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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MASIMO CORPORATION
Petitioner,

v.

APPLE INC.
Patent Owner.

Case No. IPR2023-00745
U.S. Patent No. 10,076,257

**PETITIONER'S OPPOSITION TO
PATENT OWNER'S REVISED CONTINGENT MOTION TO AMEND**

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I. INTRODUCTION

Apple’s revised substitute claims 23–27 consist of common features and would have been obvious over the prior art, including prior art relied on in the Petition. Multiple references disclose the pad “embedded in an inner surface” of a bezel and every other limitation in the substitute claims. Apple’s substitute claims also lack written-description support because they include undisclosed combinations of disparate features. Substitute claim 26 also deletes an entire limitation, thus broadening the claim. Thus, the Board should deny Apple’s motion.

II. “ENCLOSURE”

A. Mills’s Plating 14b Is Part Of An “Enclosure”

In its preliminary guidance, the Board invited the parties to address whether the claim term “enclosure” is broad enough to include Mills’s plating 14b of electrode 14. P.G., 33. It is. The ordinary meaning of “enclosure” is “something that encloses.” No intrinsic evidence suggests departing from the ordinary meaning. Mills’s plating 14b, along with housing 12, encloses components including base metal 14a. Therefore, plating 14b is part of the enclosure. EX1069, ¶320.

A POSITA would have understood that “enclosure” is a broad, generic term for “something that encloses.” Indeed, “enclosure” is an autological or self-referential noun that defines itself by its *function*—to enclose—not by any specific structure. Thus, the term encompasses *any* structure that encloses. EX1069, ¶321.

Dictionary definitions support that the ordinary meaning of “enclosure” is “something that encloses.” EX1071, 1; EX1072, 1; EX1073, 2. The Federal Circuit and the Board have also applied that meaning. *Pazandeh v. Yamaha Corp. of Am.*, 718 F. App’x 975, 975, 979 (Fed. Cir. 2018); *Fujifilm Corp. v. Hologic, Inc.*, IPR2018-00595, Paper 10 at 10-11 (PTAB, Aug. 27, 2018). EX1069, ¶322.

The intrinsic evidence also supports that an “enclosure” is “something that encloses.” Nothing in the claims, specification, or file history limits the “enclosure” to any specific structure. The intrinsic evidence does not define “enclosure” or disclaim its ordinary meaning. The specification provides non-limiting examples that are subsumed within the ordinary meaning: “portion of the device enclosure (e.g., a metallic bezel or housing forming the exterior of the device.)” EX1001, 2:48-50. The description of components “forming the exterior of the device” shows “enclosure” is not limited to specific structure but encompasses *any* structure that encloses. A POSITA would have understood “bezel” and “housing” to be just two of many exterior structures that may be part of the enclosure. EX1069, ¶323.

The Petition explained Mills’s plating 14b is another exterior structure that may be part of the enclosure, with base metal 14a as the first pad. Pet., 21-22. In its POR, Apple relied on *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) to argue that Mills’s electrode 14 is a unitary component that “cannot be both the first pad and the first portion of the enclosure”

because “it is physically impossible for the electrode 14 to be embedded in and positioned underneath itself.” POR, 29. But Apple linguistically created the alleged physical impossibility by arbitrarily treating the separate layers of electrode 14 as if they were a single component. It is not physically impossible for base metal 14a to be embedded in and underneath the separate plating 14b. In its preliminary guidance, the Board described electrode 14 as having multiple distinct layers instead of a single unitary structure. P.G., 32. And in its institution decision, the Board accepted Masimo’s showing that plating 14b is claim 1’s “exterior surface of the first portion” of the enclosure and Mills’s “embedded lead 14a” is claim 1’s “first pad ... positioned underneath the exterior surface of the first portion.” D.I., 23-24.

Even if Mills’s electrode 14 were treated as a unitary component, courts and the Board have held that a single component may satisfy two limitations if consistent with the intrinsic evidence. *See, e.g., Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231-32 (Fed. Cir. 2011); *Google LLC v. EcoFactor, Inc.*, 92 F.4th 1049, 1058 (Fed. Cir. 2024); *Apple Inc. v. Kilbourne*, IPR2019-00233, Paper 40 at 38, 57 (PTAB Mar. 25, 2020); *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1303 (Fed. Cir. 2011) (intrinsic evidence indicates that needle holder and retainer member need not be separate pieces); *SharkNinja Operating LLC v. Bissell Inc.*, IPR2022-01175, Paper 40 (PTAB Jan. 11, 2024) (rejecting argument that, because “a component cannot be considered ‘provided on’ itself,” a cleaning head 102 cannot

be both claimed “base” and “suction nozzle assembly ... provided on the base”).

