

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0150IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

SECOND DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Dated: July 16, 2024

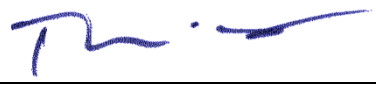
By: 
Thomas W. Kenny, Ph.D.

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I, Thomas W. Kenny, declare that:

1. On January 21, 2024, I provided an initial Declaration for the IPR2023-00745 proceeding regarding patent number 10,076,257. *See* APPLE-2003. I provide this Second Declaration in response to statements made in the June 24, 2024 Fourth Declaration of Alan L. Oslan (EX1069).

II. NEW PRIOR ART EXAMPLES

2. In the June 24th, 2024 Petitioner's Opposition to Patent Owner's Revised Contingent Motion to Amend, and the corresponding Fourth Declaration from Mr. Oslan (EX1069), prior flawed arguments related to Mills and Markel are restated, such as the argument that the 3-nm plated film in Mills would be considered a portion of an enclosure despite the absolute inability of such an infinitesimally thin film to exist on its own independent of the underlying electrode. These arguments have been shown to be flawed in my prior testimony, and I will not repeat them here.

3. In these new submissions from Masimo and its expert, Mr. Oslan, several new references are introduced and relied on in arguments. These references are not applicable to the arguments made in this IPR proceeding for a number of reasons that I explain below. The addition of these new references does not remedy the flaws in prior arguments made by Masimo that I have already identified. Masimo and its expert do not provide any discussion of how particular

elements of any of these new references would be combined with the details of the earlier Mills and Markel references, and do not provide any detailed mapping of these combinations to the proposed substitute claims.

4. These new references include the Lyons publication (20090059730, EX1068), the Larsen patent (4,230,127, EX1075), the Taheri patent (6,434,421, EX1076), the Rytky publication (20060142654, EX1074), and the Kyoso publication (M. Kyoso and A. Uchiyama, “Development of an ECG Identification System”, EX1070).

III. The Lyons publication (20090059730, EX1068)

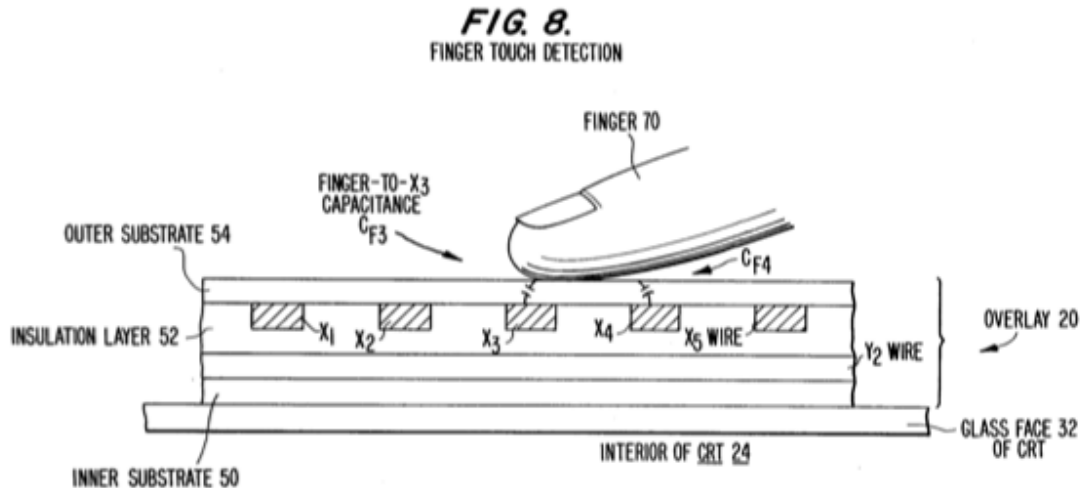
5. Lyons describes a watch with the ability to sense contact with the fingers of the user: “Accordingly, the present invention is directed to a watch device having a user interface employing a sensor positioned within the bezel of the display for detecting when the bezel is touched by a user of the watch device... In exemplary embodiments, the sensor comprises a flex or capacitive sensor. The flex sensor is located beneath a plastic or metal bezel making it a robust, reliable and stylish replacement for the mechanical buttons common in prior watch devices.” EX1068, [0018]. In other words, the sensor pads described by Lyons simply detect when a user has touched the bezel and the location of the touch. There is no disclosure in Lyons of measuring a user’s heart signal or any other

electrical signals originating within the user, or of detecting any information other than the presence, location, and duration of the touch itself.

