

ALIVECOR, INC.,
Petitioner,
v.
APPLE INC.,
Patent Owner.

U.S. Patent Nos.
U.S. Patent No. 10,866,619 B2
AIA Review Nos. IPR2023-00948, -00949

Petitioner's Demonstratives
Under 37 C.F.R. § 42.70(b) for
September 25, 2024, Oral Argument

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 1

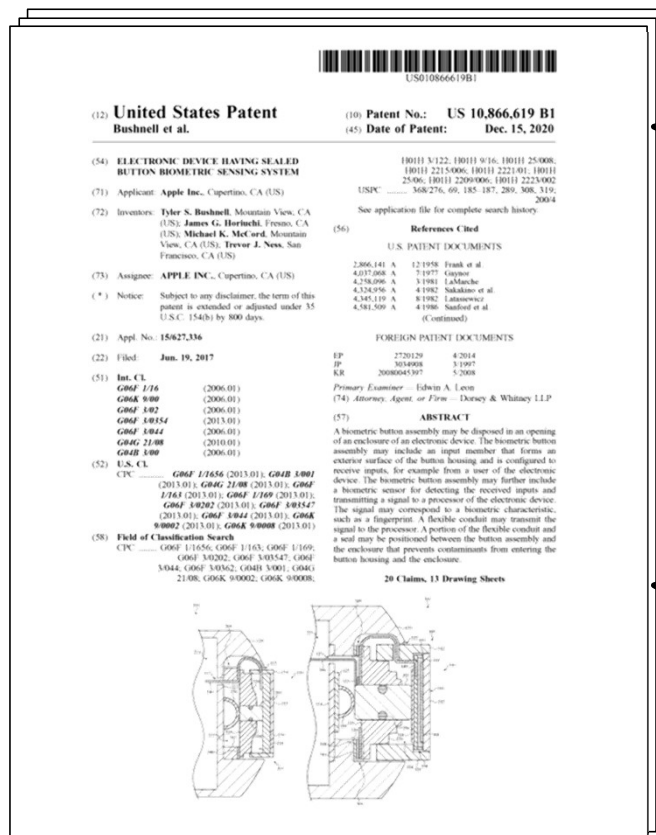
ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Kim Grounds
4. Jung + Myers Grounds
5. Chang Grounds

ROADMAP

1. Overview of the Challenged Patent
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5. Chang Grounds

Overview of the '619 Patent



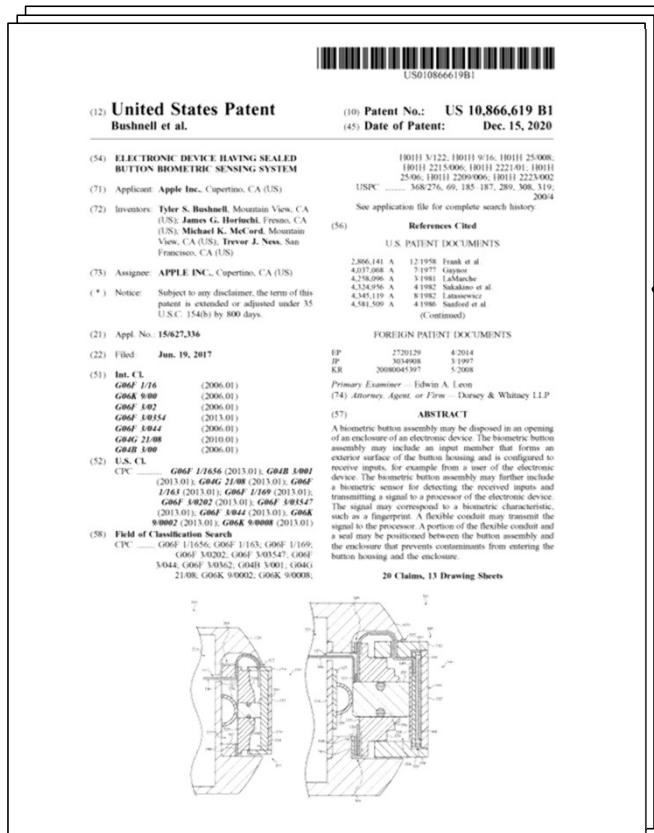
Overview of the '619 Patent

1. An electronic device comprising:
an enclosure having an enclosed volume and an opening formed in a sidewall;
a processor positioned in the enclosed volume;
a button assembly within the opening, the button assembly comprising:
an input member having an input surface; and
a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;
a seal positioned between a sealing surface of the button assembly and the enclosure; and
a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:
a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

11. A fingerprint sensing system for a wearable device comprising:
an enclosure defining an enclosed volume and an opening along an exterior surface;
a processor disposed in the enclosed volume;
a button assembly positioned in the opening and defining an input surface, the button assembly comprising:
a fingerprint sensor positioned inward from the input surface; and
a retainer positioned inward from the input surface and defining a sealing surface;
a seal disposed between the sealing surface of the retainer and a surface of the opening;
a passage extending from the opening to the enclosed volume; and
a flexible conduit electrically connecting the fingerprint sensor to the processor; wherein:
a portion of the flexible conduit is sandwiched between the seal and the sealing surface of the retainer or between the seal and the surface of the opening.

16. A watch comprising:
an enclosure defining an enclosed volume and an opening formed in a sidewall;
a processor disposed in the enclosed volume;
a display positioned within the enclosure and operably coupled to the processor;
a watchband attached to the enclosure and configured to couple the watch to a user; and
a button assembly disposed within the opening, the button assembly comprising:
a button housing;
an input member with an input surface;
a fingerprint sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a fingerprint;
a touch sensor configured to detect the touch;
a flexible conduit electrically coupled to the fingerprint sensor and configured to transmit the output signal to the processor; and
a seal positioned between the button housing and a surface of the opening;
wherein a portion of the flexible conduit is sandwiched between the seal and the button housing or between the seal and the surface of the opening.

Overview of the '619 Patent



'619 Patent

1. An electronic device comprising:
 - an enclosure having an enclosed volume and an opening formed in a sidewall;
 - a processor positioned in the enclosed volume;
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 - a seal positioned between a sealing surface of the button assembly and the enclosure; and
 - a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:
 - a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

[1.pre]

[1.a]

[1.b]

[1.c]

[1.d]

[1.e]

[1.f]

ROADMAP

1. Overview of the Challenged Patent
- 2. Claim Construction**
3. Kim Grounds
4. Jung + Myers Grounds
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a button assembly within the opening, the button assembly comprising:

- an input member having an input surface; and
- a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;



“biometric characteristic”

AliveCor’s Construction	Apple’s Construction
“a human characteristic that is so distinctive and measureable that a particular human individual may be identified”	“This term does not require an express construction”

Construction is Necessary

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
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v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

- (4) The Kim Combination Fails To Satisfy The Requirement Of A Biometric Sensor Positioned Below The Input Member Recited In Limitation [1.c.ii]

• • • •

AliveCor's omission of fingerprint sensor 240p1 also runs contrary to how a POSITA would have understood functionality of the fingerprint sensor assembly of Kim's Figure 10 embodiment. APPLE-2009, ¶83. The fingerprint sensor assembly of this embodiment relies on data collected by each of fingerprint sensors 240p1 and 240p2 to generate a composite fingerprint image. Ex-1004, 2:63-22:3.

Patent Owner's Response

Definitional Syntax and Punctuation

Intercept Pharms., Inc. v. Apotex Inc.

“[T]he phrase ‘as used herein’ has been recognized as definitional in a wide host of Federal Circuit and district court cases.”

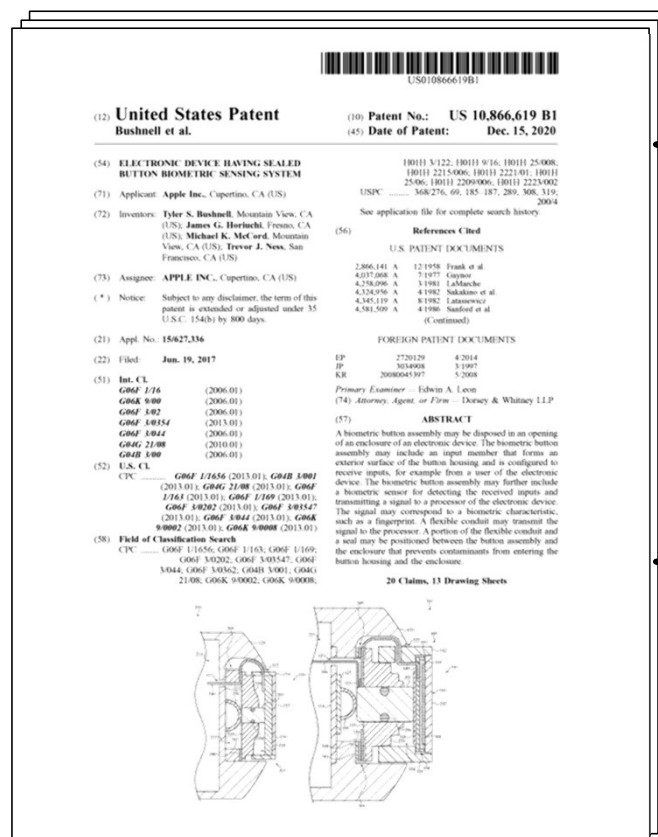
No. CV 20-1105, 2022 WL 856859, at *3 (D. Del. Mar. 23, 2022)

Sinorgchem Co. v. ITC

“The term . . . is set off by quotation marks—often a strong indication that what follows is a definition.”

511 F.3d 1132, 1136 (Fed. Cir. 2007)

“biometric characteristic”

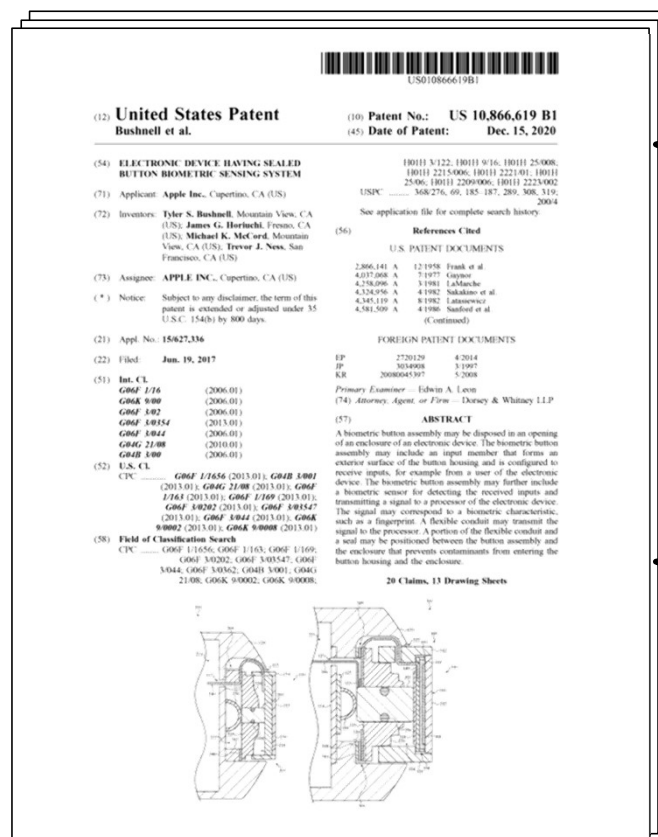


tive sensor that can be used to identify a fingerprint. “Biometric sensor,” as used herein, may be used to refer to a sensor that can identify or determine a human physical characteristic. The sensed human physical characteristic may vary widely, but may include fingerprint, palm veins, DNA, heart rate, and blood pressure. A capacitive biometric

A “biometric characteristic” or a “biometric identifier,” as used herein, may refer to a human characteristic that is so distinctive and measureable that a particular human individual may be identified. Fingerprints and DNA are example biometric characteristics.

’619 Patent

“biometric characteristic”

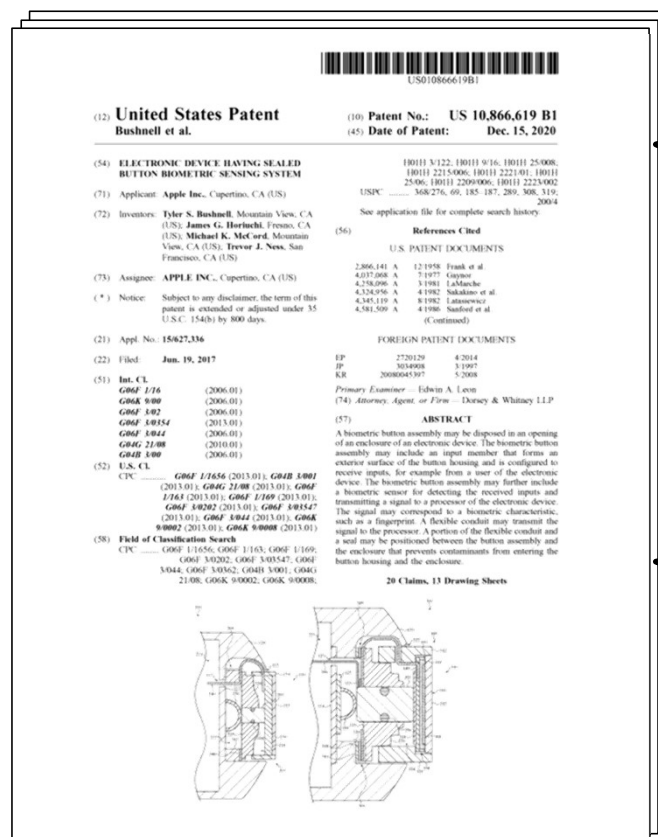


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’619 Patent

“biometric characteristic”



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A “biometric characteristic” or a “biometric identifier,” as used herein, may refer to a human characteristic that is so distinctive and measureable that a particular human individual may be identified. Fingerprints and DNA are example biometric characteristics.

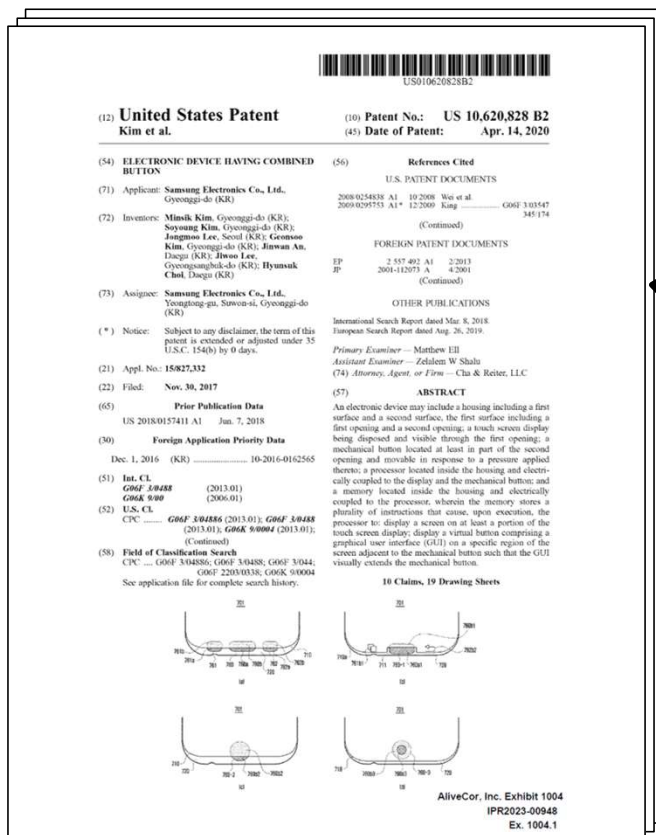
’619 Patent

ROADMAP

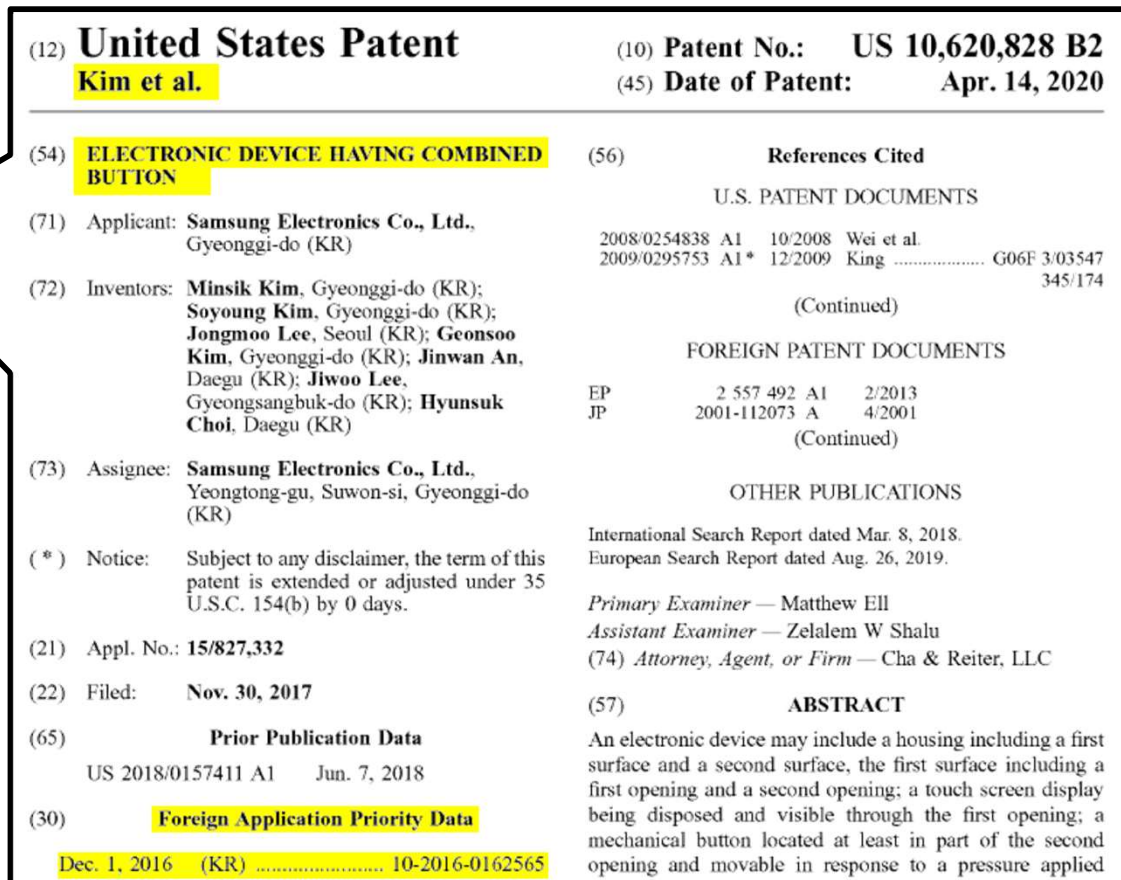
1. Overview of the Challenged Patent
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Grounds 1, 2 – Overview

Claims 1-10 are Unpatentable Under 35 U.S.C. §§102
and/or 103 over *Kim*.

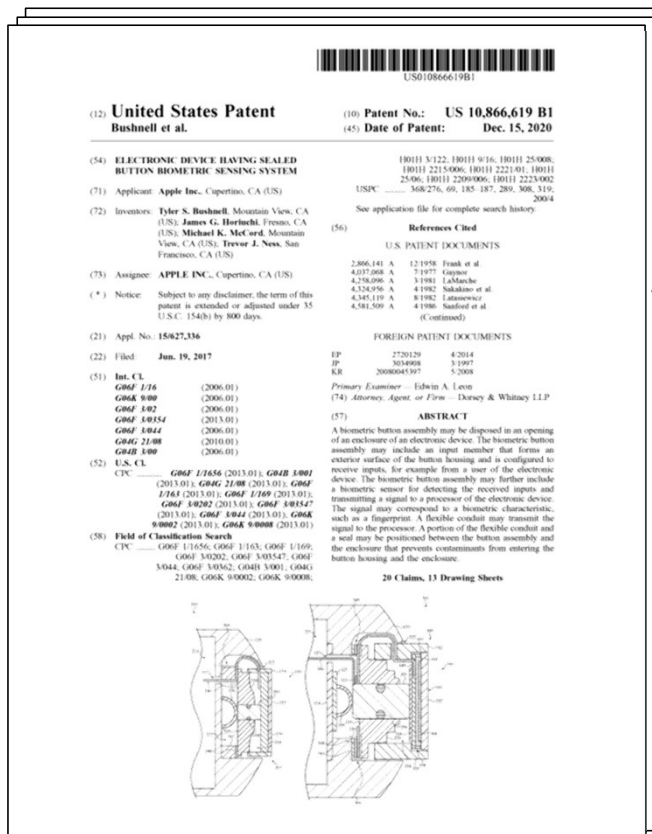


Kim



Grounds 1, 2 – Disputes

Claims 1-10 are Unpatentable Under 35 U.S.C. §§102
and/or 103 over *Kim*.