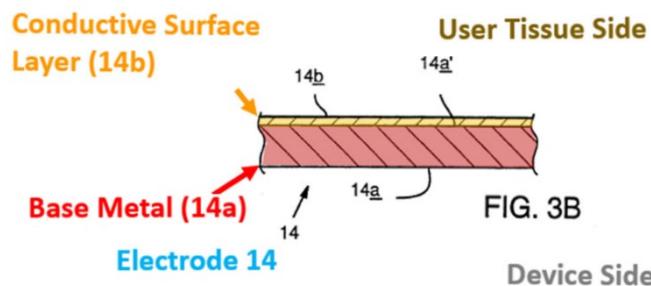
Here, the intrinsic evidence supports that a multi-layer electrode (such as in Mills) can include both the exterior portion of the enclosure and the pad positioned underneath. Indeed, the ’257 patent’s fundamental goal of *embedding* pads *in* the enclosure is to seamlessly integrate the pads with the enclosure. EX1001, 9:14-15 (“Leads 322 and 324 can be integrated in bezel 310 using any suitable approach.”), 2:7-8 (“This is directed to an electronic device having a seamlessly integrated cardiac sensor.”); *see also id.*, Title. Further, the ’257 patent expressly discloses that “an entire portion of the ... enclosure ... *can serve as a lead* for the heart sensor.” EX1001, 6:33-36.¹ Thus, a POSITA would have understood that sensing components such as leads or electrodes can be part of the enclosure. EX1069, ¶324.

Moreover, using Apple’s dictionary definition of “embedded,” an embedded pad is a pad “incorporated into a[n] . . . enclosure.” EX2005, 3. Similarly, using the Petition’s “embedded” dictionary definitions, an embedded pad is made or caused to be “an integral part of” or “incorporated ... into” an enclosure. Thus, the embedded pad is part of the enclosure. Further, the ’257 provisional also contradicts a rigid distinction between a pad and an enclosure. The provisional included a claim to an enclosure comprised of a housing and a bezel where the bezel comprises a pad

¹ All emphasis herein has been added unless noted otherwise.

embedded in the bezel's outer surface. EX2002, 29-30 (claim 9). Therefore, the embedded pad is part of the enclosure because it is part of the bezel. EX1069, ¶326.

Mills's plating 14b is part of the enclosure because it and housing 12 form the device exterior that encloses metal base 14a and other components. Just like the '257 patent describes a lead "integrated" with a bezel which is a part of the enclosure



(EX1001, 2:48-50, 9:14-15), Mills discloses electrodes 14 and 16 are an "integral part" of housing 12. EX1006, 3:8-11. The plating 14b is

the exterior surface covering the metal base 14a, as shown by Figure 3B. *Id.*, 4:4-13. Thus, housing 12 and its "integral" plating 14b enclose the metal base 14a and other internal components. EX1006, abstract, 3:8-11; 3:46-51; 3:58-59; 4:18-19; 6:55-56. And plating 14b is not ornamental. Rather, it protects and "***greatly extend[s] the life*** of ... electrode 14 by producing an ***extremely hard***, exterior, skin-contactable surface." EX1001, 4:43-47. A POSITA would have understood that enclosing and protecting internal parts are functions of an enclosure, as Apple's expert agreed. EX1052, 185:1-15. And Mills's plating 14b cooperates with housing 12 to perform those functions. EX1069, ¶325.

Accordingly, in view of the structure and function of Mills's plating 14b, a POSITA would have understood that the plating 14b discloses part of the claimed

“enclosure,” because that plating, along with the housing 12, is something that encloses. EX1069, ¶327. Therefore, the institution decision was correct. D.I., 23-24.

B. Mills’s Electrode 14 Is Part Of An “Enclosure”

Masimo’s Mills anticipation and Markel-Mills obviousness theories relying on the top of Mills’s leaf spring 62 as the first and second pads do not implicate the Board’s inquiry whether Mills’s plating 14b can be part of an “enclosure.” In those theories, the entire electrode and housing of Mills alone or combined with Markel are the “enclosure.” Pet., 20, 44-48; Reply, 21-23. The electrode and housing are an “enclosure” because they enclose internal components, including the leaf spring 62. Further, in those theories, Masimo does not rely on an electrode as both the “pad” and part of the “enclosure.” EX1069, ¶328.

III. SUBSTITUTE CLAIM 26 ENLARGES THE SCOPE OF THE CLAIM

Original claim 13 recited the “second portion of the enclosure is a bezel.” Substitute claim 26 replaces “second” with “first” so the “first portion of the enclosure is a bezel.” That amendment impermissibly broadens the claim to cover an “apparatus ...which would not have infringed the original patent.” *Sisvel Int’l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1240 (Fed. Cir. 2023).

For example, imagine a watch with two embedded-in pads: (1) pad A is embedded in and underneath a bezel on the top face and (2) pad B is embedded in the back but exposed for user contact. Such a watch could infringe the substitute

claim: (1) pad A satisfies the “first pad” limitation because it is embedded in and underneath a “first portion” that is a “bezel” and (2) pad B satisfies the “second pad” limitation because it is embedded in a “second portion.” However, the watch could not infringe the original claim: (1) pad A alone satisfies the “second pad” limitation because it—but not pad B—is embedded in a “second portion” that is a “bezel” but (2) pad B does not satisfy the “first pad” limitation because it is not underneath the “first portion.” Therefore, the substitute claim is impermissibly broadened.

The Board suggested an amendment that “*deletes some limitations of [a] corresponding original dependent claim while still retaining all limitations of the original independent claim ...* would not enlarge the scope of the claims.” P.G., 8 (emphasis in original). *Sisvel* does not support this suggestion. *Sisvel* found independent claims broadened but did not reach the broadening question for dependent claims. *Sisvel*, 81 F.4th at 1241. Thus, the Board should reject claim 26.