6. The embodiment of Lyons that Masimo and its expert Mr. Oslan rely on uses a “capacitive sensor.” Lyons gives a brief description how the capacitive sensor functions: “In embodiments of the invention, the sensor 116 may comprise a capacitive sensor capable of detecting single presses (including tap and/or press-and-hold presses) by the user's fingertip, finger, thumb, or the like, and multiple simultaneous presses, as well as scrolling motion presses...When a user touches the bezel 114 with his or her fingertip (or other conductive object) the electric field around one or more of the sensor pads 122 is changed. The integrated circuit 124 detects changes in capacitance on the pads 122.” EX1068, [0026].

7. Of course, Lyons did not invent capacitive touch sensing at the time of the filing of the Lyons publication (priority to Jan 2, 2008). For example, Stein (5,365,461 filed April 30, 1992; APPLE-2012) provides a detailed description of capacitive touch sensing for an electronic device, including circuit and measurement details that are not present in Lyons. *See* APPLE-2012, *generally*. Stein references a prior patent by Greanius (4,686,332, filed June 26, 1986; APPLE-2013), which provides further description of capacitive touch sensing. APPLE-2012, 1:62-2:16.

8. Figure 8 of Greanious shows the configuration of the capacitive touch sensor, wherein the capacitance of an electrode X3 positioned beneath the outer



substrate is increased when a finger is present on the nearby surface due to the “Finger to X3 capacitance” labeled C_{F3} in figure 8. APPLE-2013, 7:46-8:7.

9. The use of capacitive sense electrodes for detecting the proximity of external objects, such as the fingers of a user has been well established. For example, the “Studsensor” product has been available since at least 1994 when I began using this product example of capacitive sensing in my Stanford University course titled “ME220 Introduction to Sensors”.

10. The “Studsensor” that I purchased for discussion in the class in 1994 and the accompanying 1992 product instructions are shown in the photos below. The 1994 Studsensor was featured as part of the “Show and Tell” lecture in spring quarter 1994, and the brochure was included in the handouts shared with the class at the time of that lecture.



Any implied warranties applicable to the STUDSENSOR are limited to the 90 day period described above. In no event will Zircon be liable for any special, incidental or consequential damages resulting from possession, use, or malfunction of this STUDSENSOR.

In accordance with government regulations, you are advised that: (i) some states do not allow limitations on how long an implied warranty lasts and/or the exclusion or limitations of incidental or consequential damages, so the above limitations and/or exclusions may not apply to you, and further (ii) this warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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When service is required within 90 days of original purchase or receipt as a gift, send the STUDSENSOR to Zircon Corporation, freight prepaid.

For in-warranty service, you must include proof of purchase such as a sales receipt with date, your return address, and \$5.00 to cover postage and handling. If proof of purchase is not included, the repair will be treated as an out-of-warranty service, and the unit will be returned with C.O.D. charges for repairs.

If sending for out-of-warranty service, you must include your return address and \$5.00 to cover postage and handling. Your STUDSENSOR will be repaired and returned with C.O.D. charges for repairs.

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Factory Repair:
Zircon Corporation
9731 Siempre Viva Road
Suites "B & C"
San Diego, CA 92173