'619 Patent

1. An electronic device comprising:
an enclosure having an enclosed volume and an opening
formed in a sidewall;
a processor positioned in the enclosed volume;
a button assembly within the opening, the button assembly comprising:
an input member having an input surface; and
a biometric sensor positioned below the input member
and configured to produce an output signal in
response to a touch on the input surface, the output
signal corresponding to a biometric characteristic;
a seal positioned between a sealing surface of the button
assembly and the enclosure; and
a flexible conduit coupled to the biometric sensor and
configured to transmit the output signal to the processor;
wherein:
a portion of the flexible conduit is sandwiched between
the seal and the sealing surface or between the seal and
the enclosure.

[1.pre]



[1.a]



[1.b]



[1.c]

[1.d]



[1.e]



[1.f]



Grounds 1, 2 – Claim 1, [1.c]

[1.c.i] a button assembly within the opening, the button assembly comprising: an input member having an input surface;

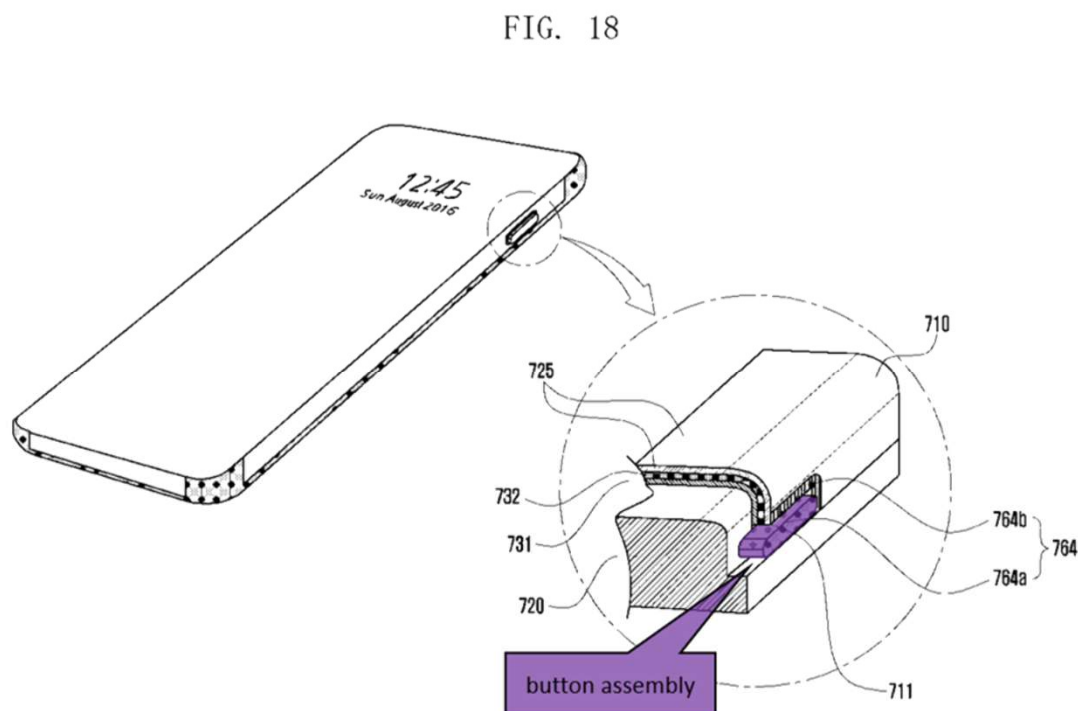
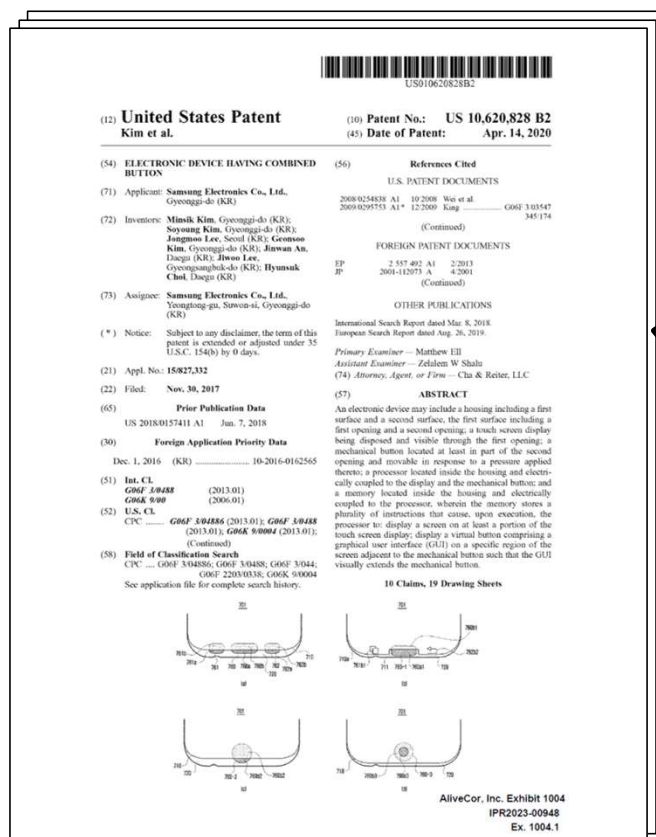
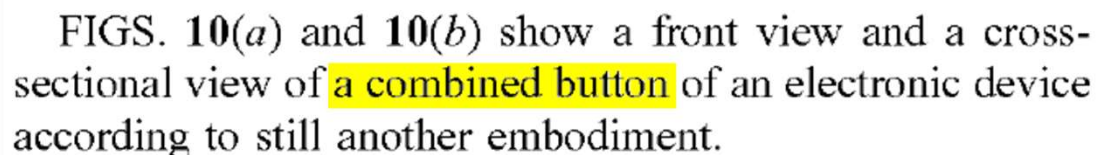


FIG. 18 shows a perspective view of an electronic device and a partially enlarged view of an area of the electronic device including a combined button of an electronic device according to one embodiment.

Kim

[1.c.i] a button assembly within the opening, the button assembly comprising: an input member having an input surface;



***[1.c.ii] ... a biometric sensor positioned below
the input member ...***

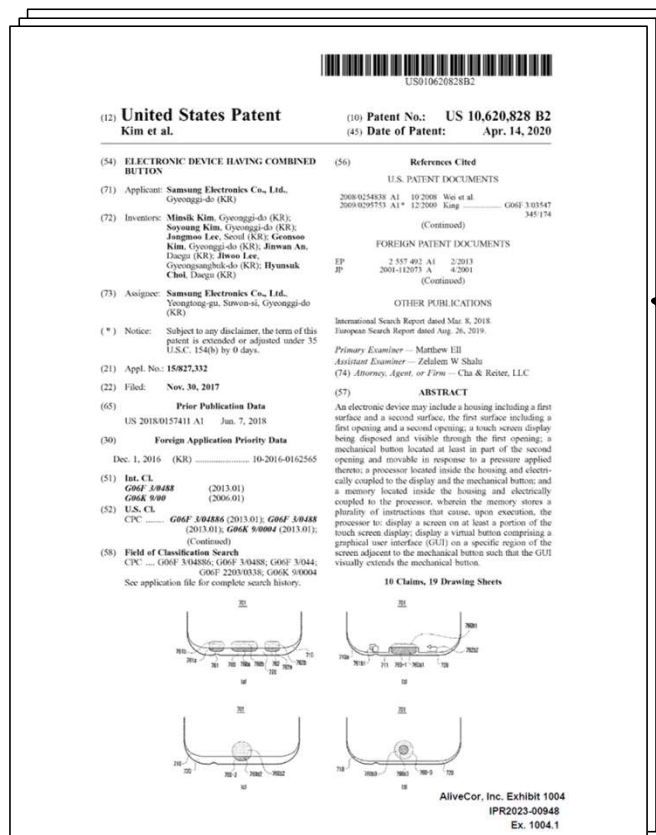


Grounds 1, 2 – Claim 1, [1.c]

[1.c.ii] ... a biometric sensor ... configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;

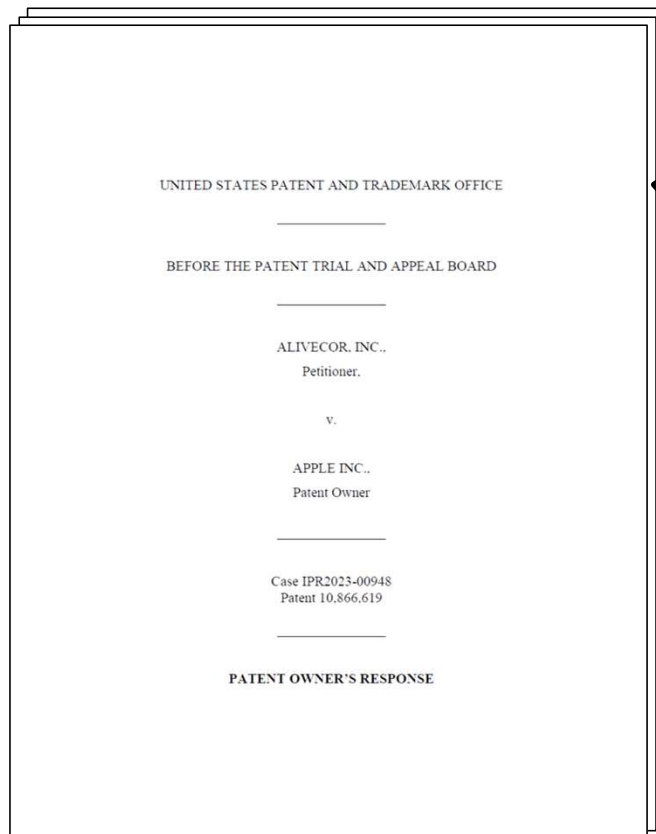
On the PCB 705, a flexible PCB 706s may be disposed separately. The fingerprint sensor may be a capacitive fingerprint sensor 240p2 embedded in the physical button 760a. The flexible PCB 706s may be electrically connected to the capacitive fingerprint sensor 240p2.

On the intermediate of the housing 720, the flexible PCB 706 may be disposed. The flexible PCB 706 may be electrically connected to the capacitive fingerprint sensor 240p2 embedded in the physical button 760a.



Kim

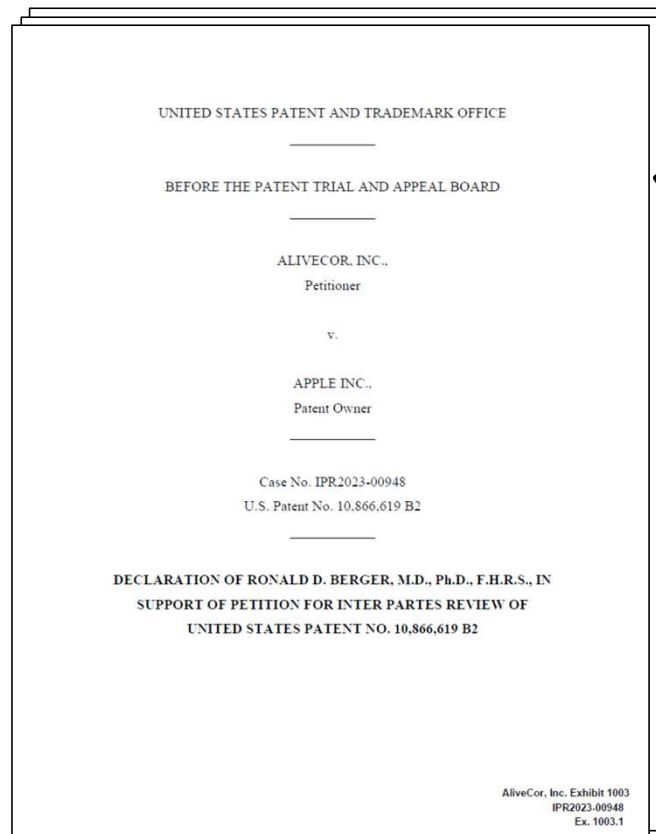
Grounds 1, 2 – Claim 1, Apple’s Argument #1



Patent Owner’s Response

AliveCor’s anticipation theory based on Kim requires each of the Figure 10 and Figure 18 embodiments, because neither embodiment—alone—satisfies every requirement of the *button assembly*. As explained in §IV.A, these requirements include (1) comprising a *biometric sensor*, (2) being *within [an] opening [formed in a sidewall]*, and (3) including a structural arrangement where *[a] portion of the flexible conduit* is *sandwiched* between (a) a *seal* and a *sealing surface*, or (b) the *seal* and the *enclosure*. Based on AliveCor’s own mapping to the *sidewall* limitations, Kim’s Figure 10 embodiment fails to satisfy requirement (2) because the “combined button” is not positioned in *within [an] opening* that is *formed in a sidewall*. Kim’s Figure 18 embodiment fails to satisfy requirement (3) because there is no component purportedly representing *a portion of [a] flexible conduit* that is *sandwiched between* components representing (a) *the seal* and *the sealing surface* or (b) *the seal* and *the enclosure*. APPLE-2009, ¶¶40-41.

Grounds 1, 2 – Claim 1, Apple's Argument #1



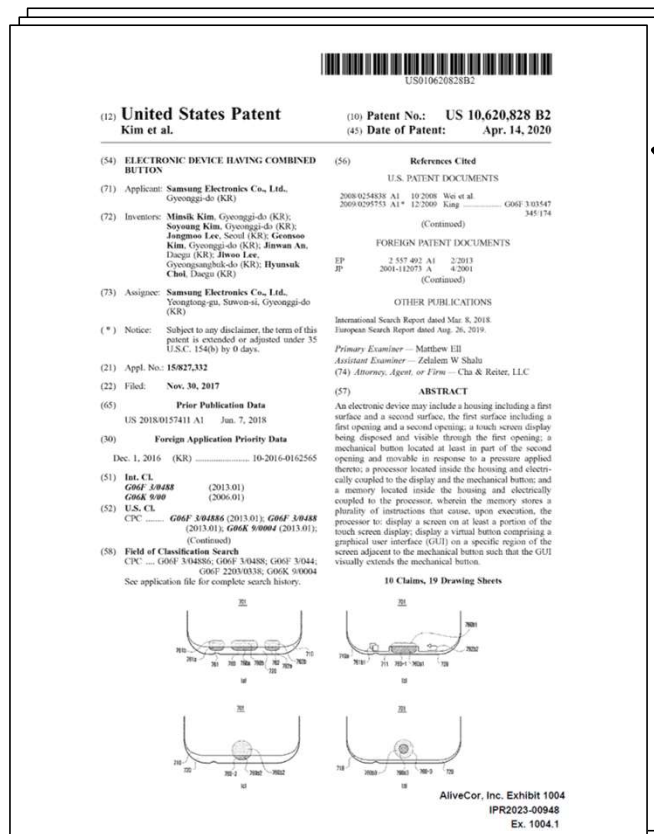
Berger Declaration

108. Second, *Kim* discloses that the enclosure has an opening formed in a sidewall. For example, *Kim* discloses an “opening 711” (Ex-1004, 18:19-24; Ex-1022, ¶132), which corresponds to the claimed “opening formed in a sidewall” of element [1.pre]. *Kim* further discloses that “[i]n the opening 711, a part of the home button 760-1 which is the combined button may be positioned” (Ex-1004, 18:23-24; Ex-1022, ¶132). An enclosure having an enclosed volume and an opening formed in a sidewall is disclosed in at least *Kim*’s Figure 18 (annotated below):

• • • •

109. *Kim* further contemplates that the “combined button” is a button assembly within an opening formed in a sidewall. For example, *Kim* discloses that “a power button . . . located on the *lateral* [*i.e.*, side] *surface* of the electronic device 600 *may also be the combined button*” (Ex-1004, 17:10-12 (emphasis added); Ex-1022, ¶166). As another example, *Kim* discloses that “the *combined buttons may further include a power button (764 in FIG. 18)* and/or a volume button (not shown). Although the home button is described as an example of the combined button in this embodiment, *the combined button is not limited to the home button*” (Ex-1004, 13:46-53 (emphasis added); Ex-1022, ¶89).

Grounds 1, 2 – Claim 1, Apple's Argument #1



Kim

In FIG. 18, the combined button located on the lateral surface of the electronic device 701 may be implemented as a power button 764 (or a power/hold button). The power button 764 which is the combined button may include a physical button 764a and a virtual button 764b. When the display 710 is extended toward the bottom of the lateral surface (e.g., closer to the back surface) of the electronic device, the physical button 764a may be located in the display 710, and the virtual button 764b may surround the physical button 764a and be located on the display 710. The power button 764 which is the combined button may include an oval shape or a rectangular shape.

Under the physical button 764a of the power button 764, a sensor (e.g., a fingerprint sensor) may be disposed. The fingerprint sensor may include an optical fingerprint sensor, a capacitive fingerprint sensor, or an ultrasonic fingerprint sensor.

Kim's Figure 18 and Figure 10(b) are directed to a single invention.

Grounds 1, 2 – Claim 1, Apple’s Argument #1

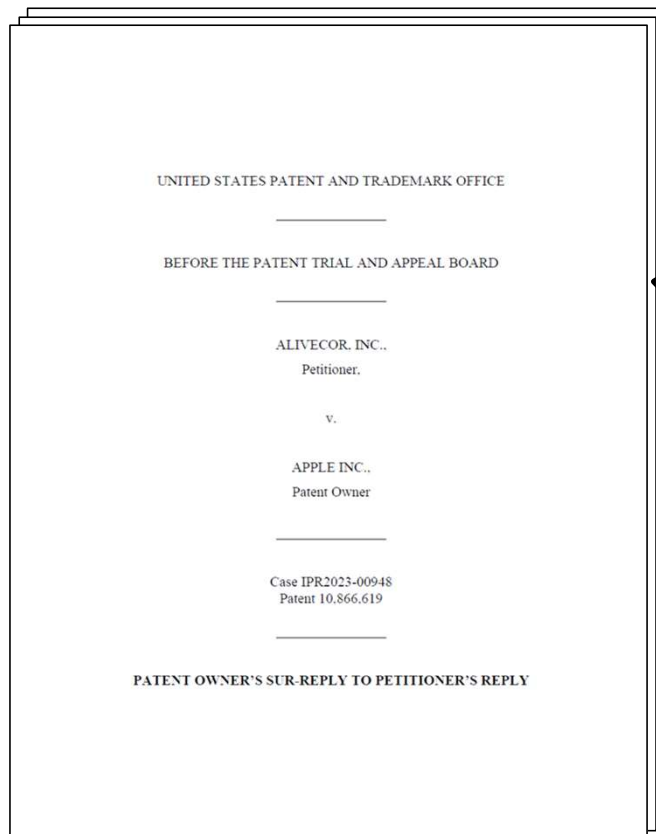
Chamberlain Grp., Inc. v. Techtronic Indus. Co.,

“[E]ven when a reference discloses elements in different locations in the disclosure, the relevant question [for anticipation] is whether the reference is sufficiently clear in disclosing the combinability of those elements such that a skilled artisan would at once envisage the claimed combination.”

935 F.3d 1341, 1350 (Fed. Cir. 2019) (internal marks omitted)

Kim’s Figure 18 and Figure 10(b) are directed to a single invention.

