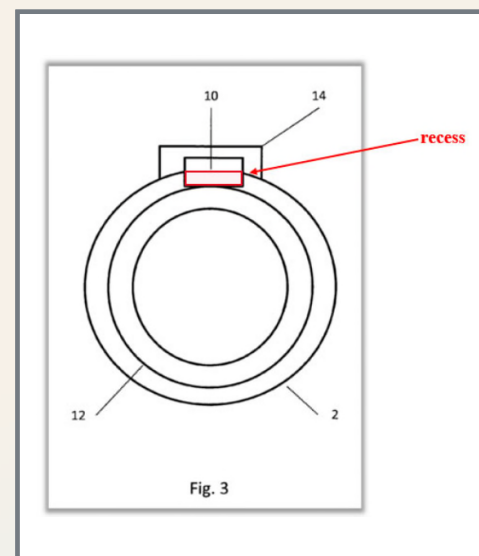
Case No. IPR2024-00928
U.S. Patent No. 9,582,034

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,582,034

Paper 3 at 10
Paper 15 at 26-28

As shown in Figure 7 below in cross-section, Schröder's finger ring consists of "two ring halves 16 and 18" with a recess within which "inlay 12 is inserted." Ex-1007, 12:7-9. Inlay 12 consists of "flexible carrier material" like PET and Kapton and can have a "chip module 10 with at least one antenna coil 8." Ex-1007, 12:28-33, 12:61-65. A battery powers chip module 10 and is charged wirelessly. Ex-1007, 11:46-58. The finger ring also has "biometric sensors" such as an infrared diode and sensor to "capture[,] e.g., at least a partial vein image in the finger while the finger-ring 2 is being pushed over a finger." Ex-1007, 9:62-10:4; Ex-1002 ¶¶134-138.

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



Ex. 1007 at 8:54-61; Fig. 3 (modified)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder Fails To Disclose Limitation 11[d]

US 10,303,867 B2

United States Patent
Schröder

(10) Patent No.: **US 10,303,867 B2**
(45) Date of Patent: **May 28, 2019**

(54) **EXTERNAL SECURE UNIT**

(71) Applicant: **GEISECKE & DEVRIENT GMBH**
Münch (DE)

(72) Inventor: **Stefan Schröder, Münch (DE)**

(73) Assignee: **GEISECKE-DEVRIENT MOBILE SECURITY GMBH, Münch (DE)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(d) by 0 days.

(21) Appl. No.: **14/907,336**

(22) PCT Filed: **Jan. 18, 2014**

(86) PCT No.: **PCT/EP2014/001693**
§ 371 (c)(1),
(2) Date: **Jan. 25, 2016**

(87) PCT Pub. No.: **WO2015/010758**
PCT Pub. Date: **Jan. 29, 2015**

(65) **Prior Publication Data**
US 2016/0171280 A1 Jan. 16, 2016

(30) **Foreign Application Priority Data**
Jul. 25, 2013 (DE) 10 2013 012 339

(51) **Int. Cl.**
G06F 21/62 (2013.01)
G06F 21/34 (2013.01)
(Continued)

(52) **U.S. Cl.**
CPC: **G06F 21/34** (2013.01); **G06F 21/32** (2013.01); **G06F 21/05** (2013.01); **H04B 5/001** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC: G06F 13/368
See application file for complete search history.

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2/2/2000
6,308,270 B4 * 10/2001 Guthe G06F 21/12
7/17/2001
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25/1/1995 AI 1/2013
(Continued)

OTHER PUBLICATIONS

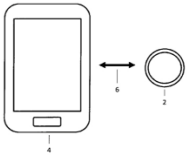
German Search Report for corresponding German Application No. 102013012339-9, dated Jan. 28, 2014.
(Continued)

Primary Examiner—Israel Jeady
(74) Attorney, Agent, or Firm—Wookman Nydegger

ABSTRACT

A method for operating an external secure unit comprises at least a memory for storing data, a processor for processing the data, at least one interface for receiving data from a communication device or sending them thereto, wherein the communication device comprises at least a memory for storing at least one application program, a processor for processing and executing the application program, at least a first interface for sending data to the external secure unit or receiving them therefrom, at least a second interface for sending data to a transmission network or receiving them therefrom, wherein the method is wherein security-relevant data necessary for executing the application program in the communication device are stored in the external secure unit, and the communication device requests the security-relevant data from the external secure unit for executing the application program.