IV. SUBSTITUTE CLAIMS 23-27 LACK WRITTEN DESCRIPTION

Apple fails to show written description for all limitations of the substitute claims. See *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 7-8 (PTAB, Feb. 25, 2019). Apple cites portions of the specification describing different embodiments but does not show that the specification links them together. RMTA, 13-14. Apple’s table of citations does not satisfy its burden. Apple “cannot show written description support by picking and choosing claim elements from different

embodiments that are never linked together in the specification.” *See NeuroDerm Ltd. v. AbbVie Inc.*, PGR2022-00040, Paper 77 at 31 (PTAB, Oct. 31, 2023)) (citing *Flash-Control, LLC v. Intel Corp.*, No. 2020-2141, 2021 WL 2944592, at *4 (Fed. Cir. July 14, 2021)); *see also Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1356 (Fed. Cir. 2010) (“a description which renders obvious a claimed invention is not sufficient to satisfy the written description requirement”).

The preliminary guidance states that Masimo did not address some of Apple’s specification cites. P.G., 10-11, 14, 16. However, because it is Apple’s burden to show written-description support, Apple must show that the specification links the cited portions together such that a POSITA would understand the cited portions describe the specific embodiment claimed. *See Flash-Control, LLC*, 2021 WL 2944592, at *4 (written description not met by “disparate disclosures that an artisan might have been able to combine”). Apple merely cobbled together portions of the specification, without any explanation. RMTA, 13-14. The Board and Federal Circuit have held such string citations inadequate. *Lippert Components, Inc. v. Days Corp.*, IPR2018-00777, Paper 28 at 52 (PTAB Sept. 24, 2019); *B.E. Tech., L.L.C. v. Google, Inc.*, No. 2015-1827, 2016 WL 6803057 at *7 (Fed. Cir. Nov. 17, 2016). Thus, the Board should deny Apple’s motion for all substitute claims.

In addition, for claims 24 and 25, Apple has not shown specification support for a “first pad is ***embedded in*** an inner surface” of a bezel. Apple principally relies

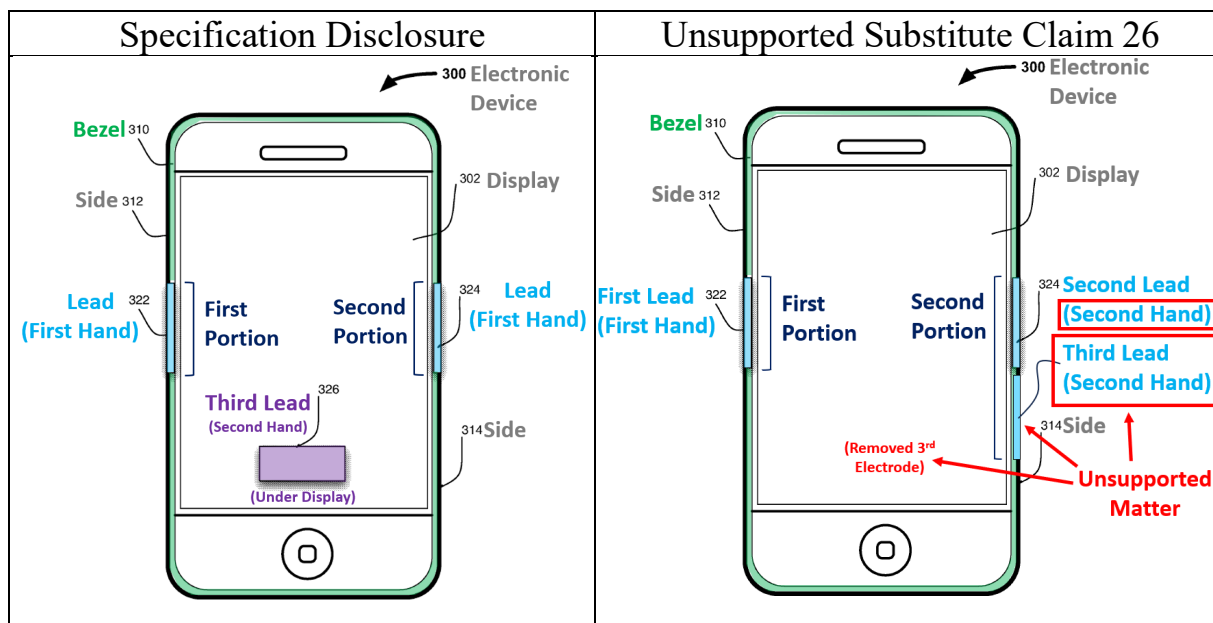
on one paragraph (¶33 of EX2002 and ¶34 of EX2009 and EX2010) that merely states that pads can be “*placed on*” an inner surface of a bezel. Similarly, Figure 4B of EX2002 merely depicts a lead “placed on” an inner surface. According to Apple, “placed on” does not satisfy “embedded in.” POR, 9-10. Indeed, Apple argued that “‘embedded in’ requires more than two materials or substrates that are merely positioned adjacent to, parallel, or against each other.” POR, 9-10. *See also* EX1002, 50-51 (prosecution arguments that prior-art electrodes merely “mounted on” a swing arm are not “embedded in” an enclosure). *See* EX1058, 2:9-12. Thus, according to Apple, “embedded in an inner surface” cannot include “placed on an inner surface.” Apple cannot argue for a construction of “embedded in” to counter obviousness arguments but use a different construction for written-description support.