Grounds 1, 2 – Claim 1, Apple’s Argument #1

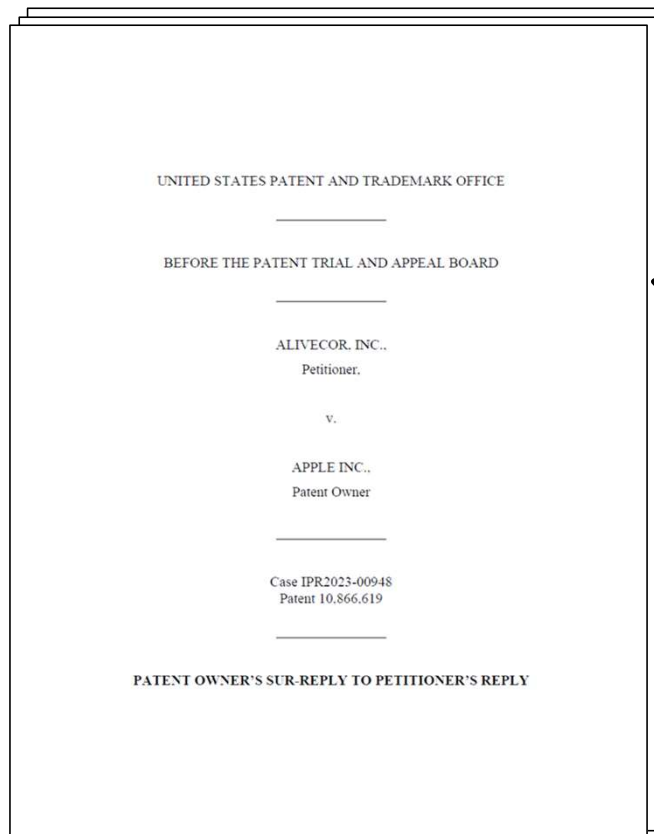


Patent Owner's Sur-Reply

Attempting to cure this deficiency, AliveCor now resorts to characterizing Kim as disclosing a “single invention.” *See* Reply, 3, 4, 6. But this contradicts Kim’s unambiguous disclosure of “various embodiments” of an “electronic device having a combined button” implemented as a combination of a physical button and a virtual button...” Ex-1004, 2:29-34.¹ Kim also uses the term “embodiment” more than seventy times within its disclosure, further indicating that Kim describes several different embodiments rather than a “single invention.” AliveCor’s

once envisage” the combination. *See* Reply, 4. But, absent generic broadening disclosures within Kim, AliveCor is unable to identify any specific teaching or suggestion relating to Kim’s Figures 10 and 18 embodiments that would have led a POSITA to envisage AliveCor’s proposed combination. Instead, “[t]he most

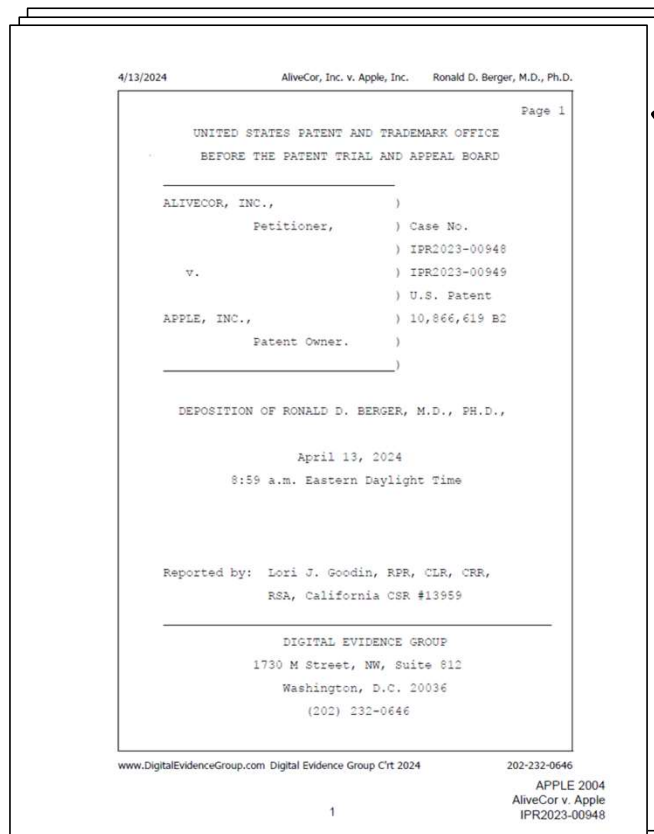
Grounds 1, 2 – Claim 1, Apple’s Argument #1



Patent Owner's Sur-Reply

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Grounds 1, 2 – Claim 1, Apple's Argument #1



Berger Tr.

Q. Okay. Now, is it your opinion that [Kim] is talking about the side wall in Figure 18, which is on the previous page, which you have cited on the previous page?

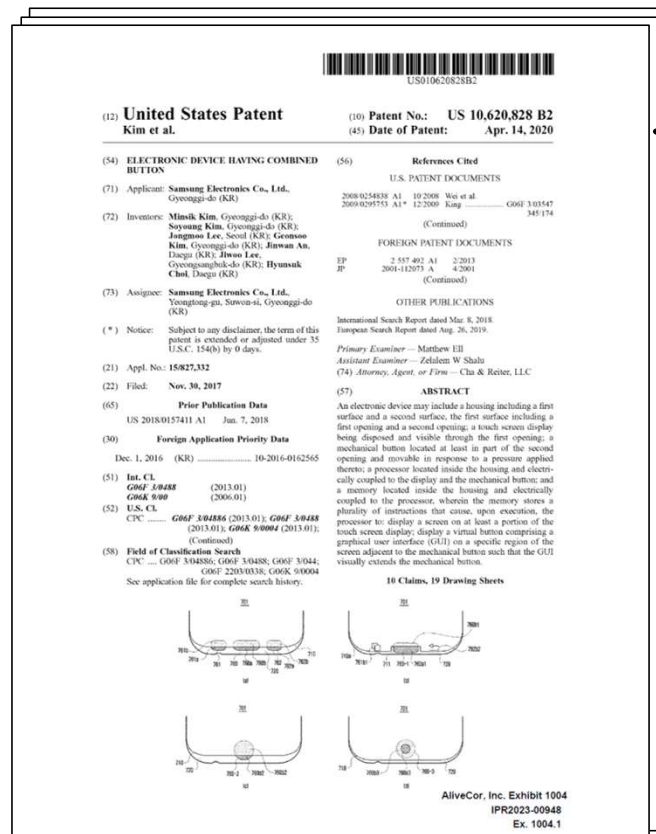
A. . . . So, I think that button could be placed -- I think it may be the same button, just shown in a different figure. . . .

. . . . But, in Figure 18, it clearly shows it on the side. And Kim makes clear that the same button could be, could be in other locations than the front.

Q. And you will agree with me that Figure 18 is a different embodiment than Figure 7. Correct?

A. I think Figure 18 shows the button in a different embodiment.

Grounds 1, 2 – Claim 1, Apple's Argument #1



FIGS. 7 and 18 show examples of the combined button located on the front surface or the side surface of the electronic device 701. In FIGS. 7(a)-(d), the combined button is located on the front surface of the electronic device 701. In FIG. 18, the combined button is located on the lateral surface (or the back surface) of the electronic device 701. The combined button may be located on the front and lateral surfaces of the electronic device 701 together.

Kim

Grounds 1, 2 – Claim 1, Apple’s Argument #2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

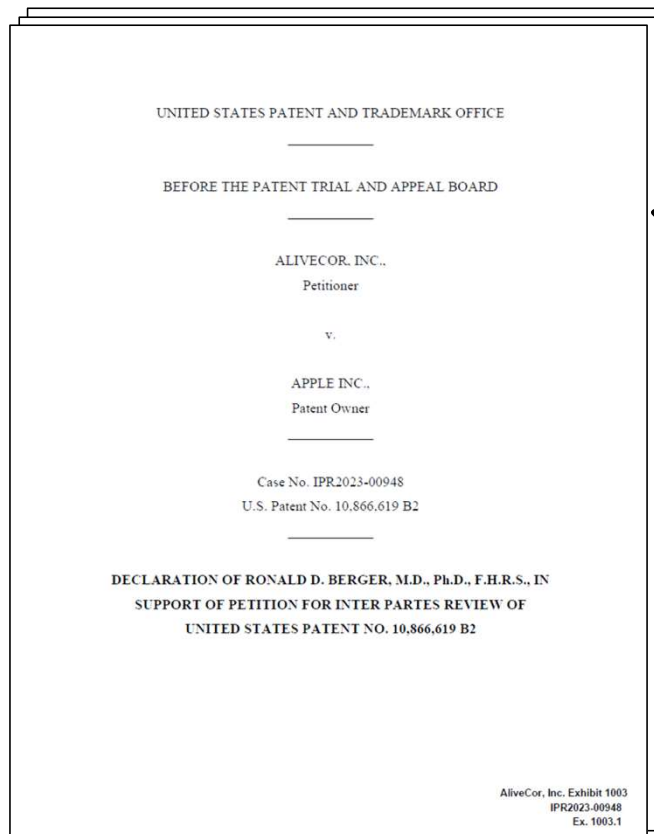
Case IPR2023-00948
Patent 10,866,619

PATENT OWNER’S RESPONSE

In Grounds 1 and 2, AliveCor combines Kim’s Figure 10 and Figure 18 embodiments (“the Kim Combination”) by positioning the fingerprint sensor assembly of the Figure 10 embodiment on a lateral surface of a device of the Figure 18 embodiment. Pet., 10. But AliveCor incorrectly assumes that Kim’s Figure 10 button is the same button as the Figure 18 button, and fails to offer sufficient explanation of motivation to combine or reasonable expectation of success that would support using the Figure 10 button in the Figure 18 embodiment. These failings alone render the Petition deficient. APPLE-2009, ¶53.

Patent Owner’s Response

Grounds 1, 2 – Claim 1, Apple's Argument #2



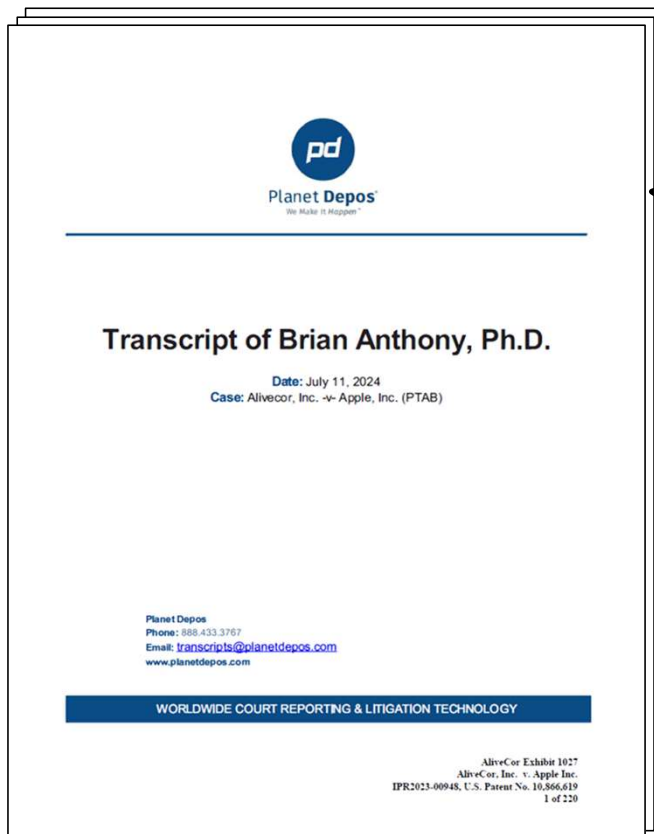
Berger Declaration

119. Furthermore, *Kim*'s Figure 10(b) (annotated below) shows a "cross-sectional view of [the] *combined button*" (Ex-1004, 21:20-22 (emphasis added); Ex-

...

120. *Kim* further contemplates that the "combined button" is a button assembly within an opening formed in a sidewall. For example, *Kim* discloses that "a power button . . . located on the *lateral* [*i.e.*, side] *surface* of the electronic device 600 *may also be the combined button*" (Ex-1004, 17:10-12 (emphasis added); Ex-1022, ¶166). As another example, *Kim* discloses that "the *combined buttons may further include a power button (764 in FIG. 18)* and/or a volume button (not shown). Although the home button is described as an example of the combined button in this embodiment, *the combined button is not limited to the home button*" (Ex-1004, 13:46-53 (emphasis added); Ex-1022, ¶89).

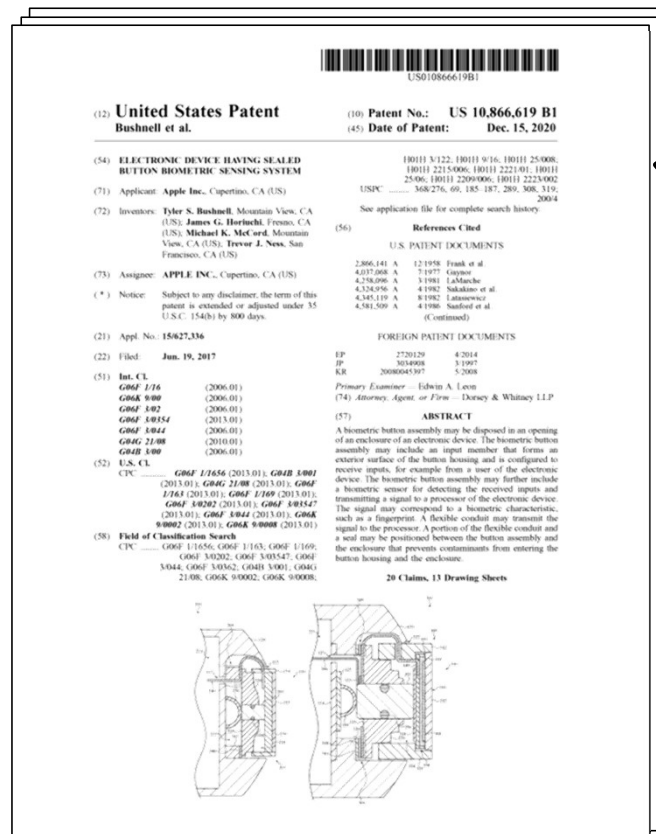
Grounds 1, 2 – Claim 1, Apple's Argument #2



A So, again, I didn't need to opine upon the particular processing steps that a POSITA would use, but a POSITA would know the different configurations, different embodiments for the different uses would require different processing steps, and a POSITA would be familiar with different processing steps to accomplish such.

Anthony Tr.

Grounds 1, 2 – Claim 1, Apple's Argument #2



The biometric button assembly 110 is positioned or set in an opening of the electronic device 100. The button assembly 110 may be disposed on any of several locations of the electronic device 100. For example, the button assembly 110 may be positioned along a sidewall of an enclosure 120 of an electronic device 100, as depicted in FIG. 1, in which the button assembly 110 is positioned on a sidewall of a watch.

Elements of the button assembly 110 may be integrated with other components of an electronic device. For example, a biometric sensor may be integrated with the rotatable watch crown 102 of a watch. In such an embodiment, a surface of the watch crown may provide an input surface for a biometric sensor of the button assembly, while the watch crown 102 maintains an ability to rotate. In some embodiments, the button assembly 110 may be positioned on a different portion of an electronic device 100, such as on an upper face of an electronic device 100. For example, the button assembly 110 may be disposed adjacent the keyboard of a laptop computer.

'619 Patent

Grounds 1, 2 – Claim 1, Apple's Argument #2

General Elec. Co. v. Raytheon Techs. Corp.

“[T]he Board’s approach would require a motivation to combine each element of the claim—even those present together in a reference. This analysis unduly dissects prior art references into collections of individual elements, requiring a party showing obviousness to re-do the work already done in the prior art reference.”

983 F.3d 1334, 1352 (Fed. Cir. 2020)

A POSITA would have been motivated to combine *Kim’s* Figures 10 and 18 with a reasonable expectation of success.

Grounds 1, 2 – Claim 1, Apple's Argument #3

[1.c.ii] ... a biometric sensor positioned below the input member ...

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
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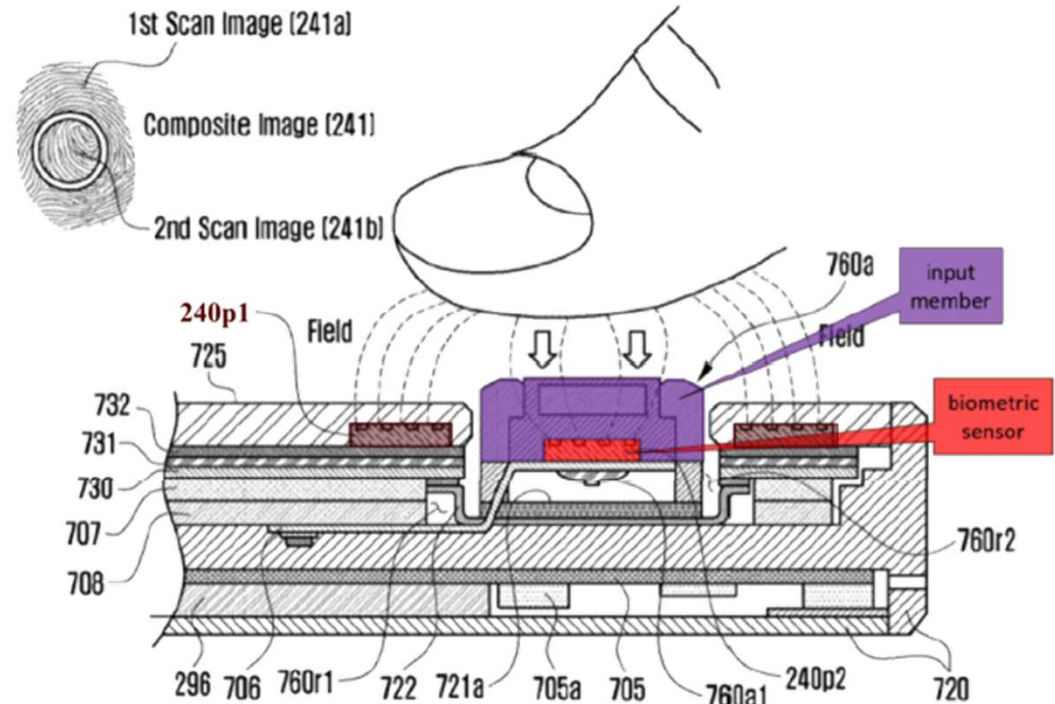
v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

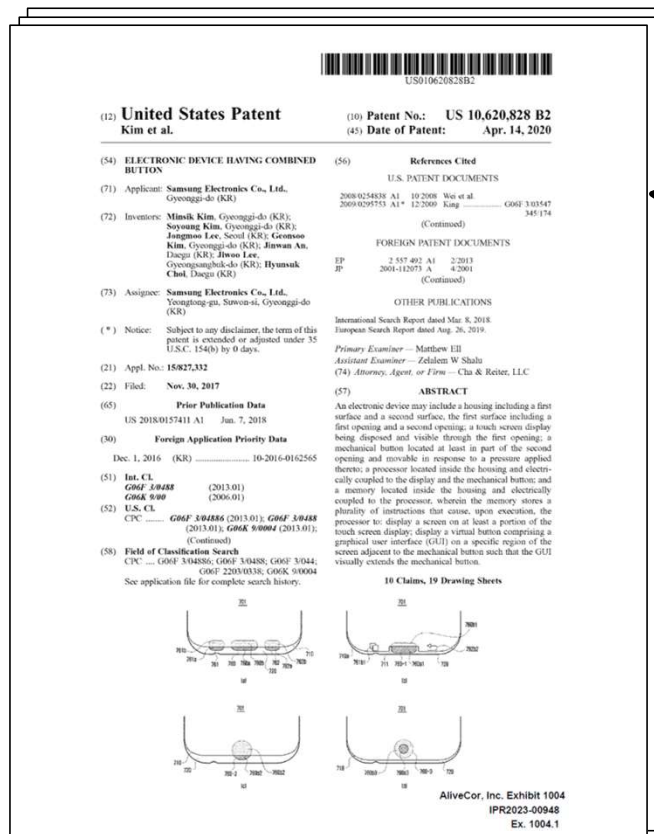
PATENT OWNER'S RESPONSE

Patent Owner's Response



Pet., 60 (further annotated to include maroon elements)

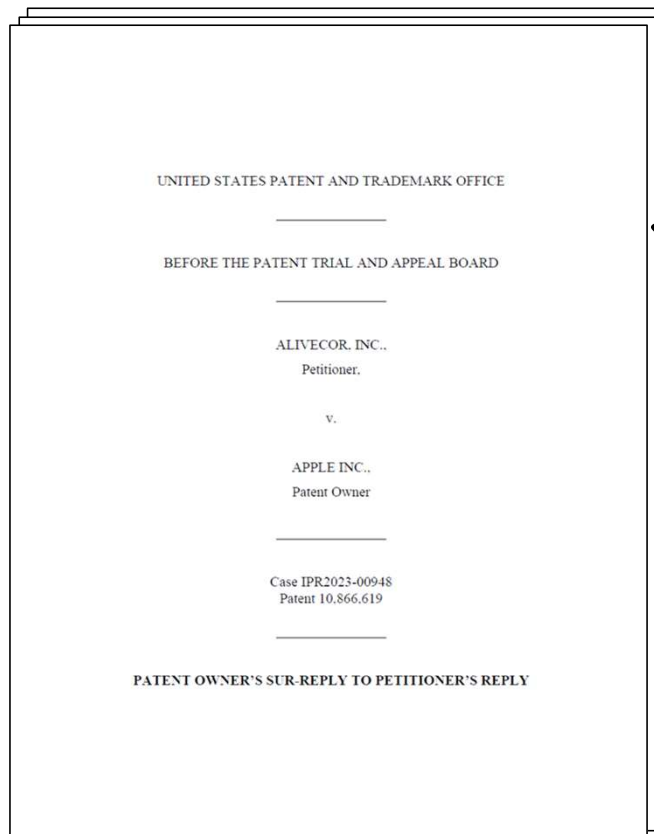
Grounds 1, 2 – Claim 1, Apple's Argument #3



A stack of the first and second protective layers 707 and 708 may be disposed on the flexible PCB 706. On the stack of the first and second protective layers 707 and 708, the display composed of the force touch panel 730, the display panel 731, and the touch screen panel 732 may be disposed. The cover glass 725 may be placed on the touch screen panel 732. In addition to the capacitive fingerprint sensor 240p2 embedded in the physical button 760a, another capacitive fingerprint sensor 240p2 may be further disposed between the cover glass 725 and the touch screen panel 732.