14 Claims, 5 Drawing Sheets

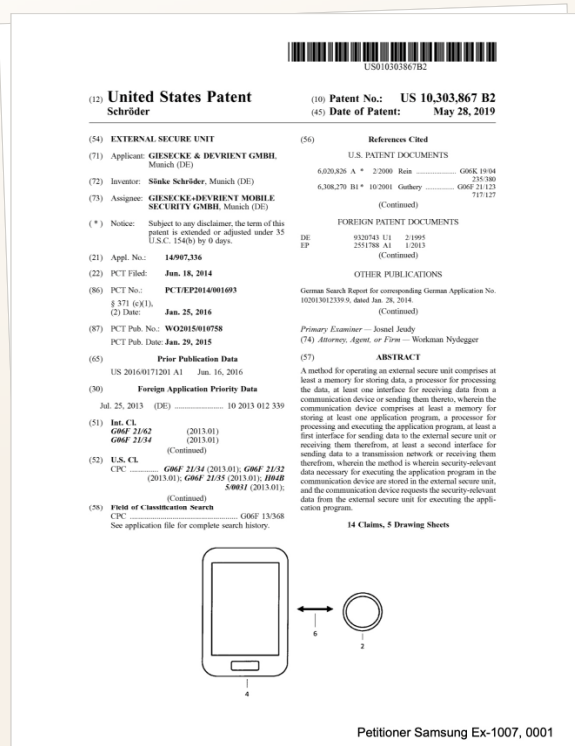


Petitioner Samsung Ex-1007, 0001

Paper 15 at 27-28
Ex. 1007 at 12:61-65

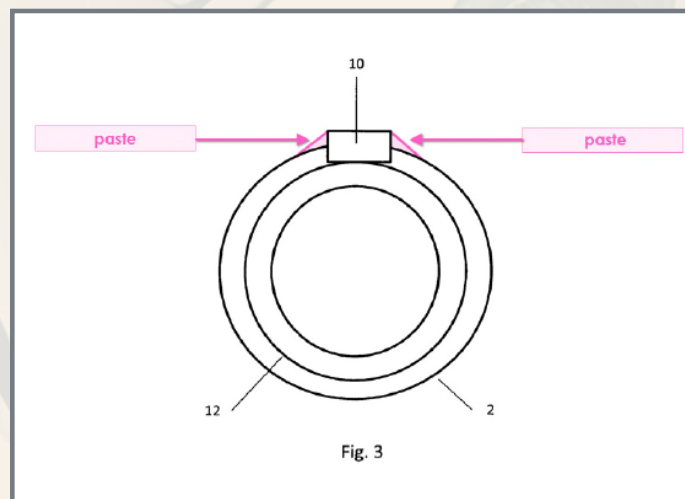
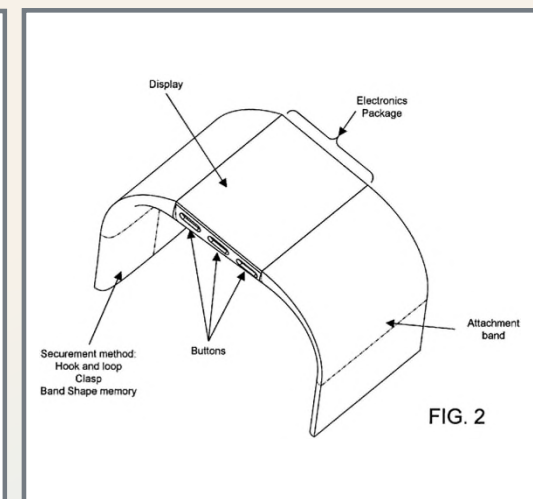
In the finger-ring 2 as an external secure unit 2 there can be arranged at least one inlay 12. The inlay 12 can have at least one chip module 10 with at least one antenna coil 8, with at least one further electronic device, e.g. a display, optionally being arranged on the inlay 12.

Schröder + Yuen Fails To Disclose Limitation 11[d]



Ex. 1007 at 14:9-13; Fig.3 (modified)

Ideally, a ring blank has a uniform thickness over its total length, in order to avoid later steps or shoulders. Should steps or shoulders nevertheless arise e.g. through the chip module 10, said steps or shoulders can be compensated by applying a paste which is e.g. thermally or UV-curing.



Ex. 1006 at Fig. 2

Paper 15 at 26-28; Paper 23 at 13-15

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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POSITA Would Apply Teachings Of Prior Art

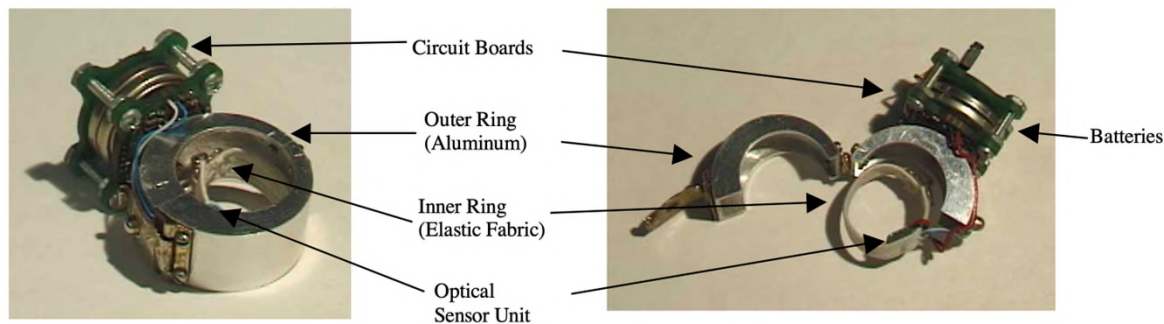


Figure 1 : Isolating ring sensor designed for motion artifact minimization

Ex. 1002, ¶172 (citing Ex. 1032)