The Board also invited Apple to explain how the original specification supports limitations included in claim 26. P.G., 13. Apple failed to do so in its revised motion. Claim 26 should be denied for at least that reason.

Claim 26 requires at least a first pad “positioned underneath the exterior surface of the first portion” (per claim 1) and second and third pads exposed to the “user’s skin’s contact.” The Board pointed out that Figure 5 is “described as possibly including three leads/conductive segments.” P.G., 14. But while Figure 5 suggests multiple leads it does not disclose the details of the claim, namely two exposed leads and a single lead underneath the enclosure. And obviousness is insufficient to satisfy

written description. *Ariad*, 598 F.3d at 1356. Figure 3 is the only figure that shows a third lead (326), but that third lead is under the display, not exposed.

Moreover, the specification does not support a “third pad that is . . . in the second portion of the enclosure” and “the second and third pads detect signals through a second hand.” The specification mentions particular hands corresponding to leads in only one embodiment: “leads 322 and 324 detect signals through a first hand, and lead 326 detects signals through the second hand.” EX1001, 8:48-49. Moreover, lead 326 is positioned under the display, not in a second portion. These annotated figures show differences between the disclosure and claim 26:



Apple has not met its burden to establish written-description support for this limitation. Therefore, substitute claims 23-27 lack written-description support.

V. UNPATENTABILITY IN VIEW OF THE PRIOR ART

The Petition proved original claims 1, 3, and 11-14 unpatentable. Petition,

§IV. Thus, this Opposition focuses on the substitute claims’ added limitations. *See Aqua Prod., Inc. v. Matal*, 872 F.3d 1290, 1326 (Fed. Cir. 2017). The level of skill of a POSITA remains the same as in the Petition. Pet. at 7. EX1069, ¶329.

A. Substitute Claim 23 Is Unpatentable Over Mills Alone or With Markel

1. **“The electronic device of claim 1, wherein the first portion is electrically isolated from the second portion by an electrically isolating component inserted between the first and second pads;”**

a. Anticipation

The Petition explained that Mills teaches placing an electrically isolating component made of a well-known insulating plastic (ABS) between its first and second electrodes. Pet., 34-35. Thus, Mills teaches this limitation. EX1069, ¶330.

b. Obviousness

The Petition explained that it would have been obvious to embed pads with the structure of Mills’s embedded pads (base metal 14a or the top of leaf spring 62) in the location of Markel’s electrodes 410b/420b. Pet., 42-48; Reply, 22-23. Markel teaches that an “insulating region 415 may separate” its electrodes 410b/420b and that its pushbutton electrodes may be “separated by an insulating portion 243.” EX1005, ¶45, ¶47; *see also* Pet. at 56-57. Thus, the Markel-Mills combination includes the claimed electrically isolating component. EX1069, ¶331.

2. **“wherein the exterior surface of the enclosure comprises an exterior surface of the second portion, wherein the second pad is positioned underneath the exterior surface of the second portion of the enclosure; and”**

a. Anticipation

For claim 1, the Petition showed that Mills discloses a first pad (base metal 14a of electrode 14) positioned underneath the exterior surface (plating 14b of electrode 14) of the first portion of the enclosure. Pet., 19-24; Reply, 2-6. Substitute claim 23 adds that the second pad is also underneath the exterior surface of the second portion. As the Petition explains, Mills's electrodes 14 and 16 have the same structure. Pet., 29; Reply, 4. Thus, electrode 16 has a second pad underneath an exterior surface of the second portion. Pet., 28-30; Reply, 10-11. EX1069, ¶332.

b. Obviousness

In Ground 2 regarding claim 1, the Petition showed that it would have been obvious to use leaf springs as taught by Mills to connect Markel's electrodes 410b and 420b to internal processing components. Pet., 44-48; Reply, 22-23. The Petition explained that in this Markel-Mills combination, the top of each leaf spring would be a pad embedded in the enclosure underneath the exterior surface. Pet., 46-48; Reply, 22-23. Therefore, the Petition further explained that in the Markel-Mills combination, "the first pad is positioned underneath the exterior surface of the first portion" because the pad of leaf spring 62 is "positioned underneath the electrodes/first portion 410b exterior surface of Markel." Pet., 49; Reply, 23. For the same reasons, in the Markel-Mills combination, "the second pad is positioned underneath the exterior surface of the second portion of the enclosure" because the

pad of a second leaf spring 62 would be positioned underneath the electrodes/second portion 420b exterior surface of Markel. EX1069, ¶333.