Kim

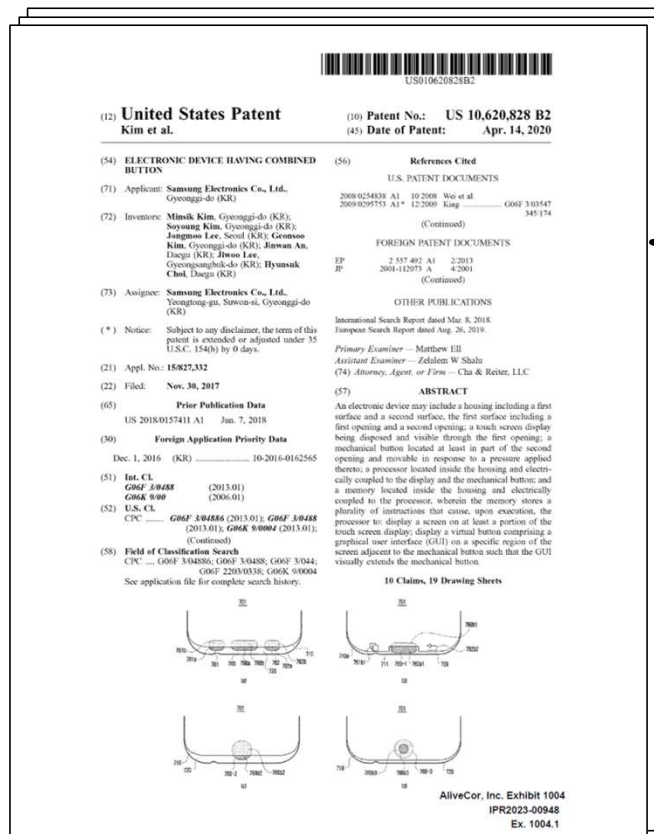
Grounds 1, 2 – Claim 1, Apple's Argument #3



Patent Owner's Sur-Reply

As noted above, 21:63-22:3 enumerates two distinct fingerprint sensors in relation to components depicted in Figure 10(a) (e.g., physical button 760a, virtual button 760b) arranged in a specific fashion. They are each *part of* the Figure 10 embodiment—not optional elements. Their removal, which AliveCor suggests is contemplated by disclosure relating to Figure 10, would materially alter functionality of the embodiment since it combines “fingerprint images 241a and 241b respectively obtained by the first and second fingerprint sensors into a single fingerprint image 241.” Ex-1004, 21:63-22:3. Indeed, Dr. Anthony testified that omission of one of these fingerprint sensors “contradicts how a POSITA would have understood functionality of the fingerprint sensor assembly of Kim’s Figure 10 embodiment” because data collected by each is used to “generate a composite fingerprint image.” APPLE-2009, ¶83. Thus, record evidence—both from Kim

Grounds 1, 2 – Claim 1, Apple's Argument #3



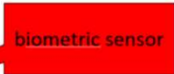
Under the physical button 764a of the power button 764, a sensor (e.g., a fingerprint sensor) may be disposed. The fingerprint sensor may include an optical fingerprint sensor, a capacitive fingerprint sensor, or an ultrasonic fingerprint sensor.

Kim

[Undisputed]

Kim

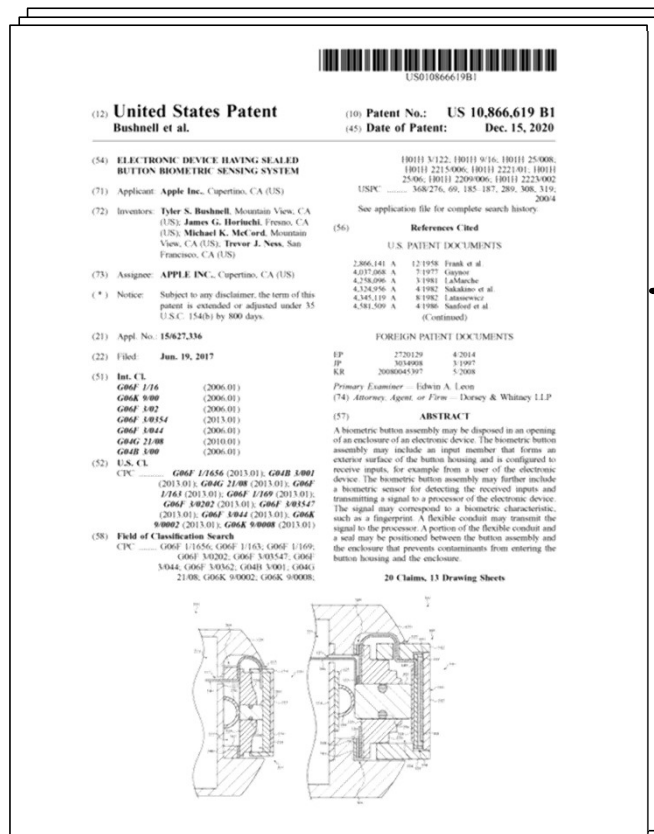
[Undisputed]



[Undisputed]



'619 Patent – Claim 4



4. The electronic device of claim 1, wherein the seal is overmolded around the portion of the flexible conduit.

'619 Patent

Ground 2 – Claim 4

[4] The electronic device of claim 1 , wherein the seal is an input member with an input surface; overmolded around the portion of the flexible conduit .

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00948
U.S. Patent No. 10,866,619 B2

PETITION FOR INTER PARTES REVIEW
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
US Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

Petition

Furthermore, a POSITA would have known overmolding refers to a technique in which a material (*i.e.*, epoxy resin) is injected, poured or otherwise loaded into a space to surround another component, then cured so it forms a hard casing or overmold around the component (Ex. 1003, ¶206).

A POSITA would have also known components would be sealed by an overmolding process so they are liquid-tight (Ex. 1003, ¶207). Similarly, a POSITA would have understood there were other, mechanical methods of fastening a control feature into the housing, but that overmolding, unlike mechanical fasteners such as screws, bolts, snap fit components, etc., provides for a liquid-tight seal (Ex. 1003, ¶207).

In light of this knowledge, a POSITA would have understood that the seal of *Kim* would be overmolded around the portion of the flexible conduit in order to enhance the quality of the seal (Ex. 1003, ¶208).

Ground 2 – Claim 4

[4] The electronic device of claim 1 , wherein the seal is an input member with an input surface; overmolded around the portion of the flexible conduit .

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

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APPLE INC.,
Patent Owner

Case No. IPR2023-00948
U.S. Patent No. 10,866,619 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN
SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,866,619 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00948
Ex. 1003.1

Berger Declaration

205. Thus, Kim explicitly discloses at least the electronic device of claim 1, wherein the seal is *adjacent* with the portion of the flexible conduit.

206. Furthermore, claim 4 would have been well known to a person of ordinary skill in the art. As I explained earlier in Section VI.B (which is incorporated

• • • •

207. A person of ordinary skill in the art would also have known that another common technique to add a seal was to use an overmolding process. For example, a

• • • •

the assembly of components. As explained in Section VI.B (which is incorporated by reference), a person of ordinary skill in the art would have known that overmolding, unlike mechanical fasteners such as screws, bolts, snap fit components, etc., provides for a liquid-tight seal, which is essential for waterproofing delicate electronic components.

Ground 2 – Claim 4, Apple’s Argument #1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
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APPLE INC.,
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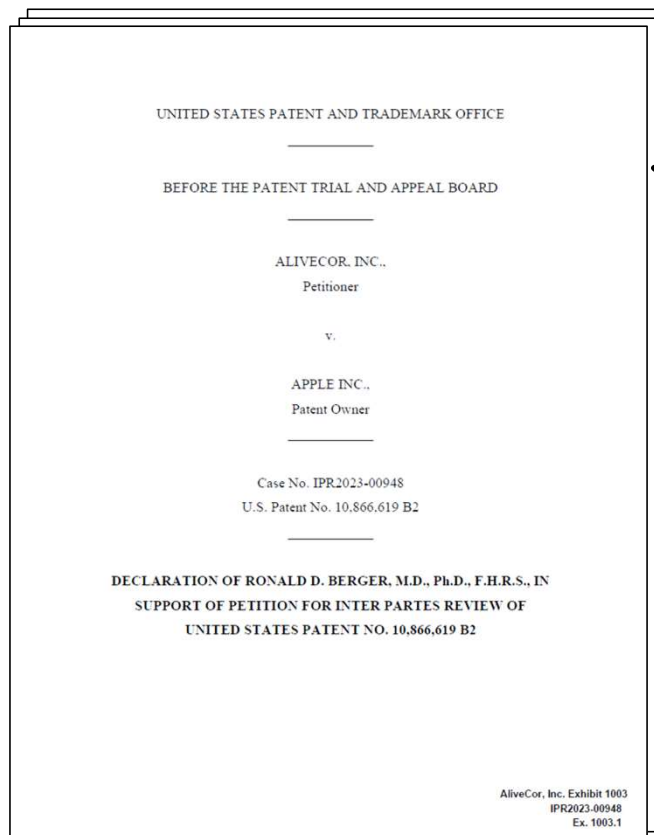
Case IPR2023-00948
Patent 10.866.619

PATENT OWNER’S RESPONSE

As discussed below, Dr. Berger suggests overmolding is useful to enable a “liquid-tight seal” but omits discussion of other manufacturing methods that may enable a “liquid-tight seal” and fails to cite to any support for statements regarding overmolding. AliveCor’s positions with respect to unpatentability of claim 4 based

Patent Owner’s Response

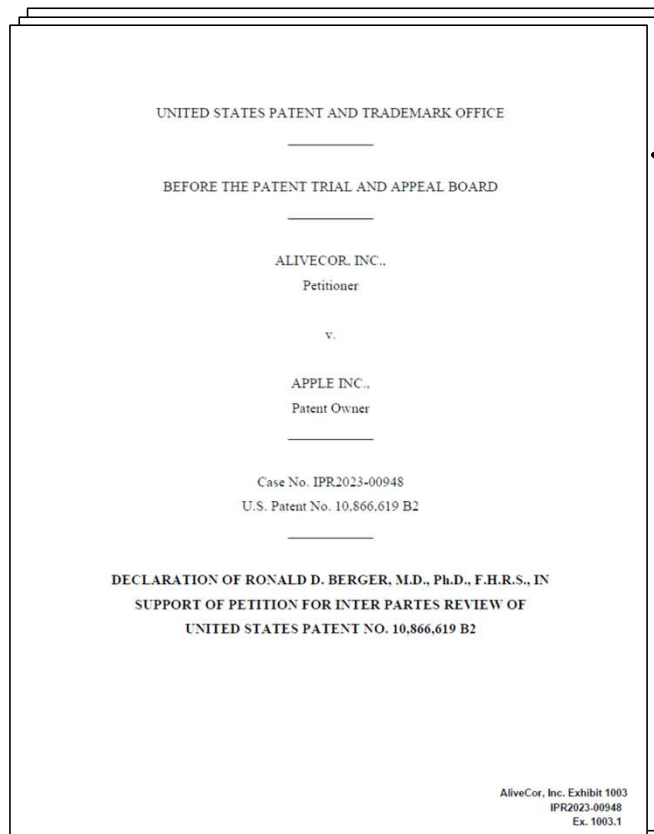
Ground 2 – Claim 4, Apple’s Argument #1



Berger Declaration

52. A person of ordinary skill in the art would also have known that another common technique to add a seal was to use an overmolding process. For example, *Wagman* (Ex-1019) is assigned to Apple, is based on an application filed on September 22, 2016, and claims priority to applications that were filed on September 30, 2015 and September 6, 2016 (Ex-1019, Face at Items (73), (22), (60)). *Wagman* discloses that components “can be sealed by an overmolded portion 2830 so they are liquid-tight” (Ex-1019, 39:44-46; *see also* 40:26-32 (disclosing components that “can then be overmolded with dielectric overmold portion 2975,” “forming a liquid-tight seal”). As another example, *Dave* (Ex-1020) is assigned to Apple and is based

Ground 2 – Claim 4, Apple's Argument #1

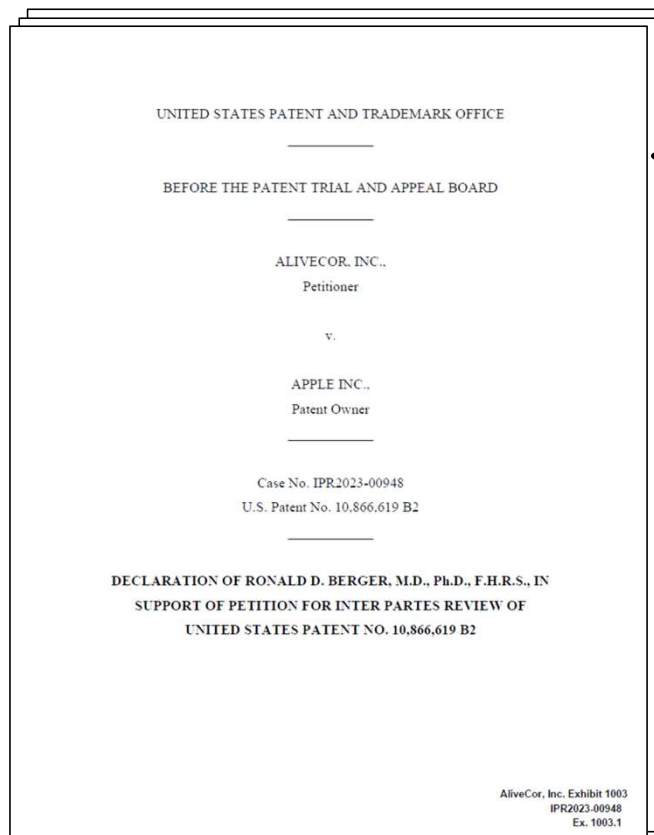


Berger Declaration

52. A person of ordinary skill in the art would also have known that another common technique to add a seal was to use an overmolding process. For example, ...

tight seal"). As another example, Dave (Ex-1020) is assigned to Apple and is based on an application filed on October 27, 2011 (Ex-1020, Face at Items (73), (22)). Dave discloses "hard material 46 around a boot of soft material (e.g., overmolded silicon or rubber) . . . that engages or forms a friction seal onto the surface" (Ex-1020, [0052]; see also [0048], [0050] (disclosing a "metal ring 40 that is overmolded . . . with soft material 41 that engage[s] or form[s] a friction seal onto the surface)).

Ground 2 – Claim 4, Apple’s Argument #1



Berger Declaration

52. A person of ordinary skill in the art would also have known that another common technique to add a seal was to use an overmolding process. For example, ...

As another example, *Polany* discloses that “[o]ne skilled the art would recognize many different methods of fastening a control feature into the housing, such as, but not limited to, screw, bolts, snap fit components, adhesives, press fits, co-molded components, overmolded components, ultrasonically welded components, rotational fits, wedge fits, and other manufacturing means of effecting the assembly of components” (Ex-1013, 21:5-11, 21:31-37).

Ground 2 – Claim 4, Apple’s Argument #2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER’S RESPONSE

As discussed below, Dr. Berger suggests overmolding is useful to enable a “liquid-tight seal” but omits discussion of other manufacturing methods that may enable a “liquid-tight seal” and fails to cite to any support for statements regarding overmolding. AliveCor’s positions with respect to unpatentability of claim 4 based

• • • • •

Contrary to Dr. Berger’s testimony, a POSITA would not have understood overmolding to necessarily be the only manufacturing method that enables a “liquid-tight seal.” APPLE-2009, ¶136 (“[a] POSITA would have also recognized that there are several common techniques used to achieve water resistance in electronic devices that do not involve use of overmolding”); *see id.*, ¶137-39.

Patent Owner’s Response

Ground 2 – Claim 4, Apple's Argument #2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Tyler S. Bushnell, et al.
U.S. Patent No.: 10,866,619 Attorney Docket No.: 50095-0156IP1
Issue Date: December 15, 2020
Appl. Serial No.: 15/627,336
Filing Date: June 19, 2017
Title: ELECTRONIC DEVICE HAVING SEALED BUTTON BIOMETRIC SENSING SYSTEM

DECLARATION OF DR. BRIAN W. ANTHONY

I currently hold the opinions set 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: 4/24/2024 By: 
Brian W. Anthony, Ph.D.

1

APPLE 2009
AppleCor v. Apple
IPR2023-00948

Anthony Decl.

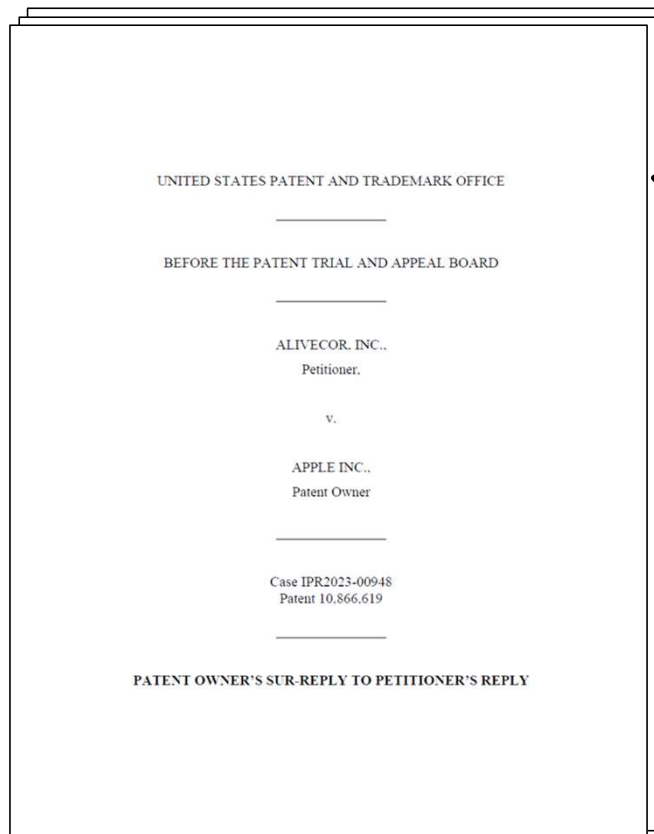
136. A POSITA would have also recognized that there are several common techniques used to achieve water resistance in electronic devices that do not involve use of overmolding.

137. One example is gasket sealing, which involves using rubber or silicone gaskets in conjunction with mating surfaces to create a watertight seal. These gaskets are often placed between housing components or around openings like buttons, ports, and connectors.

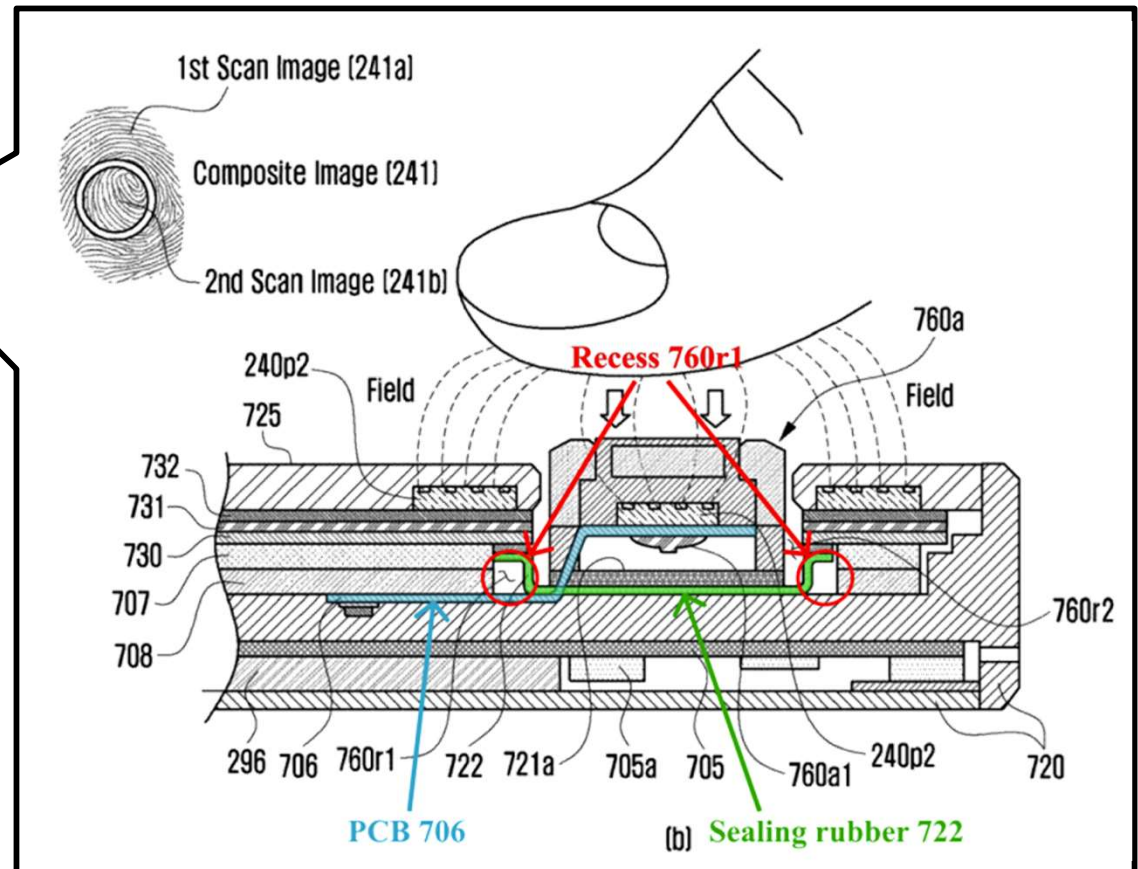
138. Another example is potting, which involves filling electronic enclosures or components with a liquid resin or gel-like material, such as epoxy or silicone, to protect them from moisture and other environmental hazards. This technique forms a protective barrier around the components, sealing out water and providing mechanical support.