U.S. Patent No. 4099118 and 4464622

OPERATING INSTRUCTIONS

STUDSENSOR PRO
MODEL NO. 50793

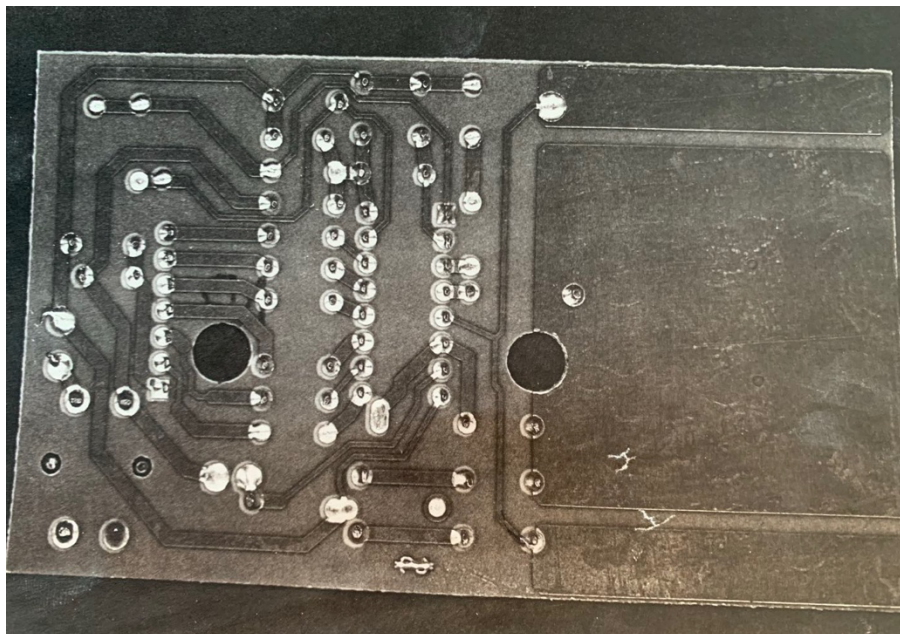
STUDSENSOR WITH SOUND
MODEL NO. 50264

STUDSENSOR
MODEL NO. SS9434

Electronic Stud and Joist Finder

The STUDSENSOR is a sophisticated and rugged instrument which will give you years of accurate, dependable operation when given reasonable care. It is simple to operate, and with a little practice, you will improve your ability to quickly and accurately determine the location of any supporting member—wall stud, brace, fire break, or ceiling joist.

P/N 50996 REV A 12/92



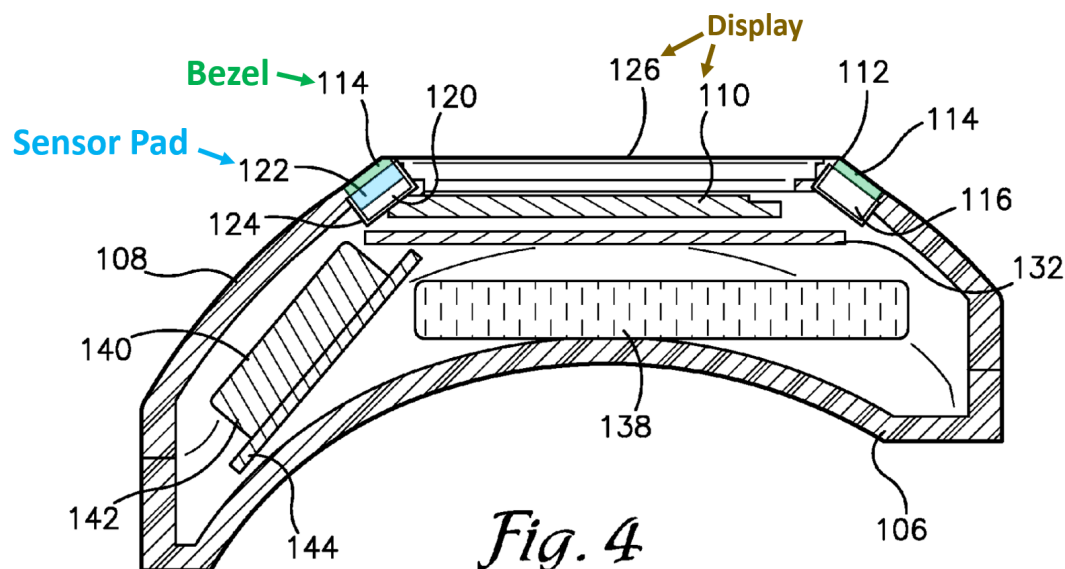
11. The “Studsensor” uses electrodes inside of the plastic enclosure of the product to detect capacitance in the region just below the working surface outside of the enclosure. The photo below shows the large planar capacitive electrodes used for the capacitive proximity sensing that allows detection of studs beneath a layer of drywall.

12. When the “Studsensor” is moved over a portion of drywall with underlying 2”X4” “studs”, the additional dielectric properties of the stud, relative to the empty space between studs, leads to an increased capacitance and allows capacitive detection of the stud. If one moved a finger into contact with the working surface of the Studfinder, the device reports detection of a stud, more or less exactly the same as in Lyons.

13. This example is illustrative of the distinction between electrodes and systems that can be used for capacitive sensing of studs or fingers and electrodes and systems that can be used for detection of ECG signals (or other electrical signals that originate at the source being detected, rather than electrical signals that originate at the measuring device). Masimo and Mr. Oslan imply that these are similar enough to be interchangeable, but they are not. I am sure that the system in the ‘257 patent and in Mills and Markel is incapable of capacitive detection of the presence of a finger or a stud. More important - I am sure that the 1994 Studsensor, which uses electrodes and methods similar to the Lyons publication for capacitive

sensing of the the presence of fingers, is incapable of detecting ECG signals. I believe a POSITA would also expect that the Studsensor is incapable of detecting ECG signals, and that even Mr. Oslan would agree. I'd be happy to provide my 1994 Studsensor for experiments if it would be helpful – it is still in good working order, and I used it recently for hanging some pictures in our lake house.

14. As explained by Mr. Oslan, “Lyons teaches placing capacitive touch sensor pads 122 on an inner surface of bezel 114 as illustrated below” and Oslan includes the annotated Figure 4 from the Lyons reference. EX1069, ¶341.