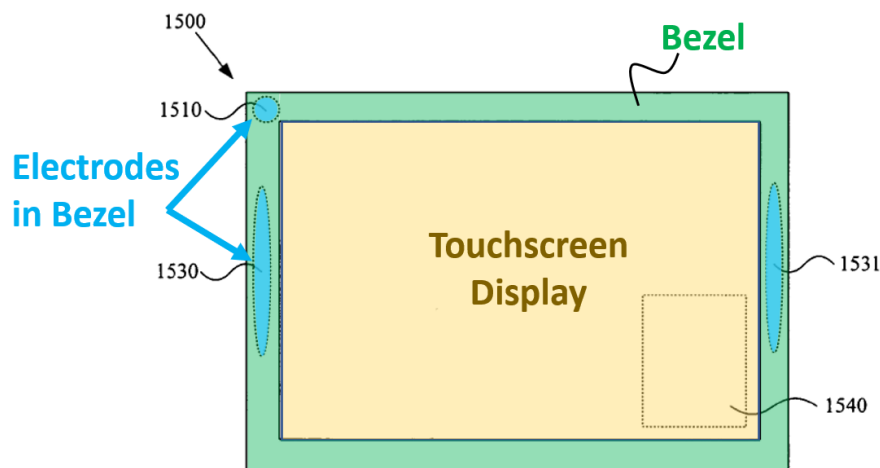
A POSITA would have been motivated to use leaf springs as taught by Mills to connect Markel's electrodes 410b and 420b to internal processing components for the reasons set forth in the Petition and Reply. Pet., 47-48; Reply, 29-31. In particular, a POSITA would have used leaf springs for those connections at least because leaf springs ensure continuous, reliable, low-resistance connections (EX1059, 1; EX1060, 1; EX1061, 2); avoid soldering, allow easier device assembly, disassembly, and maintenance (EX1060, 1); reduce movement and mating cycles without significantly reducing performance (*Id.*, 1, 4; EX1061, 7); are resilient under harsh conditions and rapid temperature changes (EX1060, 1; EX1061, 7; EX1059, 5); are compact and ideal for small consumer devices (EX1061, 7); and have a "self-adjusting nature" to "compensate for any minor misalignments" to reduce connection-failure risk (EX1061, 7). EX1069, ¶¶336-338.

Alternatively, consistent with (1) Markel's teaching of electrodes "integrated into various molded components" (¶37) and (2) Mills's teaching of electrodes forming an integral part of a housing, it would have been obvious to integrate metal-plated electrodes as taught by Mills into Markel's bezel. In the resulting combination, Mills's plating 14b would form the exterior surface of Markel's bezel and Mills's metal base 14a would be a second pad "positioned underneath the

exterior surface of the second portion.” EX1069, ¶334.

A POSITA would have been motivated to integrate Mills’s metal-plated electrodes into Markel’s bezel because Mills teaches that the plating 14b protects the device and produces “an extremely hard, exterior, skin-contactable surface.” EX1006, 4:39-43. *See also* Pet., §IV(B). Mills also teaches that the plating 14b “greatly extend[s] the life” of electrodes and “obviates use of a messy, conductive gel.” EX1006, 4:39-43, 4:19-24. Thus, a POSITA would have integrated Mills’s metal-plated electrodes into Markel’s bezel to protect the electrodes and improve their function. EX1069, ¶335.

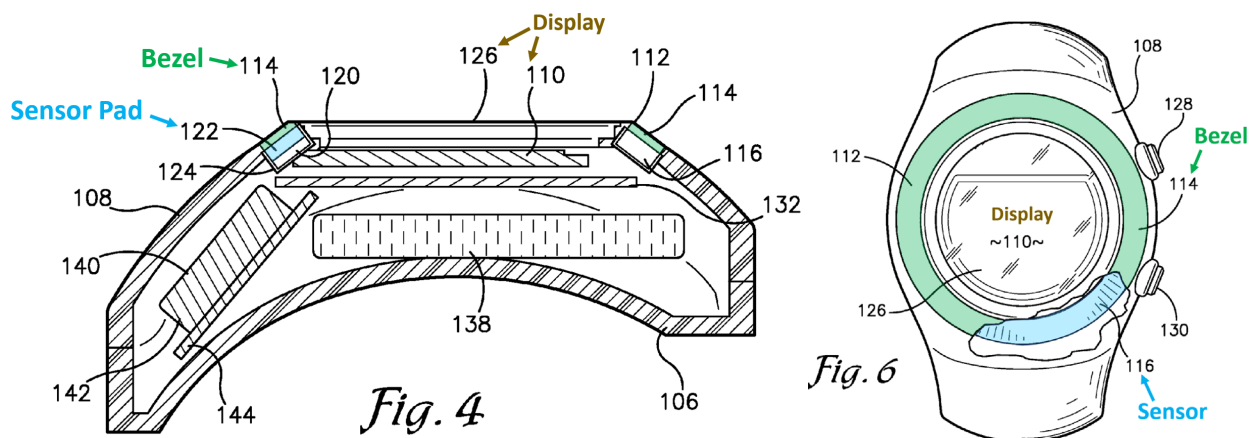
Markel further suggests integrating or embedding pads or electrodes in its bezel by disclosing that “an electrode may be disposed on a video display device 140 (e.g., a border of the display or integrated into a touch screen).” EX1005, ¶44. Figure 15 shows where in the bezel electrodes (1510, 1530, 1531) can be embedded:



The preliminary guidance found that Markel’s “disposed *on*” disclosure “does not

appear to disclose an electrode pad being embedded in an inner surface of Markel's device body or border." P.G., 25-26. But Markel explains that "disposed on" includes a pad "*integrated into* a touch screen." EX1005, ¶44. Markel's use of "disposed on" cannot be limited to being on an outer surface because a pad on the outer surface of the touchscreen would obscure the display. Moreover, Figure 15's dashed lines suggest that those electrodes are under the surface. Electrode 1540, which is underneath the display, uses the same dashed lines. Therefore, a POSITA would have understood Markel to disclose or suggest pads positioned underneath the bezel. EX1069, ¶¶339-340.