139. Waterproof adhesives and sealants can also be used to bond housing components together, sealing gaps and preventing water infiltration. Other common examples of creating watertight seals (i.e., liquid-tight seals) include conformal coating, O-Ring seals, ultrasonic welding, among others.

Ground 2 – Claim 4, Apple's Argument #3



Patent Owner's Sur-Reply

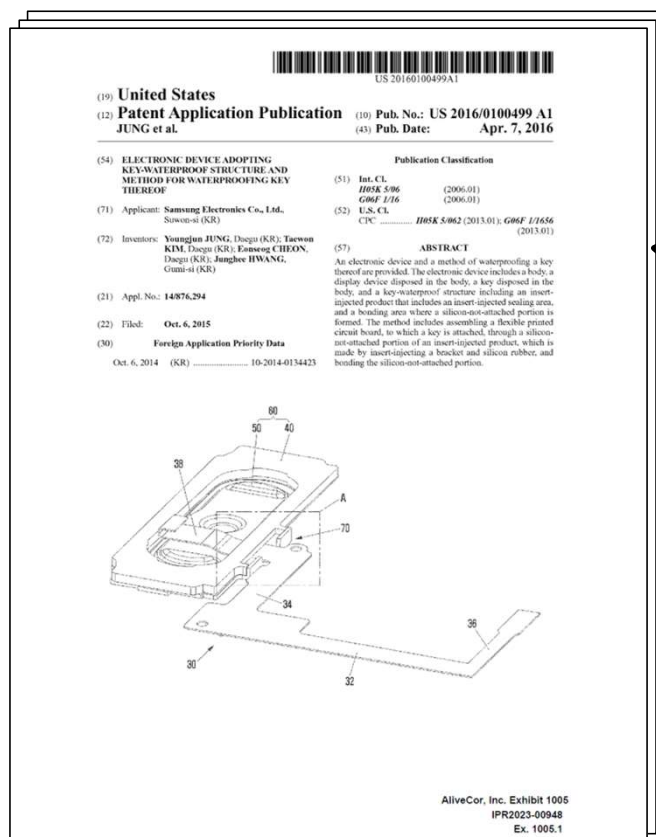


ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Kim Grounds
- 4. Jung + Myers Grounds**
5. Chang Grounds

Ground 3 – Overview

Claims 1, and 3-10 are unpatentable under 35 U.S.C. §103 over *Jung* in view of *Myers*.



Jung

(19) United States
(12) Patent Application Publication
JUNG et al.

(10) Pub. No.: US 2016/0100499 A1
(43) Pub. Date: Apr. 7, 2016

(54) ELECTRONIC DEVICE ADOPTING KEY-WATERPROOF STRUCTURE AND METHOD FOR WATERPROOFING KEY THEREOF

(51) Int. Cl. H05K 5/06 (2006.01)
(52) U.S. Cl. G06F 1/16 (2006.01)
(57) ABSTRACT

(71) Applicant: Samsung Electronics Co., Ltd., Suwon-si (KR)

(72) Inventors: Youngjun JUNG, Daegu (KR); Taewon KIM, Daegu (KR); Eonseog CHEON, Daegu (KR); Junghee HWANG, Gumi-si (KR)

(21) Appl. No.: 14/876,294

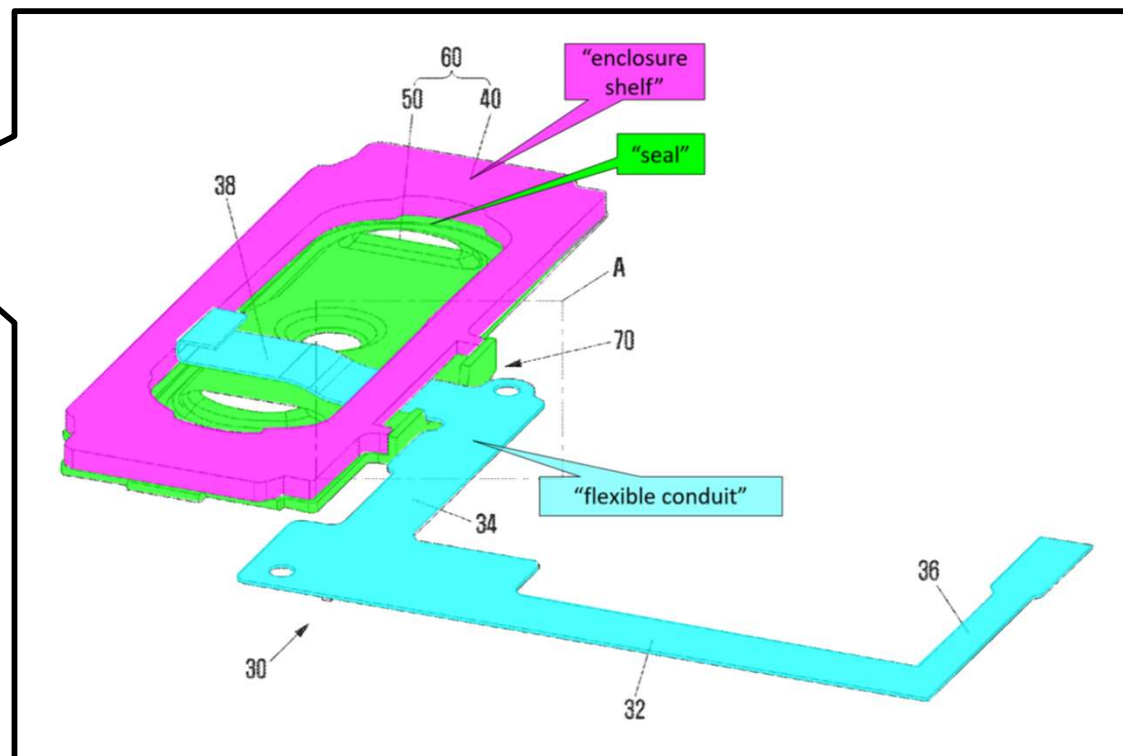
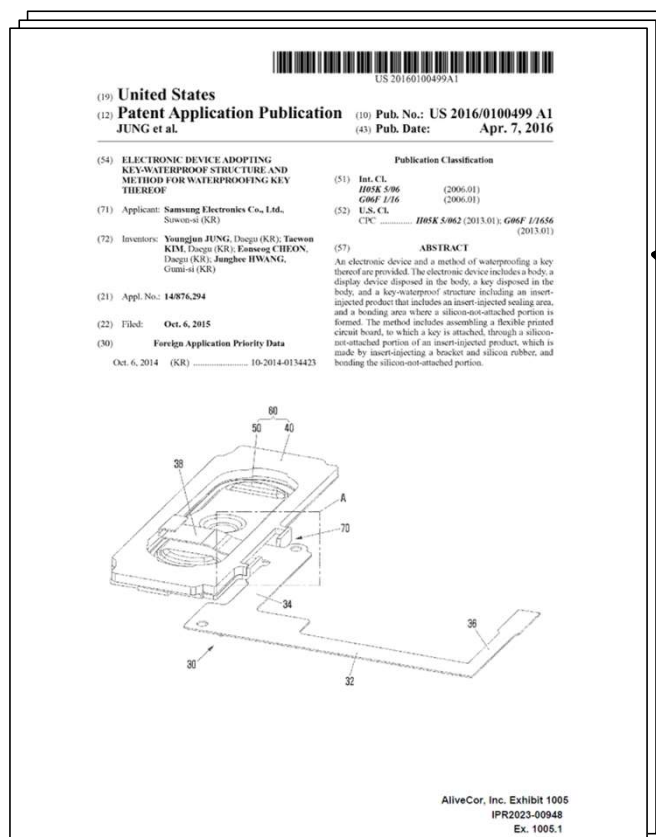
(22) Filed: Oct. 6, 2015

(30) Foreign Application Priority Data
Oct. 6, 2014 (KR) 10-2014-0134423

An electronic device and a method of waterproofing a key thereof are provided. The electronic device includes a body, a display device disposed in the body, a key disposed in the body, and a key-waterproof structure including an insert-injected product that includes an insert-injected sealing area, and a bonding area where a silicon-not-attached portion is formed. The method includes assembling a flexible printed circuit board, to which a key is attached, through a silicon-not-attached portion of an insert-injected product, which is made by insert-injecting a bracket and silicon rubber, and bonding the silicon-not-attached portion.

Ground 3 – Overview

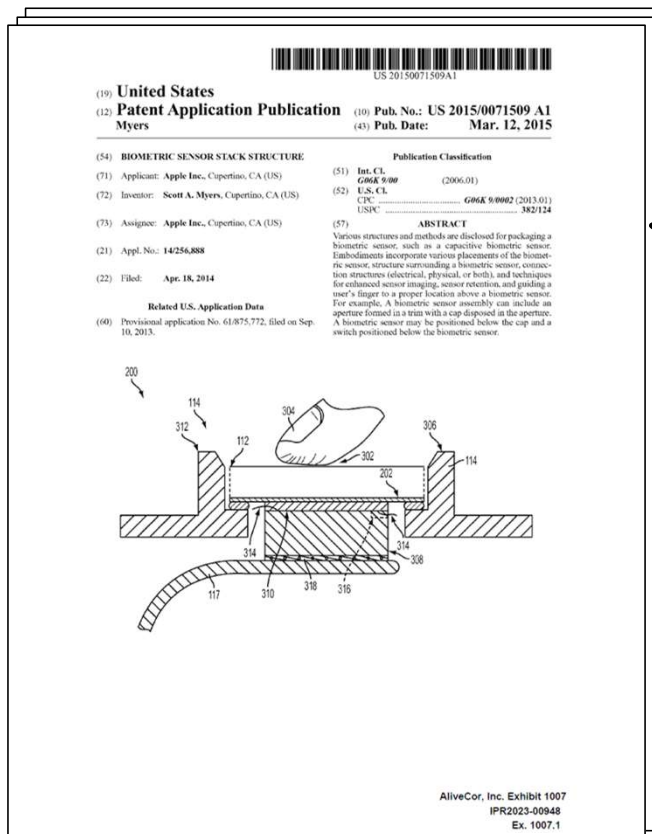
Claims 1, and 3-10 are unpatentable under 35 U.S.C. §103 over *Jung* in view of *Myers*.



Jung

Ground 3 – Overview

Claims 1, and 3-10 are unpatentable under 35 U.S.C. §103 over *Jung* in view of *Myers*.



Myers

(19) United States
(12) Patent Application Publication (10) Pub. No.: US 2015/0071509 A1
Myers (43) Pub. Date: Mar. 12, 2015

(54) BIOMETRIC SENSOR STACK STRUCTURE

(71) Applicant: Apple Inc., Cupertino, CA (US)
(72) Inventor: Scott A. Myers, Cupertino, CA (US)
(73) Assignee: Apple Inc., Cupertino, CA (US)
(21) Appl. No.: 14/256,888
(22) Filed: Apr. 18, 2014

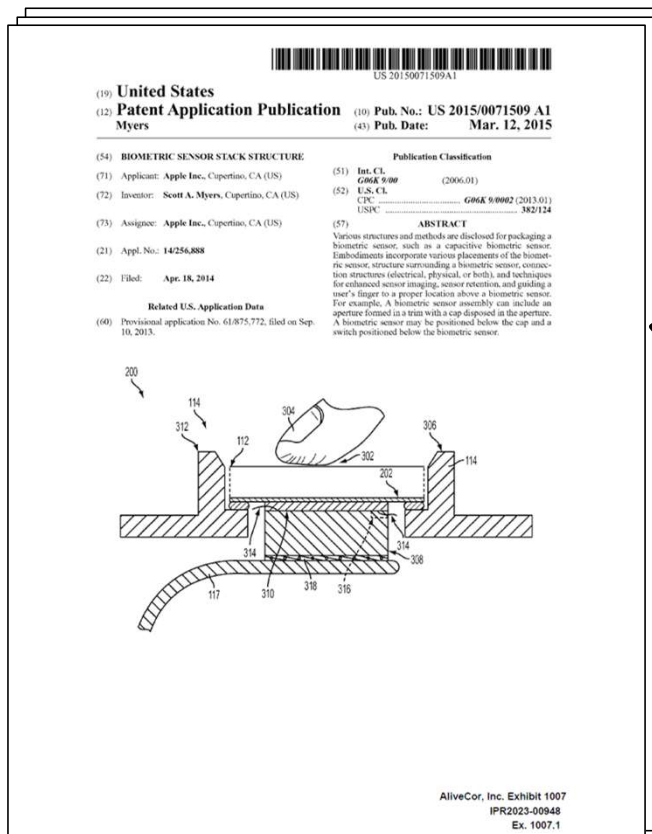
Related U.S. Application Data
(60) Provisional application No. 61/875,772, filed on Sep. 10, 2013.

Publication Classification
(51) Int. Cl. G06K 9/00 (2006.01)
(52) U.S. Cl. CPC G06K 9/0002 (2013.01)
USPC 382/124

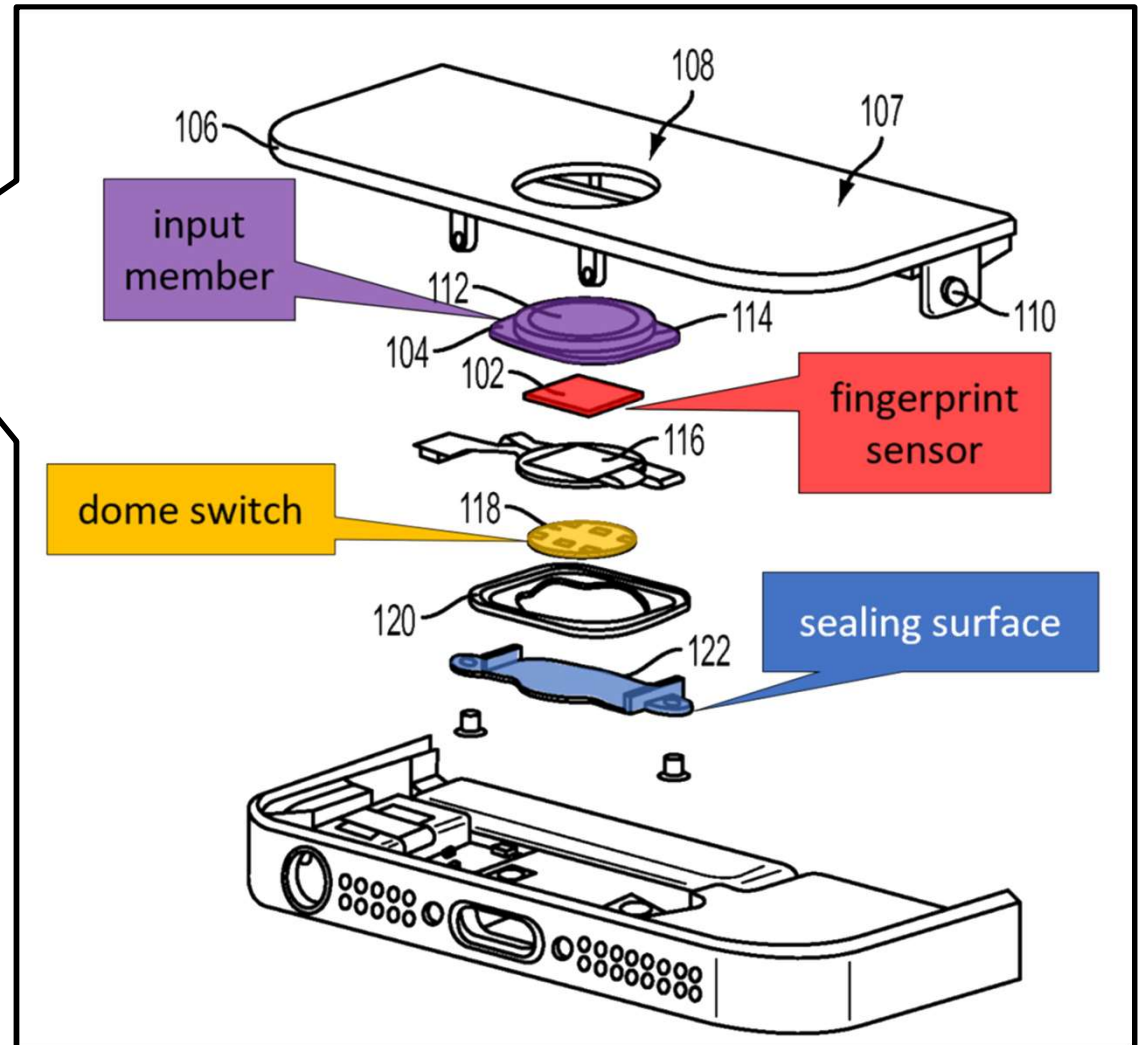
ABSTRACT
Various structures and methods are disclosed for packaging a biometric sensor, such as a capacitive biometric sensor. Embodiments incorporate various placements of the biometric sensor, structure surrounding a biometric sensor, connection structures (electrical, physical, or both), and techniques for enhanced sensor imaging, sensor retention, and guiding a user's finger to a proper location above a biometric sensor. For example, A biometric sensor assembly can include an aperture formed in a trim with a cap disposed in the aperture. A biometric sensor may be positioned below the cap and a switch positioned below the biometric sensor.

Ground 3 – Overview

Claims 1, and 3-10 are unpatentable under 35 U.S.C. §103 over *Jung* in view of *Myers*.

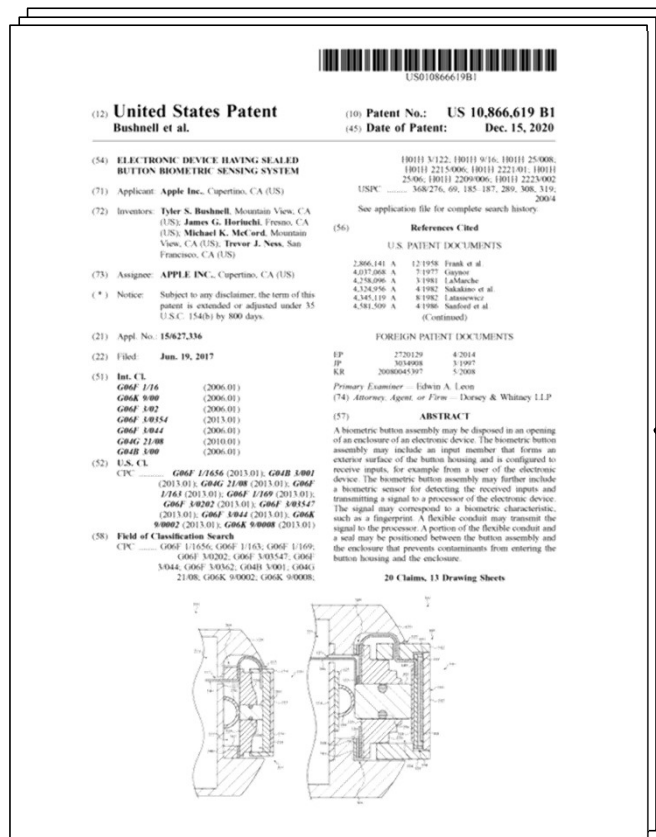


Myers



Ground 3 – Disputes

Claims 1, and 3-10 are unpatentable under 35 U.S.C. §103 over *Jung* in view of *Myers*.