15. Lyons measures the capacitance of capacitive sensor pad 122 and detects changes in this capacitance due to the presence of a finger in contact with the outside of the bezel 114. EX1068, [0026]. Oslan writes: “Sensor pad 122 is a portion of capacitive sensor 116 and ‘detects changes in capacitance on the pads 122’ specifically ‘when a user touches the bezel 114 with [a] fingertip’ ([0026])

and can ‘sense various electrical properties of the human body’ ([0044]) for determining contact with the user. EX1068, [0026], [0044].” EX1069, ¶342. Oslan further states in a footnote, “Two C-shaped regions on either side of the display is almost identical to the configuration shown in Figure 5 of the ’275 patent, with isolating portions 530 and 532 separating the two c-shaped regions. EX1001, Fig. 5.” *Id.*, fn 2.

16. As explained, the capacitive “sensor pad” of Lyons 122 is configured to detect changes in capacitance of the sensor pad that arise from the presence of a finger. As explained by Lyons and the earlier references, the presence of the finger can alter the electric fields around an electrode in a way that increases the capacitance of the electrode. EX1068, [0026]-[0028]. This alteration of the electric fields by the presence of the finger arises from the passive dielectric properties of the tissue of the finger, which are sensed by applying an oscillating voltage to the capacitive sensor pad and measuring the current required to charge and discharge the capacitive sensor pad during the oscillation. APPLE-2013, 5:39-6:35. A POSITA would have understood that this is how capacitive sensing is carried out in Lyons, as well as in the Studsensor. A POSITA could further rely on the teaching of Greanius, which describes the application of 40 kHz oscillating voltages to the capacitive sense electrodes and the circuitry used for detection of

changes in capacitance associated with the oscillating voltages applied to the electrodes. *Id.*, 5:39-6:35, 12:28-13:3.

17. There are a number of very clear distinctions between a capacitive proximity “sensor pad” of Lyons configured to detect changes in capacitance that arise from the presence of a finger, and a conductive “first pad” as recited by the claims of the ’257 patent that is configured to detect a first electrical signal of the users cardiac signal via the user’s skin’s contact with the exterior surface of the first portion of the enclosure. These differences also distinguish the capacitive finger detection of Lyons from the devices described by Mills and Markel, which include electrodes directed to an entirely different function (heart signal detection). These distinctions include:

- The capacitive sensor pad of Lyons is energized with an oscillating voltage, whereas a pad capable of detecting a user’s cardiac signal would be energized with a constant voltage bias.
- The capacitance change detected in Lyons arises from the generic passive dielectric properties of a finger, whereas the signals detected by a heart signal detection device arise from the unique electrical signals reflecting the cardiac activity of the user.
- The capacitance change detected by Lyons requires that there is only capacitive coupling between the sensor pad and the tissue of the user

and no direct electrical contact from the outside of the device to the pad (e.g., such as through a conductive portion of the enclosure), as any such contact would short out the capacitance being measured.

- The use of capacitive sensing to detect the presence of the finger necessitates the use of oscillating voltages to detect the passive dielectric properties of the finger. As such, a POSITA would have recognized that such a configuration would not have been compatible with devices configured to measure a user's cardiac signal as such devices require an electrical connection with the skin of the user (either directly or indirectly).
- The capacitance changes detected in Lyons arise from electrical signals that originate in the electrical system of Lyons – inside the watch, whereas the electrical signals detected by heart rate measurement devices arise from the user's cardiac signals.
- Lyons detects capacitively-coupled signals, whereas the heart rate measurement devices described in Markel and Mills, detect directly-conducted signals.
- Lyons is using capacitive sensing as a threshold detector of the user's presence or absence of a generic human finger at specific locations

around the device, and is not configured to distinguish the fingers of the user from fingers of any other user.

- The capacitive proximity signal captured by the capacitive sensor pad of Lyons does not include any features that can be associated with the health or function of any organs or systems of the human body.
- Lyons mentions the ability to “sense various electrical properties of the human body”, primarily the passive capacitance of the tissue.

There is no teaching in Lyons or in any of the references supporting Lyons of detecting electrical activity originating within the body, such as ECG signals. A POSITA would understand that a capacitive proximity sensing system such as disclosed in Lyons detects and processes electrical signals originating within the sensing system, and therefore can only detect passive characteristics such as capacitance. As such, the sensing pads of Lyons would be incompatible with the devices of Mills and Markel, which are configured to sense an ECG signal originating in the body of the user.