Lyons would have further motivated a POSITA to position the second pad underneath the exterior surface of the second portion of Markel's bezel. Lyons teaches placing capacitive touch sensor pads 122 on an inner surface of bezel 114:



EX1068, ¶26, Figs. 4, 6. A POSITA would have been motivated to place Markel's electrode pads under the bezel, as taught by Lyons, to accomplish Markel's goal of concealing the electrodes from the user. EX1005, ¶40. A POSITA would have been

further motivated to place the pads under the bezel to protect them (e.g., from water) and to improve reliability and aesthetics. EX1068, ¶27. EX1069, ¶¶341-343.

Further, a POSITA would have reasonably expected success in transmitting cardiac signals through the bezel to the pads. Transmitting cardiac signals to an internal ECG pad through an external conductive material that contacts the user's skin was well known before the '257 patent. *See* EX1074, ¶46, ¶55; *see also* EX1067. And while Lyons's capacitive-touch sensors do not measure ECG, they can "sense," through a bezel, "various electrical properties of the human body." EX1068 ¶44. Further, capacitive ECG sensors were well known before the '257 patent. *See* EX1075, 3:38-44, Figs. 1, 4A-4C; EX1076. In addition, Lyons expressly states its teachings can be applied to other, non-capacitive sensors. EX1068, ¶27. Finally, Mills discloses metal plating 14b that successfully transmits cardiac signals to the base metal 14a. EX1069, ¶¶343-347.

Accordingly, in view of these prior-art teachings, a POSITA would have been motivated to combine Markel and Mills, and would reasonably have expected success, to position the second pad underneath the exterior surface of the second portion of Markel's bezel. EX1069, ¶348.

3. "wherein the first and second pads are adjacent pads."

a. Anticipation

The '257 patent does not define "adjacent" but consistently describes adjacent

pads as separated from each other by a “sufficiently large” distance or near each other but separated by an insulating portion to avoid electrical interference. EX1001, 9:53-57, 2:51-59. Mills’s first and second pads are near each other in opposite top-and-bottom enclosure faces separated by an insulating portion of housing 12. Mills’s top-and-bottom-face placement is nearly identical to the left-and-right-face placement of leads 322 and 324 in Figure 3 of the ’257 patent. Thus, Mills’s first and second pads are adjacent. EX1069, ¶349.

b. Obviousness

The pads in the Markel-Mills combinations—which are located at the position of the electrodes to which they are connected, as explained in the Petition—are also adjacent. The pads of Markel’s electrodes 410b/420b are near each other on left and right sides of MCD 100 separated by an insulating portion, like leads 322 and 324 of Figure 3 of the ’257 patent. Pet., 56-57. And the pads of Markel’s Figure 15 bezel electrodes 1510 and 1530 are near each other on the same side of the bezel. *Id.*, 62. Figure 15’s electrode placement would have been obvious in MCD 100 because Markel teaches electrodes in “a border of the display” (¶44) and, as the Board determined, Figures 4 and 15 generally disclose the same embodiment. D.I., 43. Thus, Markel discloses adjacent pads. EX1069, ¶350.

B. Substitute Claim 24 Is Indefinite or Would Have Been Obvious over Markel and Mills or Markel, Mills, and Lyons

1. “The electronic device of claim 1, wherein the second lead is

configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second lead;

This limitation is obvious for the reasons provided in the Petition. Pet., 61-62. For example, Markel teaches the possibility of an electrode “exposed for user contact.” EX1006, ¶37. EX1069, ¶351.

2. “wherein the first pad is embedded in an inner surface of an electrically conductive metal bezel that forms a portion of an exterior surface of the electronic device; and”

As shown by the Petition, a first pad embedded in a bezel would have been obvious in view of Markel and Mills. Pet., 62. The limitations of substitute claim 24 differ from claim 12 because the bezel is metal, and the first pad is embedded in an “inner surface” of the bezel. These added limitations would have been obvious in view of Markel and Mills. As shown in the Petition, it would have been obvious to put Mills’s pad under Markel’s bezel, in which case it would be embedded in an interior surface of the bezel. Pet., 62; Reply, 26-27. As discussed with respect to claim 23, Markel’s disclosure of electrodes “disposed on” the device suggests electrodes being “integrated into” the bezel. *See* §V.A.2.b. A POSITA would have found it obvious to configure Markel’s bezel from a metallic conductive material to facilitate conduction of cardiac signals through the bezel. *See* EX1074, ¶46 (“Conducting material may be provided between the surface of the skin and the electrode area”). EX1069, ¶352.