'619 Patent

Motivation to Combine *Jung* and *Myers*

1. An electronic device comprising:
 - an enclosure having an enclosed volume and an opening formed in a sidewall;
 - a processor positioned in the enclosed volume;
 - a button assembly within the opening, the button assembly comprising:
 - an input member having an input surface; and
 - a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;
 - a seal positioned between a sealing surface of the button assembly and the enclosure; and
 - a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:
 - a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

[1.pre] ✓

[1.a]

[1.b] ✓

[1.c]

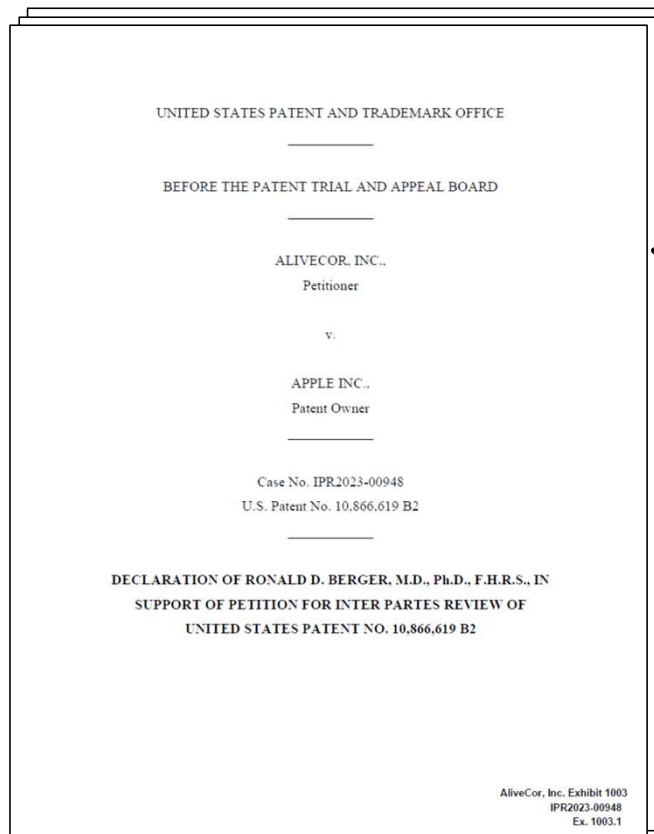
[1.d] ✓

[1.e] ✓

[1.f] ✓

Ground 3 – Motivation to Combine

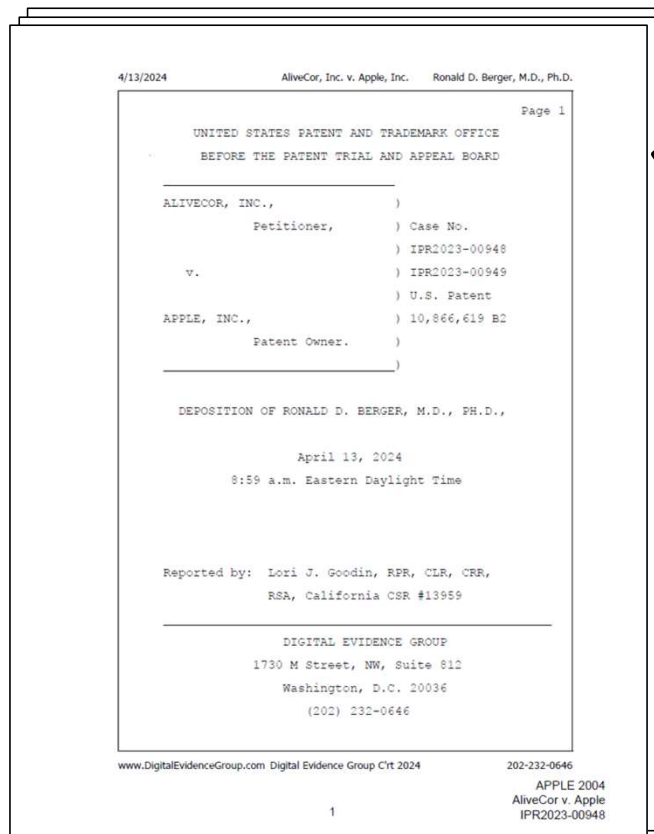
Motivation to Combine



Berger Declaration

241. In particular, *Jung* discloses “[a]n electronic device and a method of waterproofing a key thereof” (Ex-1005, Abstract). “The device includes a body, a display device disposed in the body, a key disposed in the body, and a key-waterproof structure . . . ” (Ex-1005, [0012]). *Jung* also discloses a “biometric sensor” such as a “fingerprint sensor” (Ex-1005, [0060]). But *Jung* does not expressly disclose the structure of its “fingerprint sensor.” To supply this teaching, a person of ordinary skill in the art would have turned to *Meyers*, which expressly discloses the structure of a “fingerprint sensor” button assembly. Indeed, *Meyers* teaches that its button assembly should be incorporated in devices using biometric recognition (Ex-1007, Abstract, ¶¶[0003], [0011]).

Ground 3 – Motivation to Combine



Berger Tr.

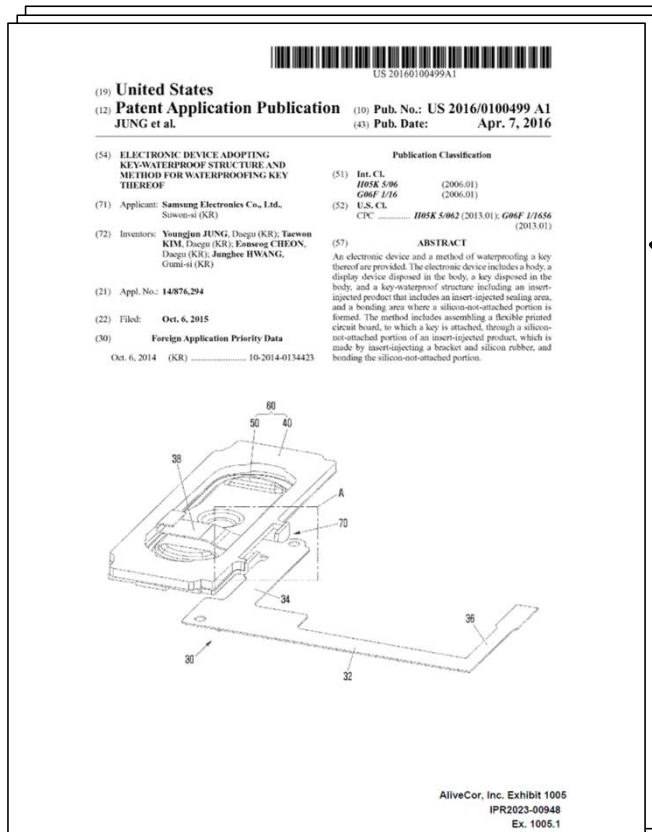
[A] I think that Jung provides an understanding of how to create a waterproof seal for a button, a multicomponent button that would then communicate with the inside of the device. . . .

And I think one who wants to manufacture a button that has those functions that can, that can readily be inserted into the waterproof seal system of Jung would turn to Meyers which provides exactly that, the button, a multicomponent button, a multifunction button, particularly one that includes a fingerprint sensor and would fit nicely and neatly into the structure of Jung, into the seal structure of Jung. . . .

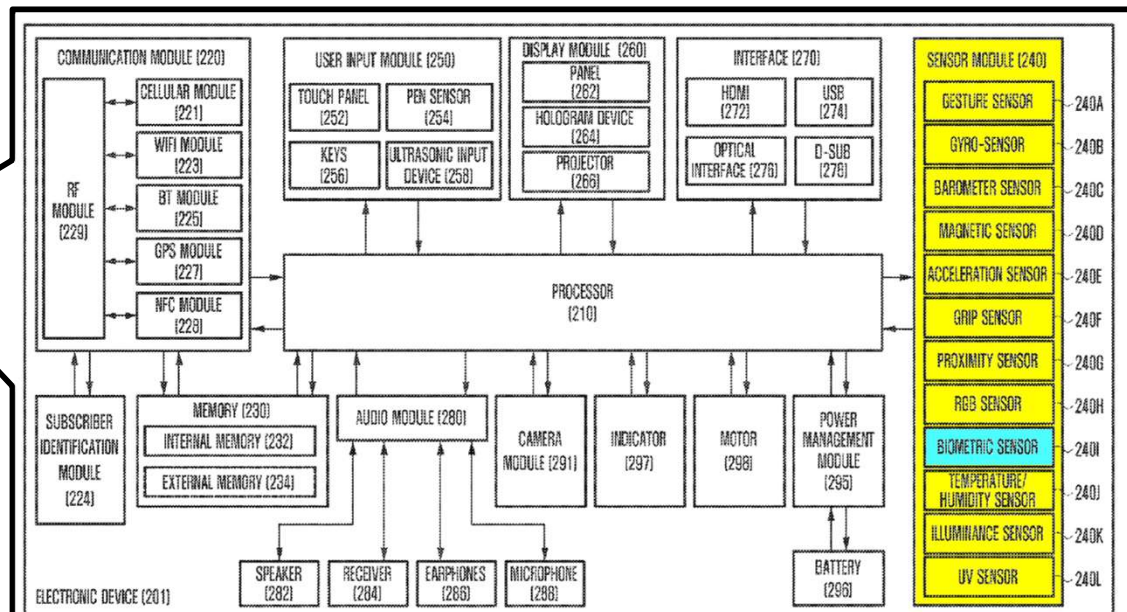
And the waterproofing structure of Jung is particularly adapted to prevent that from getting into the electronics of the device.

Ground 3 – Motivation to Combine

Motivation to Combine



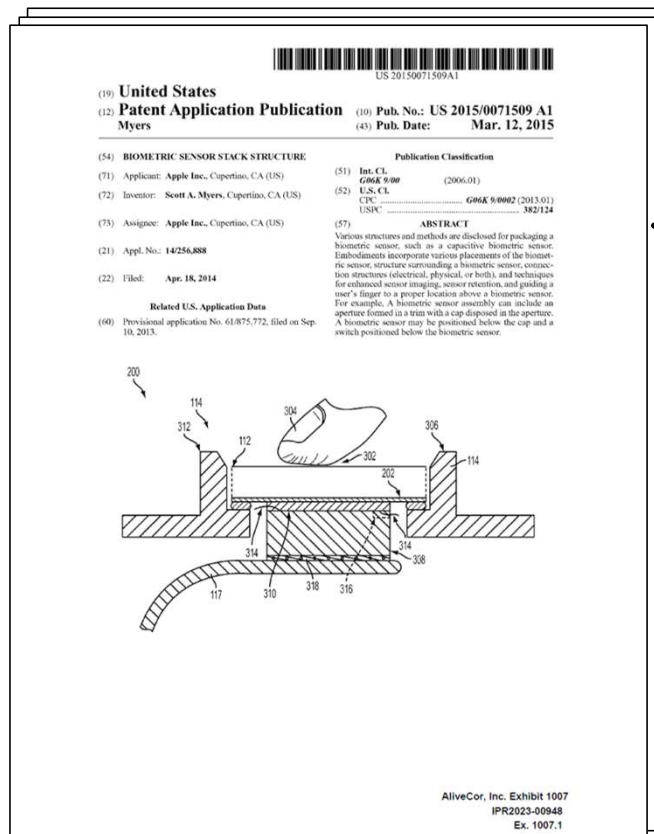
Jung



[0060] The sensor module 240 may include, for example, at least one of a gesture sensor 240A, a gyro sensor 240B, a diogram (ECG) sensor (not illustrated), a fingerprint sensor (not illustrated), and the like. Additionally or alternatively, the

Ground 3 – Motivation to Combine

Motivation to Combine



SUMMARY

[0011] This application provides techniques, including circuits and designs, which can receive information with respect to biometric images and data, such as fingerprint data, and which can be incorporated into devices using biometric recognition. For example, a fingerprint or other biometric sensor can be disposed beneath a control button or display element, for fingerprint recognition and authentication while the device is being operated by a user.

Myers

Ground 3 – Motivation to Combine

Motivation to Combine

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

b) Ground 3—The Jung-Myers Combination Is Defective

In Ground 3, AliveCor combines the teachings of Jung and Myers (“Jung-Myers Combination”) by incorporating Myers’ button assembly structures into a lateral surface of Jung’s device. *See* Pet., 47. The Jung-Myers Combination fails to demonstrate obviousness of the *button assembly*, at least because (1) a POSITA would not have sought Myers in reviewing Jung, (2) a POSITA would not have been motivated to combine their teachings, and (3) the combination fails to satisfy the requirement of a *button assembly within [an] opening [formed in a sidewall]* recited in limitations [1.a] and [1.c]. APPLE-2009, ¶84.

Patent Owner’s Response

Ground 3 – Claim 1, Apple’s Argument #1a

Motivation to Combine

UNITED STATES PATENT AND TRADEMARK OFFICE

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Case IPR2023-00948
Patent 10,866,619

PATENT OWNER’S RESPONSE

Indeed, when reviewing Jung, a POSITA would not have sought out Myers’ disclosure of fingerprint sensor assemblies because Jung does not contemplate any button assembly with an incorporated fingerprint sensor (as recited for the *button assembly* in claim 1). APPLE-2009, ¶86. Where Jung does identify a button incorporated in devices using biometric recognition.” Pet., 50. To the extent that AliveCor’s position is that a POSITA would have sought to improve Jung by seeking implementation details regarding a fingerprint sensor, AliveCor fails to explain the relevancy of a Myers’ button assembly since Jung does not teach button assemblies incorporating fingerprint sensors (which the Petition does not expressly contend otherwise). See Pet., 49-51; APPLE-2009, ¶88.

Patent Owner’s Response

Ground 3 – Claim 1, Apple’s Argument #1b

UNITED STATES PATENT AND TRADEMARK OFFICE

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Case IPR2023-00948
Patent 10,866,619

PATENT OWNER’S RESPONSE

Patent Owner’s Response

Motivation to Combine

(*id.*, 51). AliveCor switches the order of the primary and secondary references, supporting not the Jung-Myers Combination but instead offering a different motivation for the opposite modification (Myers in view of Jung). This suggests hindsight bias in combining the teachings of Jung and Myers to satisfy requirements of the *button assembly*. See, e.g., *Graham v. John Deere Co. of*

Schwendimann v. Neenah, Inc.

“[C]haracterizing references ‘as ‘primary’ and ‘secondary’ is merely a matter of presentation with no legal significance.”

82 F.4th 1371, 1384 (Fed. Cir. 2023)

Ground 3 – Claim 1, Apple’s Argument #1c

Reasonable Expectation of Success

its button assembly. Ex-1007, [0130]; APPLE-2009, ¶91. Further, Dr. Anthony explains that “[a] POSITA would have also perceived various disadvantages involved in implementing the Jung-Myers Combination,” which would have prevented the POSITA from having a reasonable expectation of success in implementing the Jung-Myers Combination. See APPLE-2009, ¶¶92-95.

UNITED STATES PATENT AND TRADEMARK OFFICE

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Case IPR2023-00948
Patent 10,866,619

PATENT OWNER’S RESPONSE

Patent Owner’s Response

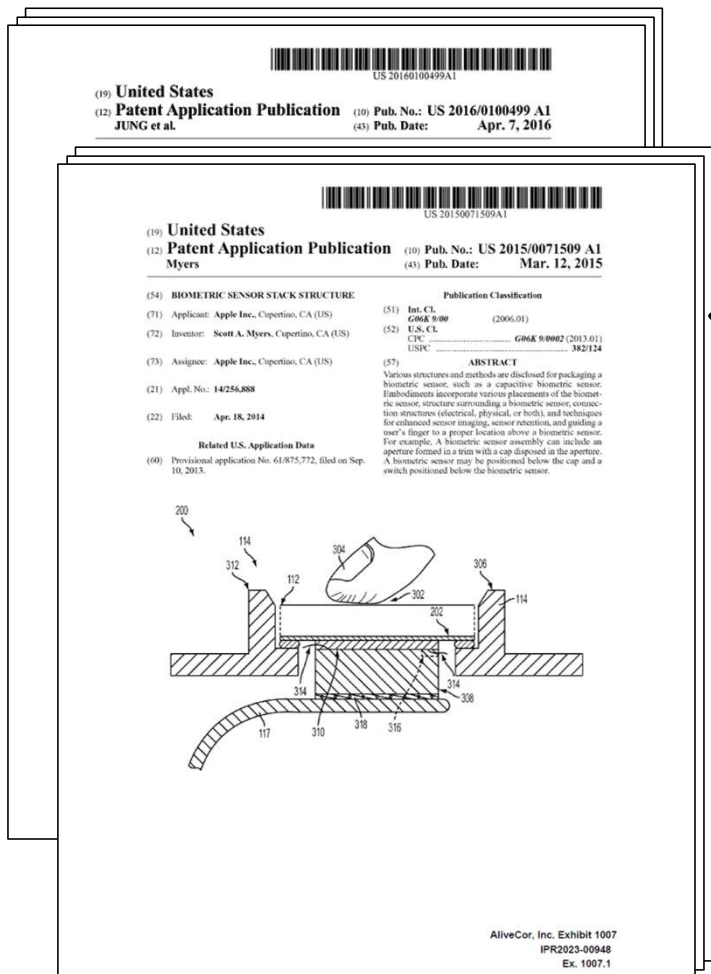
Velander v. Garner

“[W]hat the Board consistently did was accord little weight to broad conclusory statements that it determined were unsupported by corroborating references. It is within the discretion of the trier of fact to give each item of evidence such weight as it feels appropriate.”

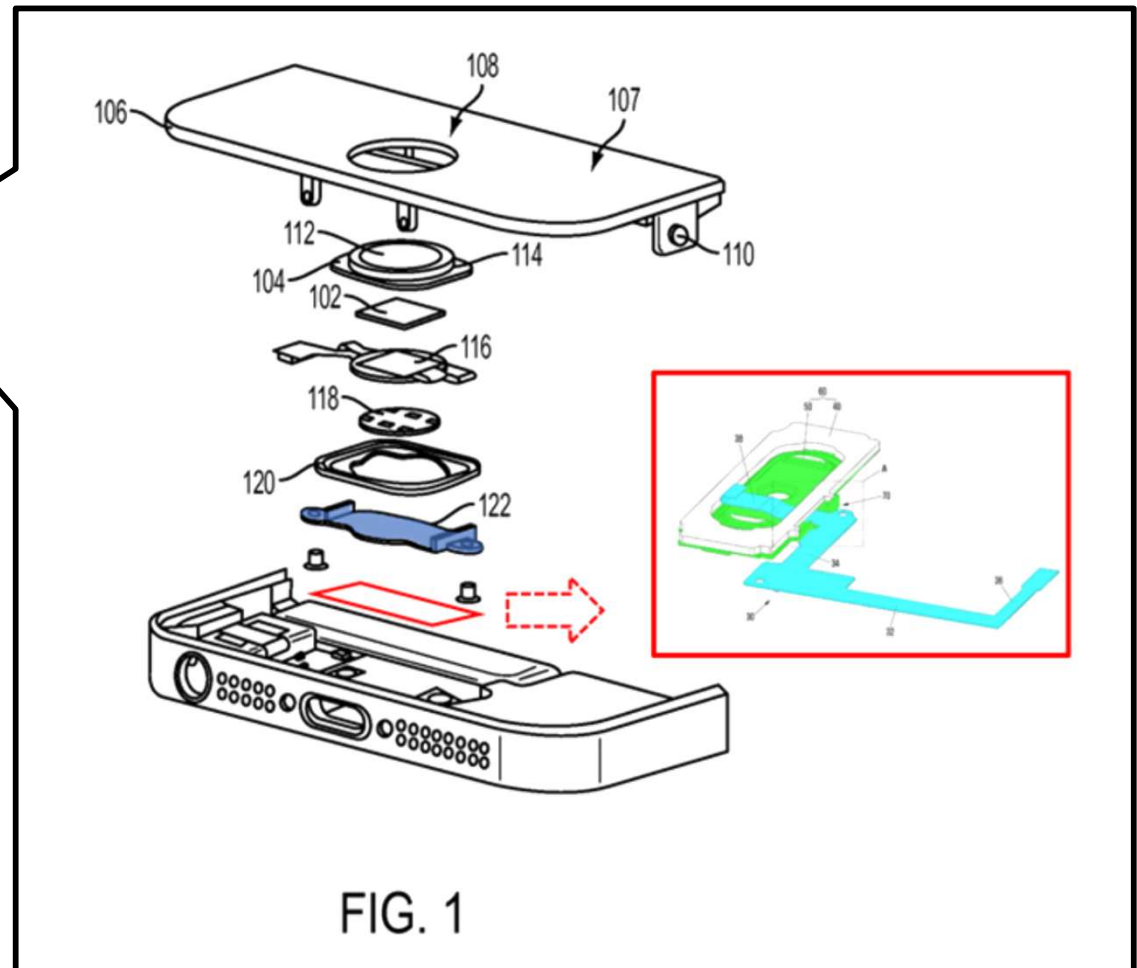
82 F.4th 1371, 1384 (Fed. Cir. 2023)