- Further, in contrast to Mr. Oslan, a POSITA would appreciate that the ability to “sense various electrical properties of the human body” refers to detection of things like capacitance, resistance, inductance, dielectric properties, etc. These are properties that are associated with

the characteristics of the human body, similar to things like size or weight. These “electrical properties” are different from “electrical signals” associated with activity of organs within the body. Electrical signals arising from the user’s cardiac activity are distinct from electrical properties of the human body. A POSITA would understand that this single statement in Lyons is referring to measurements of electrical properties “...in order to determine if the watch device 100 is being worn”, and not measurements of electrical signals associated with the function of internal organs that can be used to assess the health of those organs. Oslan’s reliance on the statement in Lyons about measuring properties in order to claim that the teachings of Lyons “...may apply to other sensors, such as Markel’s conductive electrodes” goes far beyond the actual teaching of Lyons.

- The term “pad” as used in Lyons is distinct from the first and second pads recited in the claims of the ’257 patent. Beyond the superficial similarity between Lyons and the ’257 patent arising from the common use of the term “pad”, there are many more differences that would render the teachings of Lyons to be useless for improving the ECG electrodes of Mills and Markel. A POSITA would not look to

the capacitive proximity sensing system of Lyons to improve on the ECG sensing system of Mills and Markel.

For all these reasons, a POSITA would understand that the capacitive proximity sensing system of Lyons, with use of capacitive sensor pads within the housing of a watch, bears no useful relationship to the electrodes of the Mills and Markel devices or to the conductive first and second pads of the '257 patent.

IV. The Larsen patent (4,230,127, EX1075)

18. Larsen describes electrodes and circuits for ECG measurements, including a variety of layered electrode structures which include insulating and conductive layers. The electrodes disclosed in Larsen provide a means for capacitive sensing of ECG signals, which is distinct from the conductive electrodes of Markel and Mills (and the '257 patent). A POSITA would understand that capacitive electrodes could generally be used for detection of ECG signals, but a POSITA would also understand that Markel and Mills rely exclusively and explicitly on conductive ECG electrodes positioned on the outer surface of the disclosed embodiments. There is nothing in Mills or Markel that teaches a POSITA to consider replacing the conductive electrodes with capacitive electrodes, or to relocate electrodes from the surface to locations within the structure. There is no motivation for consideration of such a substantial modification away from all of the details disclosed in Mills and Markel.

Furthermore, if the conductive electrodes of Mills and/or Markel were replaced with capacitive electrodes, various other elements of the '257 patent claims would not be met by the resulting devices.

19. The system described by Larsen relies on specialized processes for formation of very thin insulating layers: “There is sputtered by conventional sputtering techniques, a layer of dielectric material #4520, (consisting of a silicon dioxide, lead oxide and sodium mixture)...on top of conductive layer 66. When a finger is placed on top of layer 68, a capacitor is formed with conductive material 66 being one plate of the capacitor and layer 68 being the dielectric material between the plates.” EX1075, 4:63-5:5.

20. It is well understood that sputtering has been a technique used for the formation of very thin films (less than 1 micrometer) for a variety of purposes in semiconductor device manufacturing and other applications. Like the very thin metal film referred to by Masimo and Mr. Oslan from the Mills reference, the sputtered films of Larsen can only be formed on a solid substrate, and cannot sustain their structure or other useful mechanical properties without being supported by the underlying substrate. Larsen confirms the need for support of these films, stating: “The dielectric material...covers the conductive material. Both of these materials may be attached to a ceramic substrate for physical

strength.” EX1075, 3:45-50. Additionally, being as this thin layer in Larson is a dielectric, by definition it is non-conductive.

21. In the case of Larsen, a POSITA would understand that the electrical impedance of a capacitor is proportional to the reciprocal of the capacitance, and so a large C means a low impedance and less of an obstacle to the propagation of electrical signals. Further, the capacitance of a capacitor is proportional to the reciprocal of the thickness of the dielectric insulating layer. Based on this understanding, the very thin dielectric films discussed in Larsen allow the capacitance of the contact to have a large value, and therefore the impedance has a low value, enabling high-fidelity propagation of weak electrical signals of the ECG through the dielectric to the underlying electrode. A thick dielectric layer would reduce the capacitance and inhibit propagation of electrical signals originating within the user’s body. A POSITA would understand that Lyons relies on a specialized fabrication technique such as sputtering, which is only capable of producing very thin films, because it is important to have very thin films for the capacitive ECG electrode to work well.

22. There is no teaching in Mills or Markel of a thin dielectric material formed on the surface of metallic structures to form a capacitive electrode. The use of such a film would add significant complexity to the structures, circuits and

signal processing of the devices disclosed by Mills and Markel, and would discard some of the claimed benefits of the teaching of Mills and Markel.