Alternatively, the added limitations would have been obvious in view of

Markel, Mills, and Lyons. Lyons clearly teaches a sensor pad embedded in an “inner surface” of a metal bezel. *See* Lyons, Figure 4, ¶20. As explained above in §V.A.2.b, a POSITA would have been motivated to embed a pad like Mills’s in the inner surface of the bezel for reliability, protecting the device from water, and aesthetics and style. EX1068, ¶27. A POSITA would have found it obvious to configure the bezel from metallic conductive material to facilitate transmission of cardiac signals through the bezel. *See id.*, ¶26 (discussing electrical signals through the bezel); *see also* EX1074, ¶46. EX1069, ¶353.

Accordingly, it would have been obvious to a POSITA to embed the pad in the inner surface of a metal bezel in view of Markel and Mills or Markel, Mills, and Lyons. EX1069, ¶354.

3. **“wherein the second pad is exposed on the exterior surface of the electronic device for direct contact from a user”**

This limitation would have been obvious under any construction of “embedded in” that does not require the top surface of the pad to be covered by the enclosure. However, the limitation is indefinite if “embedded in” requires the top surface of the pad to be covered by the enclosure because, under that construction, the pad could not both be “embedded in” the enclosure (as required by claim 1) and have “direct contact from the user.” EX1069, ¶355.

Markel teaches having some electrodes exposed and others hidden: “*an electrode* (or all electrodes) or other sensor may be substantially concealed (or

hidden) from a user.” EX1005, [0040]. Markel teaches the possibility of a surface “electrode [that] may comprise a metallic surface exposed for user contact.” EX1005, ¶37. Thus, Markel teaches this limitation, and the selection of a hidden or exposed electrode would have been a mere design choice. *See KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740 (2007). A POSITA would have chosen a hidden electrode for aesthetic reasons or an exposed electrode for maximizing signal strength. EX1069, ¶356.

C. Substitute Claim 25 Would Have Been Obvious Over Markel and Mills or Markel, Mills, and Lyons

1. **“The electronic device of claim 1, further comprising a touch screen display, wherein the first portion of the enclosure is a bezel; wherein the bezel extends around the touch screen display; and”**

As shown in the Petition and Markel’s Figure 15 reproduced above in §V.A.2.b, Markel’s bezel extends around “a touch screen portion of the display device.” EX1005, ¶78; Pet., 62. EX1069, ¶357.

2. **“wherein the first pad is embedded in an inner surface of the bezel”**

A pad embedded on an inner surface of a bezel would have been obvious to a POSITA, as discussed in Section §V.B.2. EX1068, ¶27. EX1069, ¶358.

D. Substitute Claim 26 Is Indefinite or Would Have Been Obvious Over Markel and Mills or Markel, Mills, and Lyons

1. **“wherein the second first portion of the enclosure is a bezel, the electronic device further comprising:”**

As discussed above in §V.A.2.b, Markel in view of Mills and Markel in view of Mills and Lyons teaches electrodes embedded in a device bezel. EX1069, ¶359.

2. **“a third lead comprising a third pad that is embedded in the second portion of the enclosure ...”**

These limitations would have been obvious under any construction of “embedded in” that does not require the top surface of the pad to be covered by the enclosure. However, these limitations are indefinite if “embedded in” requires the top surface of the pad to be covered by the enclosure because, under that construction, the pad could not both be “embedded in” the enclosure and have contact with the user’s skin. As discussed above, Markel teaches both electrodes that are hidden and others that are exposed to the user’s skin. §V.B.3; EX1005, ¶37. The selection of a hidden or exposed electrode would have been a mere design choice. *KSR*, 127 S.Ct. at 1740. A POSITA would have chosen a hidden electrode for aesthetics or an exposed electrode for maximizing signal strength. EX1069, ¶360.

As shown above in §V.A.2.b regarding Markel’s Figure 15, Markel teaches at least three leads (1510, 1530, 1531), including a third lead with a third pad that is embedded in the second portion of the enclosure (bezel) around a touchscreen. Markel’s third pad detects a third electrical signal via the user’s skin’s contact with the third pad. For example, Markel states that “the MCD 100 may be adapted to detect cardiac activity of a user that is conductively coupled to at least two of a first, second and third (or N) electrodes.” EX1005, [0051]. Thus, Markel discloses these

limitations, including detecting cardiac signals through first, second, and third electrodes (1510, 1530, 1531). EX1051, ¶¶170-172. EX1069, ¶361.

3. **“wherein the second pad is configured to detect the second electrical signal ... wherein the first pad detects signals through a first hand, and the second and third pads detect signals through a second hand.”**

As discussed in §V.B.3, Markel discloses a second pad configured to detect the second electrical signal via the user’s skin’s contact with the second pad. For example, Markel discloses an “exposed” electrode surface. EX1005, ¶37. Thus, Markel discloses the first part of this limitation. EX1069, ¶362.