Ground 3 – Claim 1, Apple's Argument #1d

Reasonable Expectation of Success



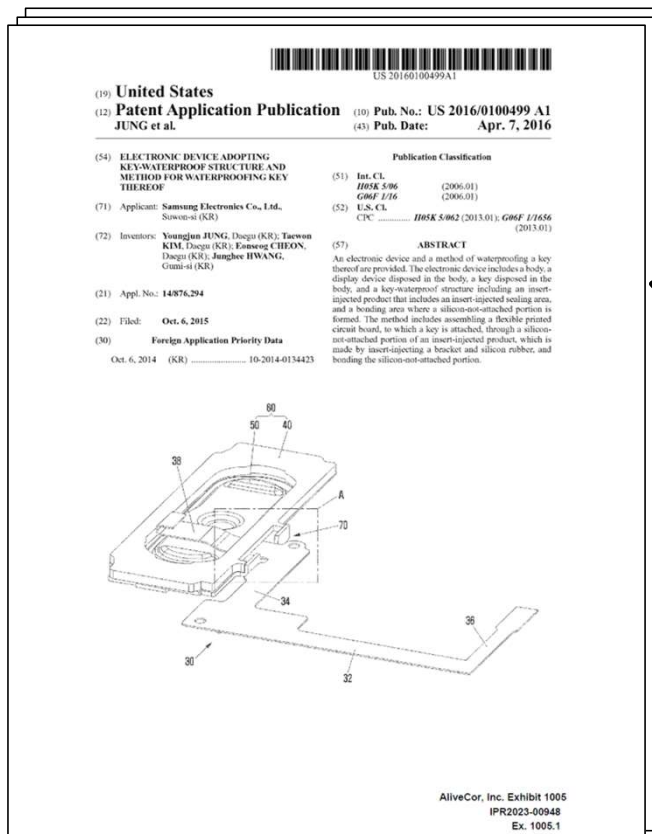
Jung, Myers



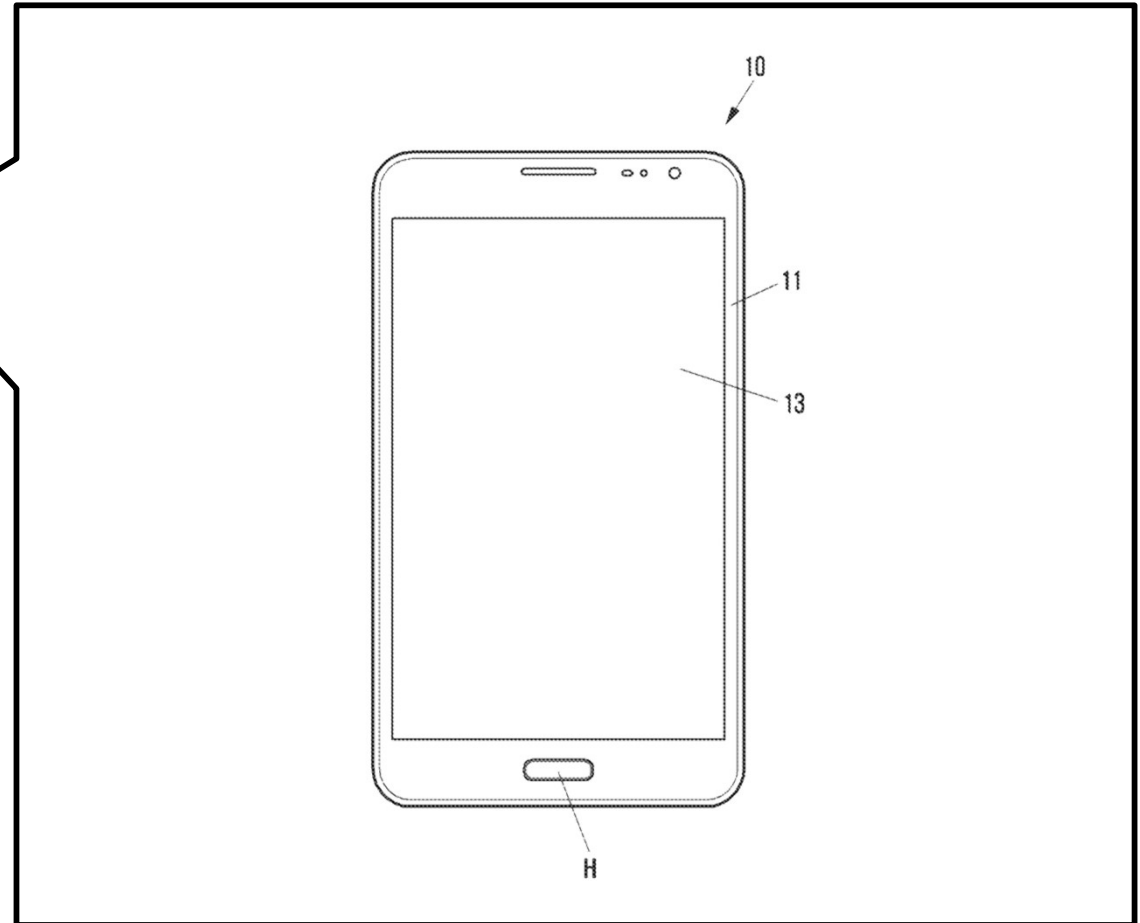
Ground 3 – Claim 1, [1.pre]

[Undisputed]

[1.pre] An electronic device comprising:

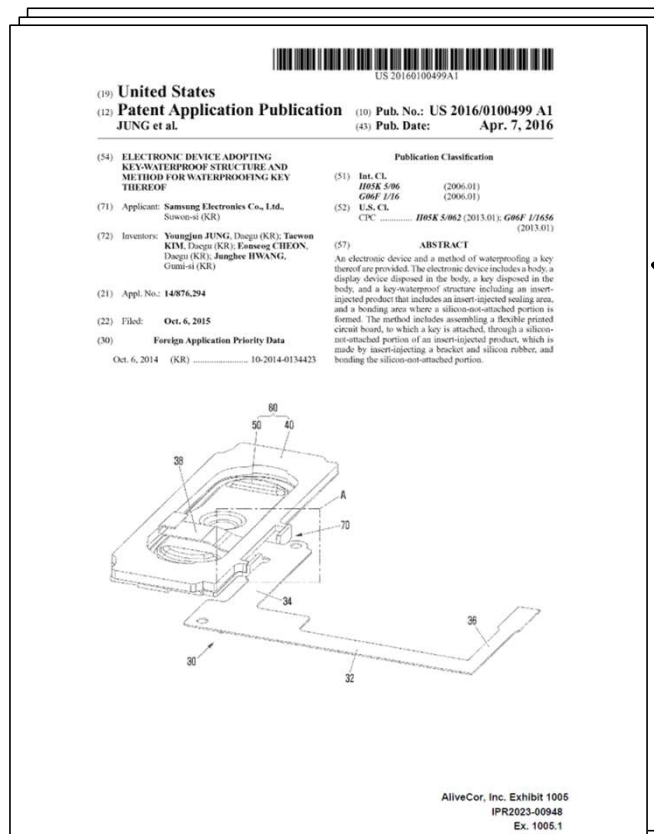


Jung

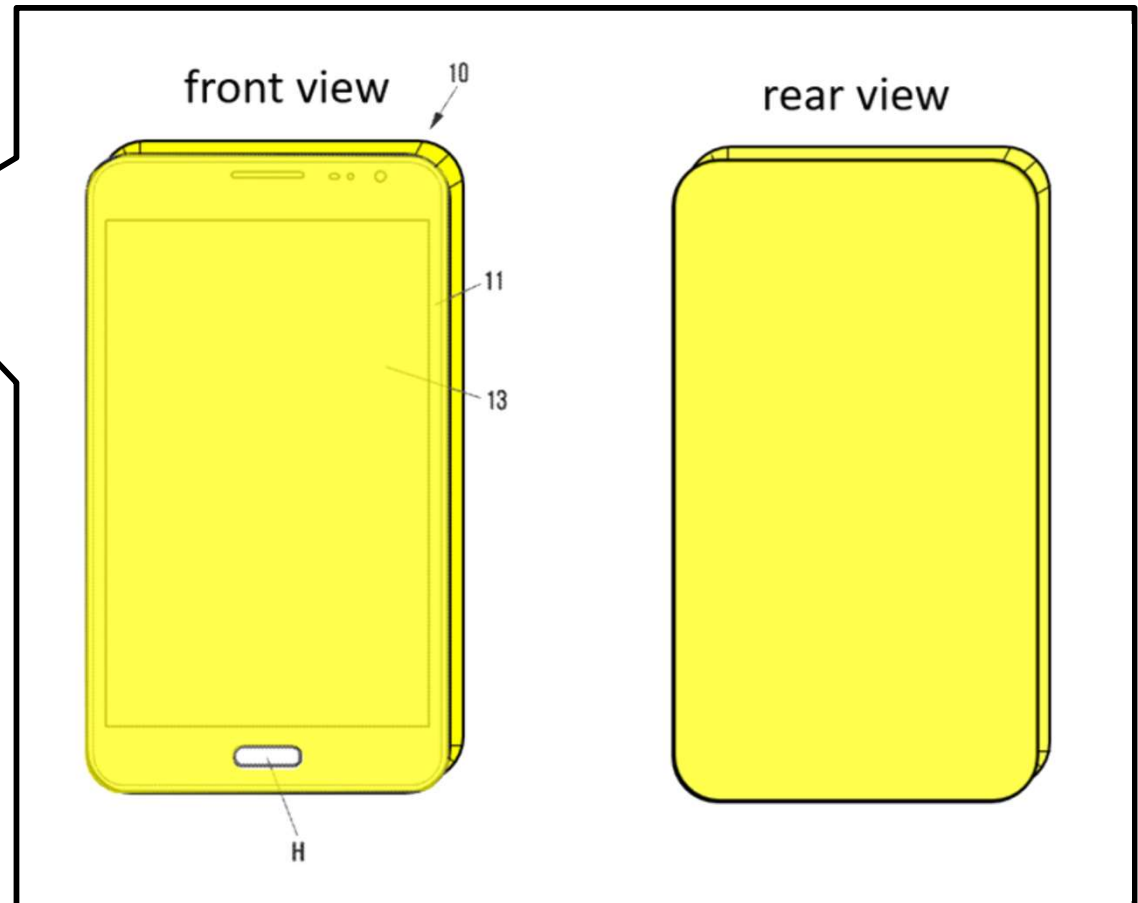


Ground 3 – Claim 1, [1.a]

[1.a] an enclosure having an enclosed volume and an opening formed in a sidewall;



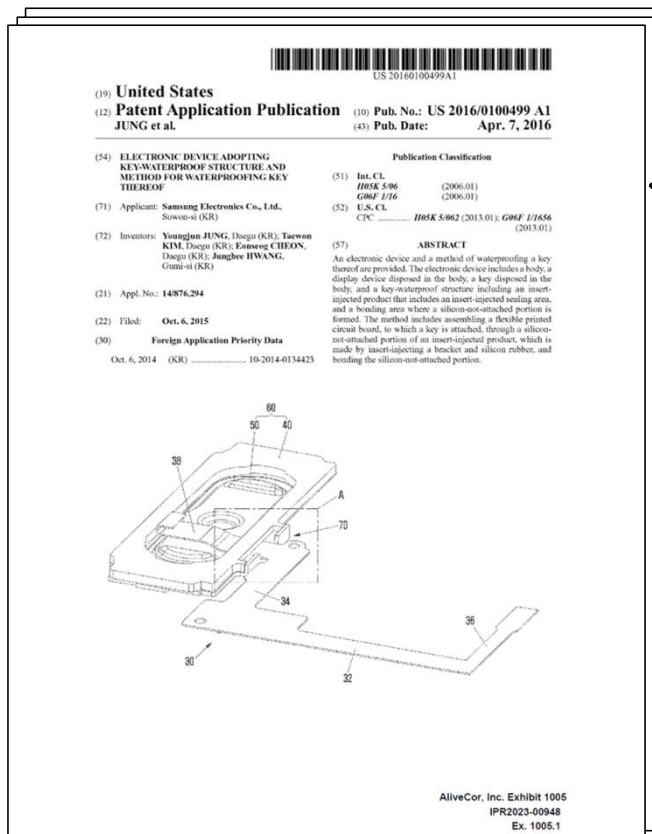
Jung



Ground 3 – Claim 1, [1.a]

[1.a] an enclosure having an enclosed volume and an opening formed in a sidewall;

[0037] An electronic device according to the present disclosure may be a device including a communication function. For example, the device corresponds to a combination of at least one of a smartphone, a tablet personal computer (PC), a mobile phone, a video phone, an e-book reader, a desktop PC, a laptop PC, a netbook computer, a personal digital assistant (PDA), a portable multimedia player (PMP), a digital audio player, a mobile medical device, an electronic bracelet, an electronic necklace, an electronic accessory, a camera, a wearable device, an electronic clock, a wrist watch, home appliances (for example, an air-conditioner, vacuum, an oven,



Jung

Ground 3 – Claim 1, [1.a]

***[1.a] an enclosure having an enclosed volume
and an opening formed in a sidewall;***

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SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,866,619 B2

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Ex. 1003.1

Berger Declaration

252. Second, *Jung* renders obvious that the enclosure has an opening formed in a sidewall. Specifically, *Jung* discloses home key “H” as an example of a key-waterproof structure found in an exterior surface of the enclosure. Although *Jung* includes Figs. 4A and 4B are provided as “examples of an electronic device adopting a key-waterproof structure,” a person of ordinary skill in the art would understand that the key-waterproof structure of *Jung* can be applied to any of the electronic devices disclosed in paragraph [0037], including but not limited to the smartphones, tablet computers, wearable devices, and wrist watches described therein (Ex-1005, [0019]; *see also* claim element [1.a], above). In light of the various disclosed devices, a person of ordinary skill in the art would understand that the key-waterproof structure can be applied to one or more keys and/or buttons, including keys located in the sidewall of the electronic device.

Ground 3 – Claim 1, [1.a]

*[1.a] an enclosure having an enclosed volume
and an opening formed in a sidewall;*

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00948
U.S. Patent No. 10,866,619 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN
SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,866,619 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00948
Ex. 1003.1

253. *Jung recognizes this,* and explicitly acknowledges that “[a]lthough the description for the key-waterproof structure of the present disclosure is made of the home-key in the specification, *other keys for performing various functions rather than the home-key may be applied to the key-waterproof structure of the present disclosure*” (Ex-1005, [0123]) (emphasis added).

Berger Declaration

Ground 3 – Claim 1, Apple's Argument #2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

b) Ground 3—The Jung-Myers Combination Is Defective

In Ground 3, AliveCor combines the teachings of Jung and Myers (“Jung-Myers Combination”) by incorporating Myers’ button assembly structures into a lateral surface of Jung’s device. *See* Pet., 47. The Jung-Myers Combination fails to demonstrate obviousness of the *button assembly*, at least because (1) a POSITA would not have sought Myers in reviewing Jung, (2) a POSITA would not have been motivated to combine their teachings, and (3) the combination fails to satisfy the requirement of a *button assembly within [an] opening [formed in a sidewall]* recited in limitations [1.a] and [1.c]. APPLE-2009, ¶84.

Patent Owner's Response

Ground 3 – Claim 1, Apple's Argument #2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Patent Owner

Case No. IPR2023-00948
U.S. Patent No. 10,866,619 B2

PETITION FOR INTER PARTES REVIEW
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

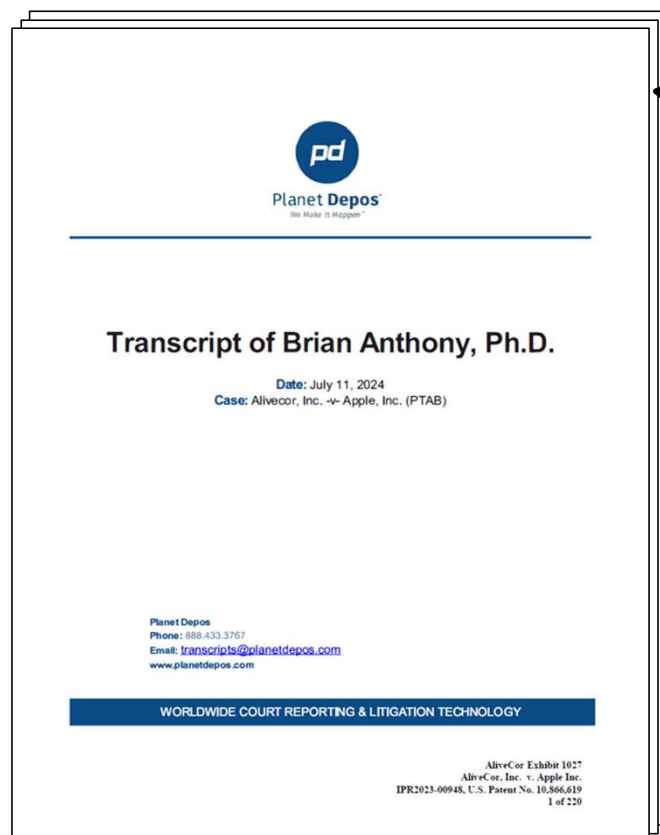
Mail Stop PATENT BOARD
Patent Trial and Appeal Board
US Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

Petition

1003, ¶¶250-251). Second, *Jung* renders obvious that the enclosure has an opening formed in a sidewall, stating “other keys for performing various functions rather than the home-key may be applied to the key-waterproof structure of the present disclosure” (Ex. 1005, [0123]; Ex. 1003, ¶252).

A POSITA would have understood the key-waterproof structure of *Jung* would be applied to any of the electronic devices disclosed therein (Ex. 1005, [0019], [0037]; claim [1.a]; Ex. 1003, ¶252). Therefore, a POSITA would have understood that the key-waterproof structure can be applied to one or more keys and/or buttons, including keys located in the sidewall of the electronic device (Ex. 1003, ¶¶252-253). Indeed, waterproofing keys located in the sidewall of the electronic device was well within the general knowledge of a POSITA (*see, e.g.*, Ex. 1004, 13:46-53, 17:10-12; Ex. 1022, ¶¶89, 166; Ex. 1003, ¶¶252-254).

Ground 3 – Claim 1, Apple's Argument #2



Anthony Tr.

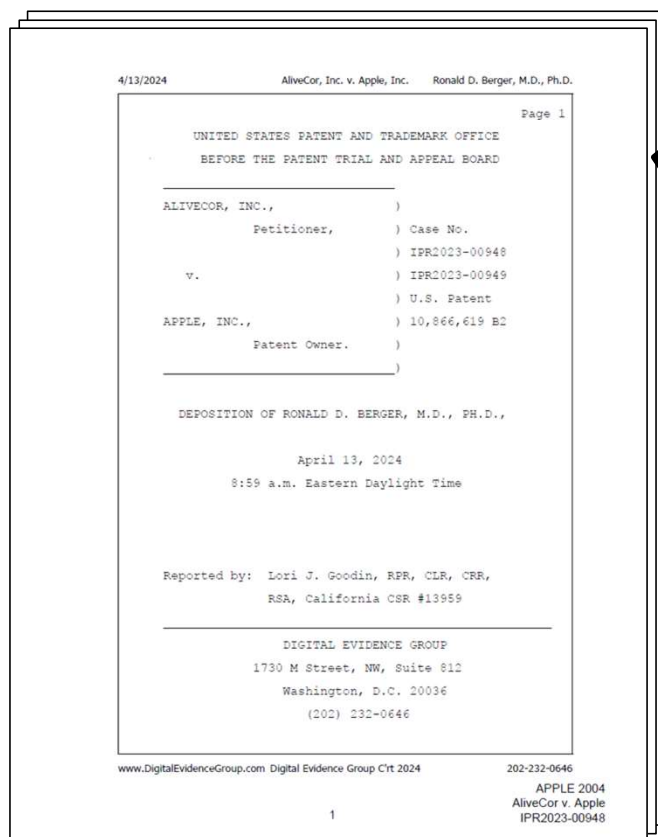
Q [W]ould a POSITA know the different manufacturing processing steps that would be needed to implement the buttons described in column 10, line 20 through line 23?

A [A] POSITA would know the different configurations, different embodiments for the different uses would require different processing steps, and a POSITA would be familiar with different processing steps to accomplish such.

Ex. 1001 ('619 Patent), 10:20-23

action, or to send an alert. A biometric button assembly may be configured, for example, as a power button, a key of a keyboard, a control button (e.g., volume control), a home button, a watch crown, and so on.

Ground 3 – Claim 1, Apple's Argument #2



Berger Tr.

[A] I think that Jung provides an understanding of how to create a waterproof seal for a button, a multicomponent button that would then communicate with the inside of the device. . . .