23. Rather than provide any motivation for consideration of capacitive ECG electrodes, Mills and Markel consistently focus on the characteristics of conductive electrodes. Mills repeatedly describes electrodes “...for making conductive contact,” and using “biocompatible conductive element such as titanium.” “Such plating also has been found to provide high conductivity and thus to produce a high quality electrical interface between an electrode ... and the patient’s skin surface, which may be very dry.” Markel describes electrodes which “...comprise a metallic surface exposed for user contact.” Markel emphasizes the use of externally positioned conductive metal or plastic for these electrodes, and describes means “...to enhance the conductive contact with the user.”

24. Indeed, such a configuration is distinct from the claimed device of the ’257 patent which requires a conductive first portion of the enclosure to allow for electrical connectivity between the user contact and the first pad positioned underneath the exterior surface of the first portion of the enclosure such that the first pad can detect a first electrical signal of the user’s cardiac signal via the user’s skin’s contact with the exterior surface of the first portion of the enclosure. The claimed features of the ’257 patent rely on conductive contact through a portion of

the enclosure, and would not function if the contact was a capacitive contact through a relatively thick portion of the enclosure.

25. Masimo and Oslan rely on Larsen to assert that capacitive ECG electrodes exist and that such capacitive electrodes and conventional conductive ECG electrodes are interchangeable “pieces of a puzzle.” EX1069, ¶344.

However, the capacitive ECG structures of Larsen rely on a very thin dielectric layer to provide capacitive coupling of weak ECG signals from the user to an electrode, while the capacitive sensor pads of Lyons provide oscillating voltages and are capable of detecting the proximity of a finger through a thicker insulating structure. These are not “pieces of a puzzle” that can be interchanged. A POSITA would understand that an electrode beneath a thick insulating layer, such as in Lyons, could not detect ECG signals in the same way as the electrode positioned beneath a 1 micrometer thick insulating layer. This is more “apples and oranges” than “pieces of a puzzle.

26. Further, a POSITA would have been aware that such capacitive electrodes function in distinctly different ways from the devices described by Mills and Markel. As such, there is no motivation in the teachings of Mills or Markel to consider the substantial modifications that would be required for the Mills or Markel references to include capacitive ECG electrodes. Even if such motivation were to exist, the first pad recited by the claims of the '257 patent is not a

capacitive electrode – it is an electrode that has an electrically conductive path through the first portion of the enclosure to the skin of the user.

V. The Taheri patent (6,434,421, EX1076),

27. Masimo and Oslan introduce the Taheri patent as another example of a capacitive ECG electrode as shown in figure 12 from Taheri.

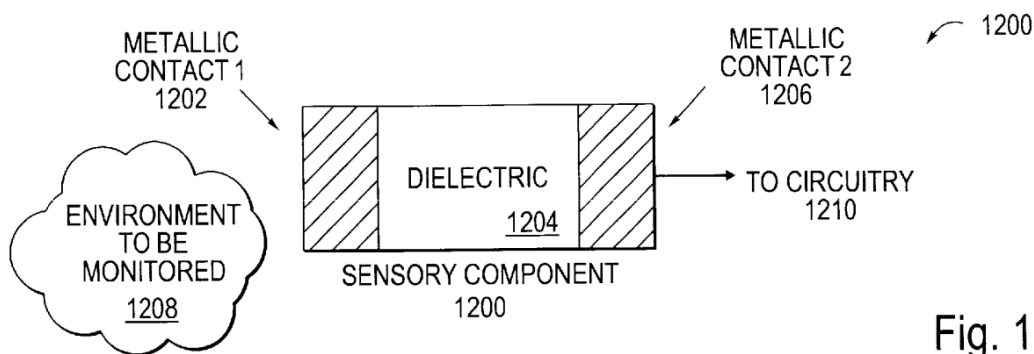


Fig. 12

28. Taheri describes an ECG electrode with a thin metal film on top of a thin dielectric film, providing a metallic contact to the external surface of the capacitive ECG electrode. This provides some of the benefits of a metallic “dry electrode”, including “metallic or conductive material in contact with the skin”, as well as some of a capacitive ECG electrode.

29. Oslan mis-represents the disclosure of Taheri when writing that “a POSITA would have known that adding a metal layer on top of a capacitive ECG sensor would have been desirable because it ‘minimizes interference noise’ and ‘provides an improved signal to noise ratio.’” EX1069, ¶345. In fact, these

benefits of minimizing noise and improving signal to noise ratio are attributed by Taheri to the benefits of including the power source within the package. EX1076, 5:24-30 (“unlike any of the typical dry or insulated electrodes, the hybrid sensor electrode houses the power source within the same package. This configuration minimizes interference noise, provides plug compatibility to the current monitoring systems, and reduces the possibility of accidental shocks...”). As such, the benefits identified by Mr. Oslan as motivation actually have nothing to do with the structure of the electrodes, and do not provide any motivation to combine the electrodes of Taheri with any of the other references.