Concerning detecting signals “through a first hand” and “through a second hand,” Markel teaches that electrodes may have a “*placement . . . for convenient access* for a user to contact both the first and second electrodes simultaneously (e.g., with different hands or different fingers).” EX1006, ¶49. A POSITA would have found it obvious to use a “second hand” to contact both the second and third electrodes to provide redundancy, noise cancellation for the signal, or as a reference/neutral electrode that may also include a right-leg drive configuration. *See* EX1006, ¶51 (“third (or N) electrodes”); ¶88 (“additional “Nth electrode”); EX1052 at 230:2-4 (Apple’s expert testifying “if you can have a third electrode, you have an opportunity to capture a cleaner signal”); EX1056, 4:12-18 (“one hand makes contact with two of the contacts, and the other hand makes contact with the third contact.”); *Id.*, 7:33-34; EX1057, abstract. The figure below shows a user naturally

would touch the three electrodes with two hands:

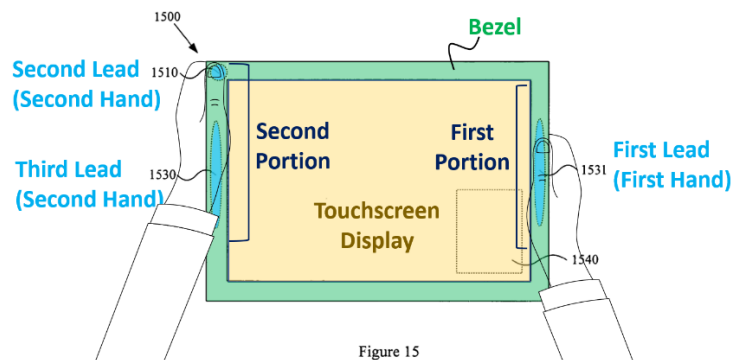


Figure 15

A POSITA would have understood that a user can easily touch three electrodes with two hands in the Figure 4 format as well, since Figure 15 provides sample placement for electrodes. Finally, claim 26's recitation regarding the *use* of a device with a first hand and second hand does not structurally limit the device, as the preliminary guidance correctly states. P.G., 13. EX1069, ¶¶363-364.

E. Substitute Claim 27 Would Have Been Obvious over Markel and Mills or Markel, Mills, and Kyoso

The limitations of original claim 14, including a first pad “positioned on the interior surface,” are anticipated by Mills or obvious in view of Markel and Mills for the reasons provided in the Petition. Pet. 39-40, 63-64. Additionally, a pad positioned on an interior surface would have been obvious for the reasons provided in §V.A.2.b above. EX1069, ¶365.

Regarding authentication, Markel discloses a cardiac information processing system (MCD 1700) that applies to each embodiment in Figures 1-16. EX1005, ¶85. This processing system has a “cardiac information acquisition module 1710 [that]

acquires cardiac information from a plurality of users” and “may store at least a portion of such acquired information in the memory 1740 (e.g., indexed by user identification).” EX1005, ¶98. The module 1710 is “adapted to identify the user” based on acquired cardiac information. EX1005, ¶97. This cardiac information acquisition performs authentication and “such identification (or *authentication*) may be utilized in an exemplary scenario where a variety of users may be utilizing the MCD 1700.” EX1005, ¶97. The processing system “MCD 1700 may store, *analyze* and/or communicate acquired cardiac information.” EX1005, ¶98. Thus, it would have been obvious to compare acquired signals to the “stored” cardiac signals to match a user “indexed by user identification” and perform “authentication.” See EX1005, ¶¶97-98. EX1069, ¶366.

Alternatively, Kyoso also teaches an “ECG identification system” that “identifies subjects based on a *comparison* of a patient’s ECG with *previously registered* ECG feature parameters.” EX1070 at Abstract. Kyoso teaches that “[i]n order to perform any identification process, feature parameters must be *extracted* from the ECG” and those extracted signals are used to “discriminate between the registered ECGs.” EX1070 at 1. Using the extraction and comparison techniques taught in Kyoso “the system can discriminate between registered subjects within a single [heart]beat.” EX1070 at 1. EX1069, ¶367.

A POSITA would have found it obvious to combine the authentication process

taught by Markel with the extraction, comparison, and authentication techniques of Kyoso at least because Markel and Kyoso both teach identification of an individual based on heart signals. Furthermore, a POSITA would have found authentication beneficial to (1) ensure device security, (2) add a unique identifier used in conjunction with fingerprint reading or other biometrics, (3) enable an identifier that does not require keys or passcodes, and (4) secure protected healthcare information with the user. Finally, it would have been obvious because many other references taught such ECG authentication years before the '257 patent priority. *See* EX1077 at 13-14 (teaching ECG authentication in a “convenient [] low cost” measurement hardware to be used “in daily life”); EX1055; EX1078 (an ECG identification system should “require[] only to be touched by the hands or two fingers while still providing the required signal quality”); EX1079, Fig. 1. EX1069, ¶368.

VI. CONCLUSION

Accordingly, the Board should deny Apple’s revised motion to amend.

Respectfully submitted,

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Dated: June 24, 2024

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CERTIFICATE OF SERVICE

I hereby certify that, pursuant to 37 C.F.R. §42.105, a true and correct copy of the foregoing **PETITIONER'S OPPOSITION TO PATENT OWNER'S REVISED CONTINGENT MOTION TO AMEND** is being served electronically on June 24, 2024, to the e-mail addresses shown below:

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