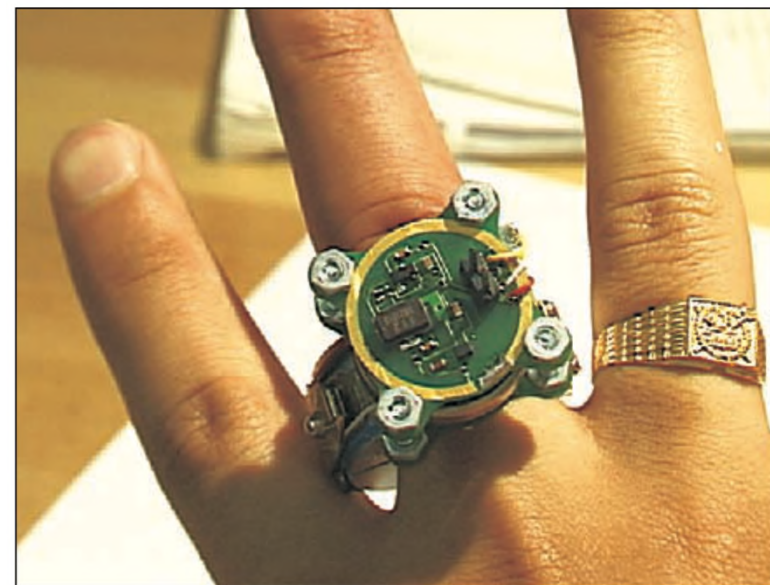


Fig. 9. First prototype ring sensor with RF transmitter powered by a coin-size cell battery.

Ex. 1037, 7)



POSITA Would Apply Teachings Of Prior Art

- A. And in the 2012-2013 time frame, as I was beginning to launch the center, we were looking at all sorts of different types of wearable device form factors. I was aware of smart ring designs, including, you know, the designs by Professor Harry Asada at MIT, in part because that's where I went to grad school, and I met with him there.

And when I was trying to look at different types of wearables I could potentially make within my center, I had considered designing a wearable smart ring, and I had done some exploration on what would need to go into, you know, the design of such a ring to make it small and comfortable and so on for a user to wear.

And I very quickly concluded that the most logical way to build such a device was to follow the prior art, including Professor Asada's and the other art that I found in the literature on this topic, and place the battery at the top of the device, as all the other prior art did, simply because there's just not enough room in kind of the body, if you will, of the ring that goes around the sides and the bottom of the finger, while making the user comfortable.

Ex. 1081 at 35:16-36:12

Schröder + Yuen Fail To Disclose Limitation 12

- Petitioner maps Schröder security window and Yuen's optical window to substantially transparent external potting.
- But the '034 Patent distinguishes between (i) a external housing portion comprised of a "substantially transparent external potting" that encapsulates the internal electronics (Ex. 1001, 17:4-29; 18:61-63) and (ii) an aperture or window a localized opening in an external housing. Ex. 1001, 17:30-35 "... light, external to the housing can pass through the external housing 1214 . . . without the need for a window.
- Even if the Board were to agree that a window and potting were equivalent, Petitioner argues that the plastic or metal housing has an IR window which is transparent to infrared light, but fails to argue the window is substantially transparent

11. A wearable computing device, comprising:

an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user;

a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing;

at least one component disposed on the flexible printed circuit board; and

an external housing portion defining a second enclosing structure, the external 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 housing.
12. *The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.*
13. *The wearable computing device of claim 12, wherein the at least one component comprises at least one LED configured to emit at least one of visible light, infrared radiation, and ultraviolet radiation through the external potting.*

Paper 15 at 28-30; Paper 23 at 15-16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Schröder + Yuen Fail To Disclose Limitation 13

- Petitioner fails to argue that LED's are configured to emit through substantially external potting making the same mapping mistake discussed for Claim 12.
- Petitioner argues that an infrared LED can be used for vein mapping. Petitioner also argues that a visible light LED and infrared LEDs can be used to give data to a user through the external housing windows.
- Windows in Schröder's plastic or metal external housing are not substantially transparent external potting.
- Schröder and Yuen do not at least one component disposed disclosed on a sealed flexible PCB
- Petitioner fails to argue that LEDs are disposed on a sealed flexible printed circuit board,

11. A wearable computing device, comprising:

an internal housing portion defining a first enclosing structure, the internal housing portion configured to be disposed near a finger of a user;

a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing;

at least one component disposed on the flexible printed circuit board; and

an external housing portion defining a second enclosing structure, the external 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 housing.
12. The wearable device of claim 11, wherein the external housing portion comprises a substantially transparent external potting.
13. *The wearable computing device of claim 12, wherein the at least one component comprises at least one LED configured to emit at least one of visible light, infrared radiation, and ultraviolet radiation through the external potting.*

Paper 15 at 26-30; Paper 23 at 15-16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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