30. As with Larsen, Taheri describes the insulating layer as a very thin film, specifically as Silicon Nitride, because of its dielectric and insulating properties, and describes the fabrication of these films using chemical vapor deposition methods (LPCVD, PECVD, or APCVD) – all of which would be understood by a POSITA as being suitable for films of thickness 1 micrometers or less, and requiring formation on a solid substrate. EX1076, 10:41-11:5. These are essentially more modern materials and methods for forming ultrathin insulating films than discussed in Larsen.

31. The additional conductive layer of Taheri “...provides metallic contact at both ends and allows means of stimulating the sensor environment in addition to sensing the signals from the environment. Like the dry electrodes, the

sensor has a metallic or conductive material (e.g., Gold, Stainless Steel, platinum, Silver Silver-chloride) in contact with the skin.” EX1076, 8:49-55. These claimed benefits of Taheri do not solve any of the problems described in Mills or Markel, which do not use capacitive sensors, or provide any useful improvements to Mills or Markel. As mentioned above, these electrode layers of Taheri do not provide minimized interference noise or improved signal to noise, or any other features and benefits that would be useful in combination with Mills and Markel.

VI. The Rytky publication (20060142654, EX1074)

32. Masimo and Mr. Oslan introduce the Rytky publication. EX1069, ¶347. Rytky describes layered electrodes that include conducting and insulating layers. EX1074, [0004]. In all cases in Rytky, the conducting layers are positioned such that they are at least partially exposed on the outer surface of the structure, or partially covered by an insulating layer, and in all cases the electrical signals are transmitted to the conducting electrode layer by direct conductive contact, not capacitive contact or through a conductive portion of the enclosure.

33. Rytky includes a brief mention of using additional “[c]onducting material...between the surface of the skin and the electrode area.” EX1074, [0046]. However, Rytky does not provide any detail as to the structure or purpose of this layer. There is certainly no description or depiction in Rytky of the physical arrangement of such additional conductive material with respect to the “electrode

area” or the insulating material. For example, the electrodes of Rytiky are flexible electrode film structures configured to adhere to the skin of a patient. EX1074, [0006], FIGs. 10-11. As such, a POSITA would have recognized that the additional “conducting material” would most likely have been electrode gel or an electrically conductive adhesive. It is also entirely possible that such additional conducting material is one or more conductive bumps or other structures protruding from the electrode area. Mr. Oslan leaps to an interpretation of this additional material as being equivalent to the conducting bezel recited, for example, by substitute claim 23 from the Revised Motion to Amend. This is an absurd leap – the electrodes of Rytiky are described as being flexible elements of garments, not rigid structures such as the bezel of a device, or even the rigid housings with external electrodes of Mills and Markel. A POSITA would appreciate that electrical contact between the structures of Rytiky, positioned within garments, could be improved by some intervening conductive material, which a POSITA would appreciate to be something like a conductive adhesive.

34. The absence of any disclosure of the structure of the additional layer, any description of the purpose for the layer, or any description of use of such a layer in the bezel of a device, would not lead a POSITA to consider Rytiky to be suggesting the benefits of adding something like a bezel made of steel or aluminum to the flexible electrode of Rytiky.

35. There is no disclosure in Rytky for an additional structural layer, and certainly not for a thick added layer as is shown in Oslan's altered figure from Rytky:

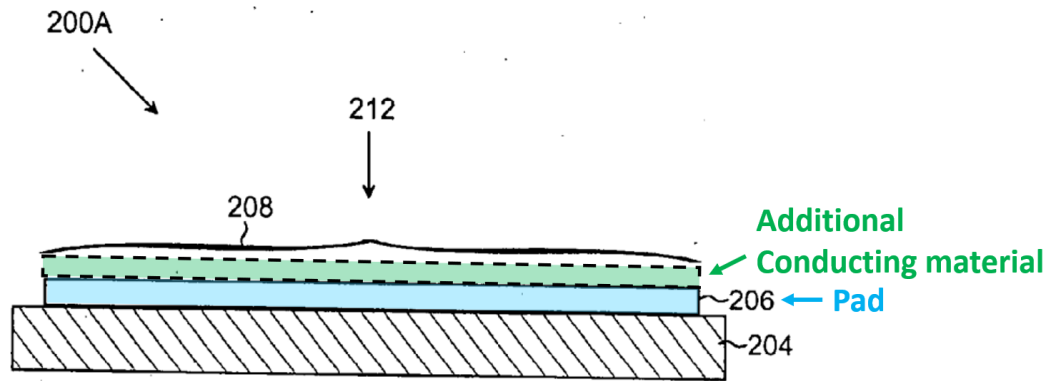


Fig. 2A

To be clear, the physical dimensions and arrangement of this additional, flat conductive material depicted in Oslan's altered Figure 2A is described nowhere in Rytky. The brief mention of "[c]onducting material" in Rytky provides no support for Oslan's depiction, or any other particular physical arrangement of this additional material.

36. In addition to the lack of any description in Rytky of the additional conductive material as a thick structural layer, or any motivation from Rytky such as shown in the annotated figure, there is also no motivation from Mills or Markel to construct such a layer, as both teach electrodes positioned on the surface of the structure for direct contact with the skin of a user. Further, in contrast to the labeling in the figure provided by Oslan, Rytky never refers to the underlying electrode as a "pad".

VII. The Kyoso publication (M. Kyoso and A. Uchiyama, “Development of an ECG Identification System”, EX1070)

37. Finally, Masimo and Mr. Oslan introduce the Kyoso reference, describing an ECG Identification System. EX1069, ¶367. This reference describes an initial experimental implementation of a software package that can be used to process captured ECG signals, identify some features of the ECG signals, and distinguish some users from other users with modest reliability. EX1070, 1-3. There is nothing in Kyoso that requires particular electrode structures or configurations. There is merely a suggestion that some software processing of signals may provide somewhat reliable determination of one user out of nine in a limited experiment. *Id.* A POSITA would find Kyoso to be somewhat encouraging, but far short of a useful method for improving on the devices described by Mills or Markel. For starters, while Kyoso discusses some initial success of differentiating between a small sample set of users based on measured ECG data, there is no discussion of using such information to authenticate a user, as recited by substitute claim 27.

38. Furthermore, there is no evidence that the experimental software described by Kyoso would have been compatible with the devices of Mills or Markel or that the devices of Mills or Markel, which have relatively small form factors and limited processing capacity, would have been capable of performing the processing tasks required to achieve the results described by Kyoso.

VIII. Application of newly identified prior art to Mills and the Markel-Mills combination

39. In the Masimo's Opposition to Patent Owner's Revised Contingent Motion to Amend and the most recent declaration from Mr. Oslan, Masimo and Mr. Oslan rely on Mills, Markel, Lyons, Larsen, Taheri, Rytke and Kyoso as a combination that somehow provides all elements of the proposed substitute claims. However, these references are distinct from one another, not suitable for combination in any meaningful way, as I've discussed above.

40. Masimo and Oslan never provide even a single coherent description of any specific combination of the features of these multiple references that make sense together, and would function in a reasonable and useful way. Because there are no details provided to support claims of obviousness, Masimo and Oslan never provide any partial or complete mapping of the features of these references to the proposed substitute claims. Instead, we have many apples, oranges and other fruits and vegetables, not "pieces of a puzzle", and are left to find some way to put everything together somehow. The result that is offered ends up as some imaginary Frankenstein combination of the various unrelated and contradictory features of some elements of these references. The pieces of this combination somehow uses portions of external conductive electrical ECG electrodes made of metal or conductive plastic, capacitive ECG electrodes (with and without a surface metallic layer), capacitive proximity sensors for detection of fingers, flexible ECG

electrodes, and some software that may or may not work well with any of the electrical signals that could be captured by any of these particular references or any combinations of these references (and also fails to perform authentication of users).

41. Masimo and Mr. Oslan claim that somehow Mills + Markel + Lyons + Larsen + Taheri + Rytiky + Kyoso all fit together like pieces of a puzzle and that a POSITA would know what to do with all of this. An example of this is the reliance on the Lyons patent, which uses different electrodes in a completely different way for a completely different purpose than either Markel or Mills, but has attracted attention in this set of declarations simply because Lyons has at least one element called a “pad” positioned under the bezel.

42. The fundamental problem with this Mills + Markel + Lyons + Larsen + Taheri + Rytiky + Kyoso collection is that capacitive proximity sensor electrodes, conductive surface ECG electrodes, and capacitive ECG electrodes are not compatible pieces, and no combination of these pieces would lead a POSITA to the inventions recited in the proposed substitute claims. This “puzzle” would leave a POSITA with an immense challenge, far beyond the standard of obviousness.

IX. CONCLUSION

43. I reserve the right to supplement my opinions to address any information obtained, or positions taken, based on any new information introduced throughout this proceeding.

44. I declare under penalty of perjury that the foregoing is true and accurate to the best of my ability.