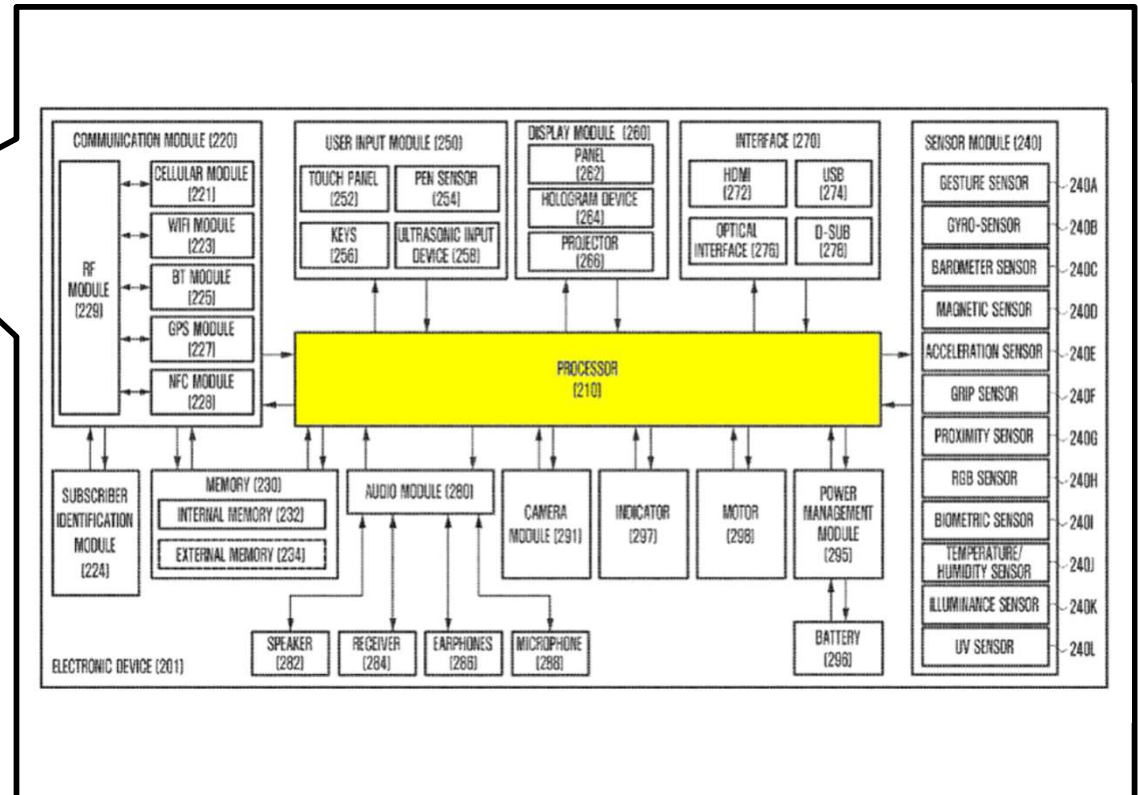
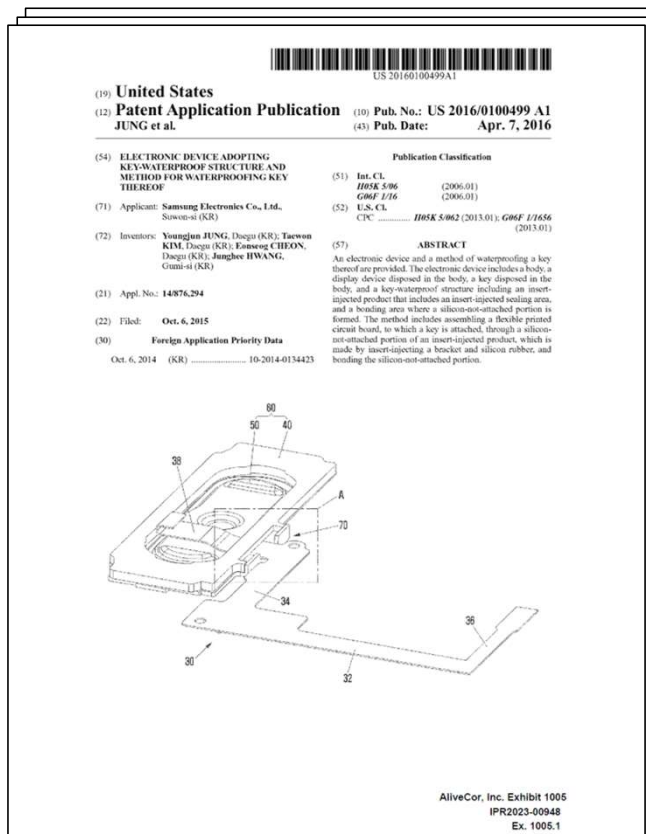
And I think one who wants to manufacture a button that has those functions that can, that can readily be inserted into the waterproof seal system of Jung would turn to Meyers which provides exactly that, the button, a multicomponent button, a multifunction button, particularly one that includes a fingerprint sensor and would fit nicely and neatly into the structure of Jung, into the seal structure of Jung. . . .

And the waterproofing structure of Jung is particularly adapted to prevent that from getting into the electronics of the device.

Ground 3 – Claim 1, [1.b]

[Undisputed]

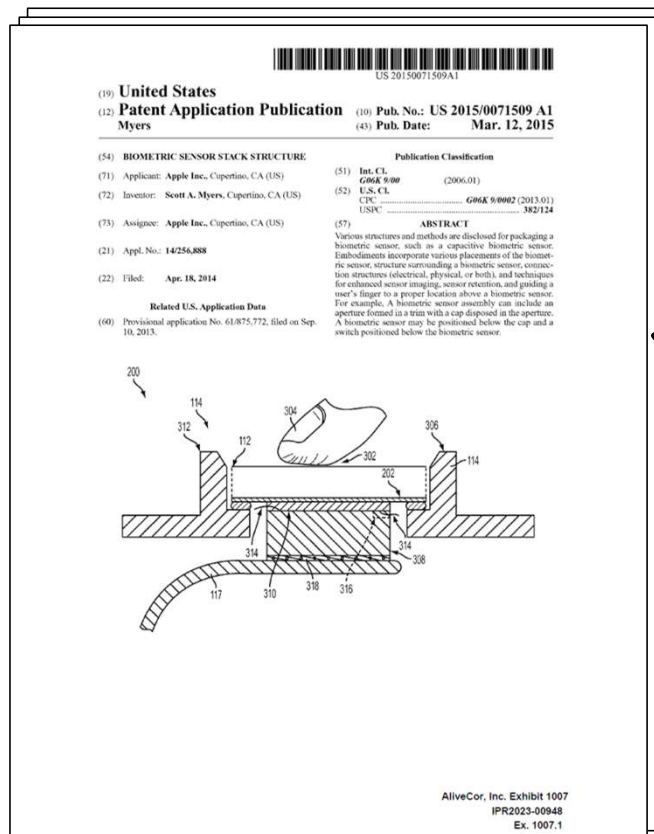
[1.b] a processor positioned in the enclosed volume;



Jung

Ground 3 – Claim 1, [1.c]

[1.c.i] a button assembly within the opening, the button assembly comprising: an input member having an input surface;



Myers

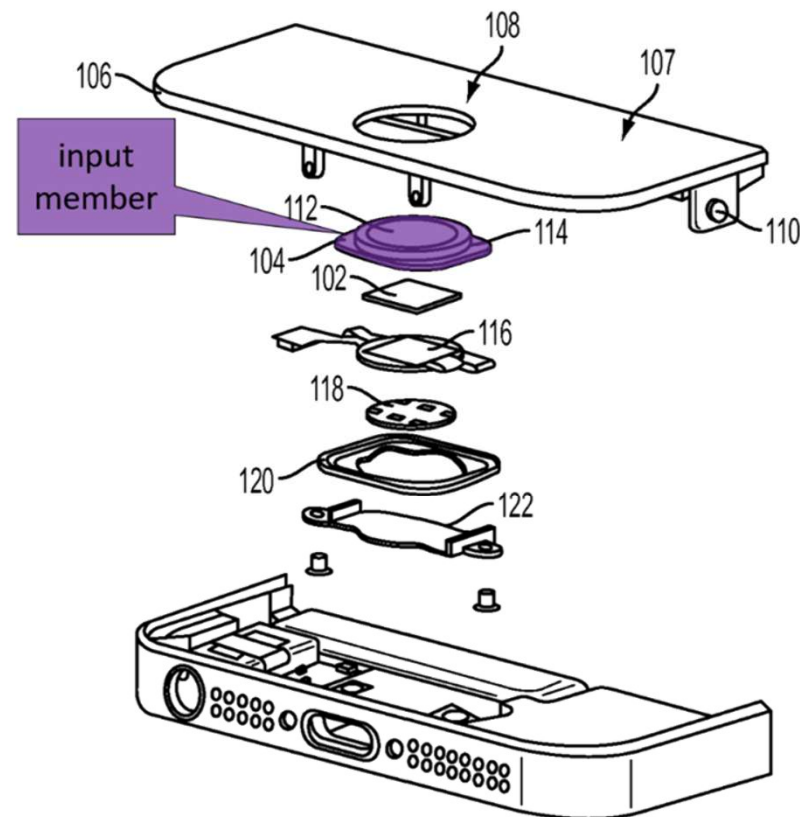
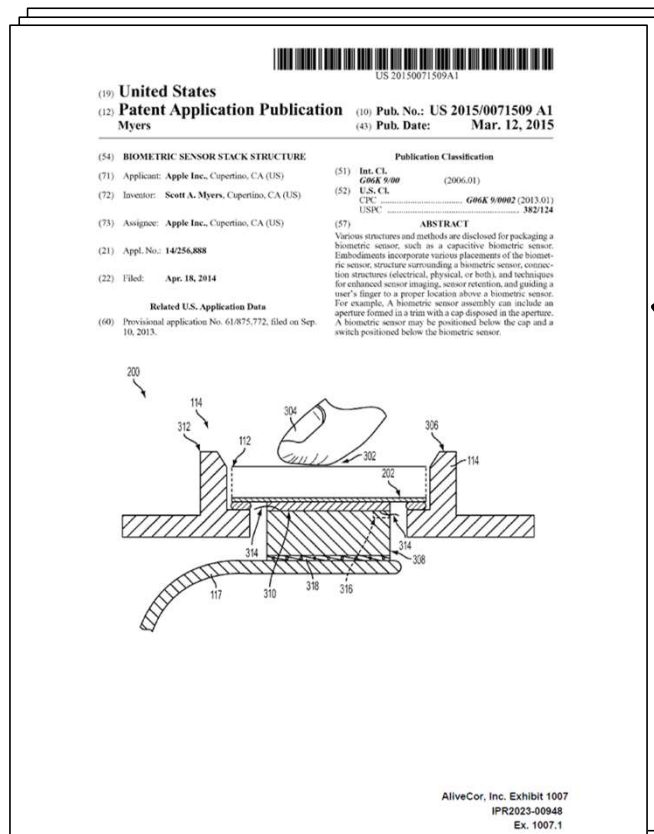


FIG. 1

Ground 3 – Claim 1, [1.c]

[1.c.ii] ... a biometric sensor positioned below the input member ...



Myers

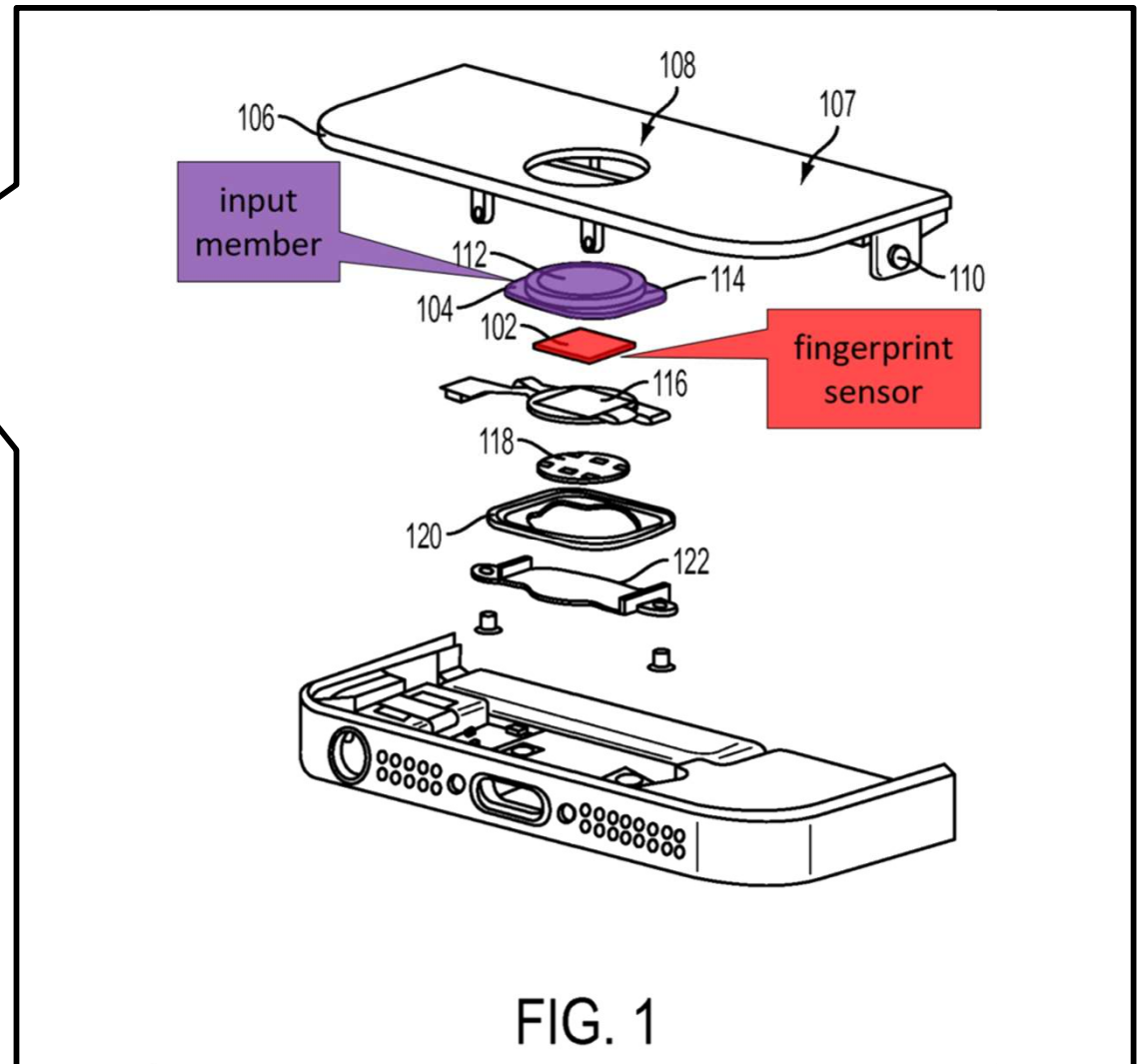
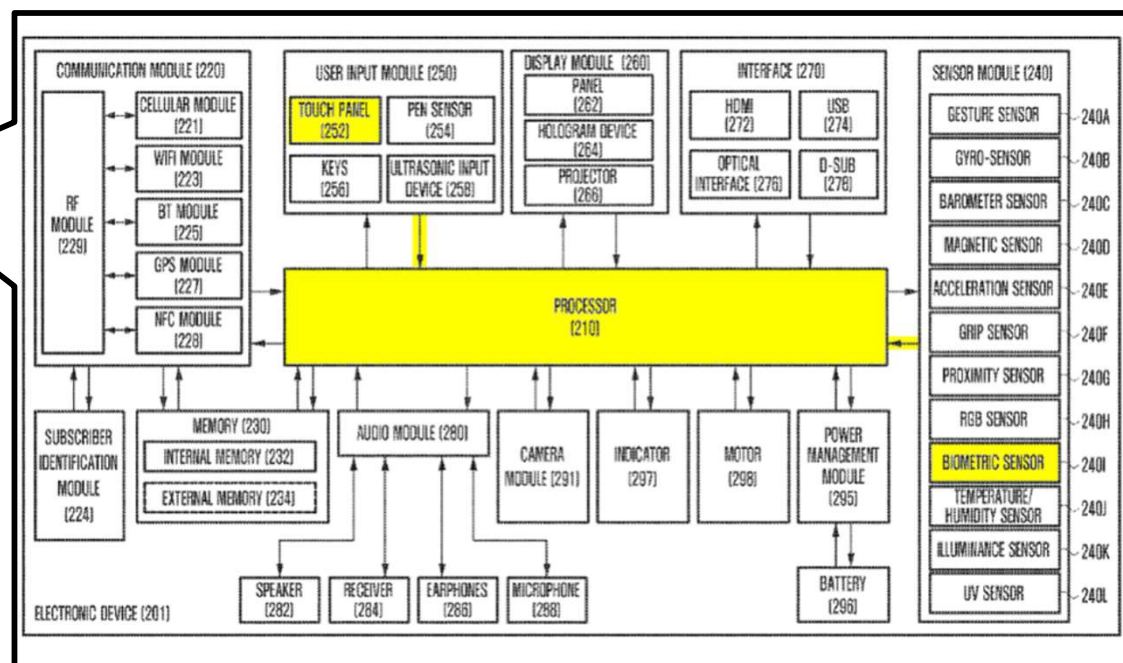
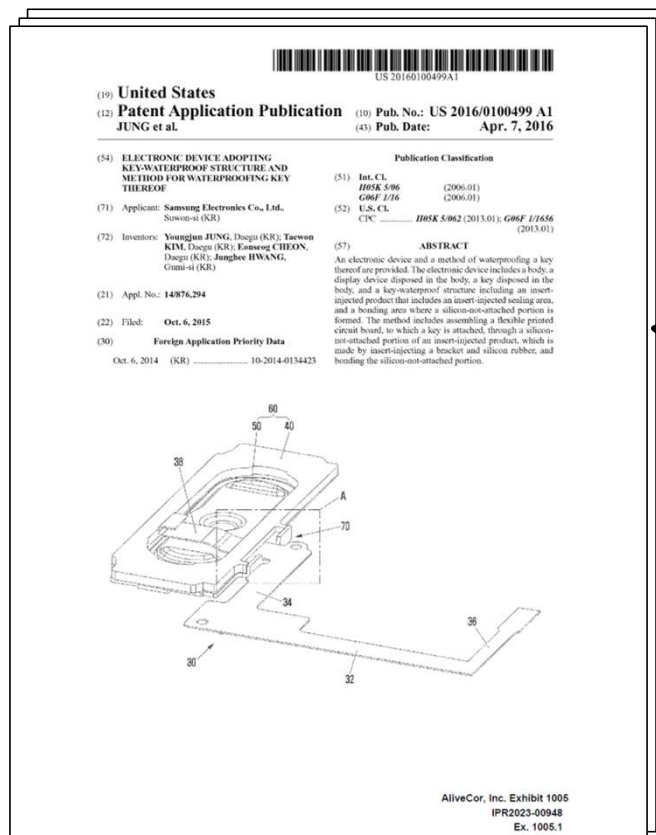


FIG. 1

Ground 3 – Claim 1, [1.c]

[1.c.ii] ... a biometric sensor ... configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;

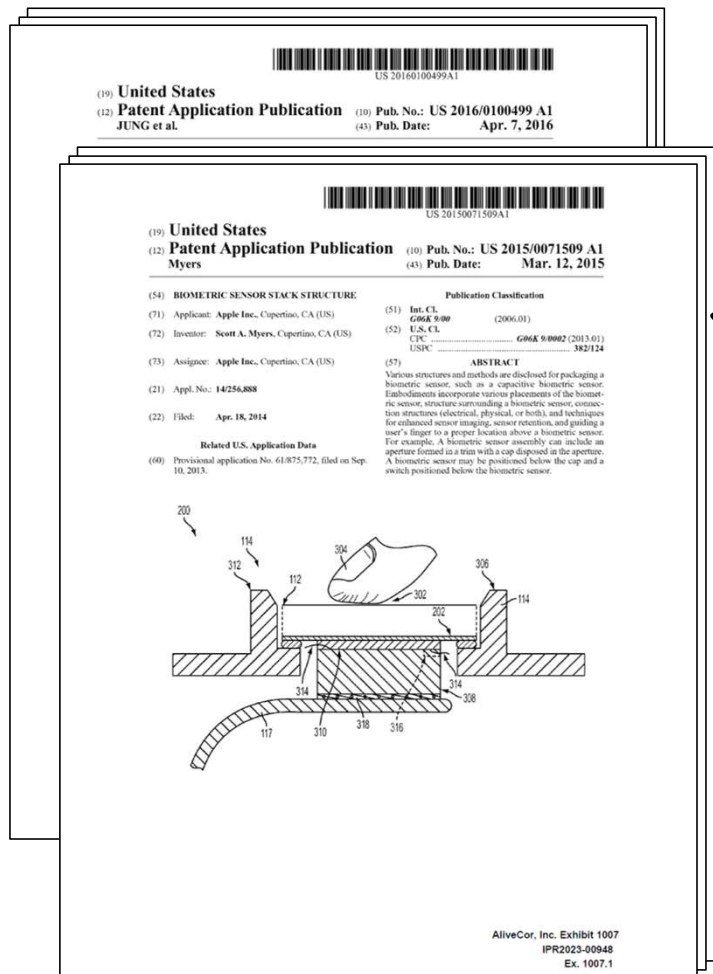


Jung

Ground 3 – Claim 1, [1.d]

[Undisputed]

[1.d] a seal positioned between a sealing surface of the button assembly and the enclosure;



Jung, Myers

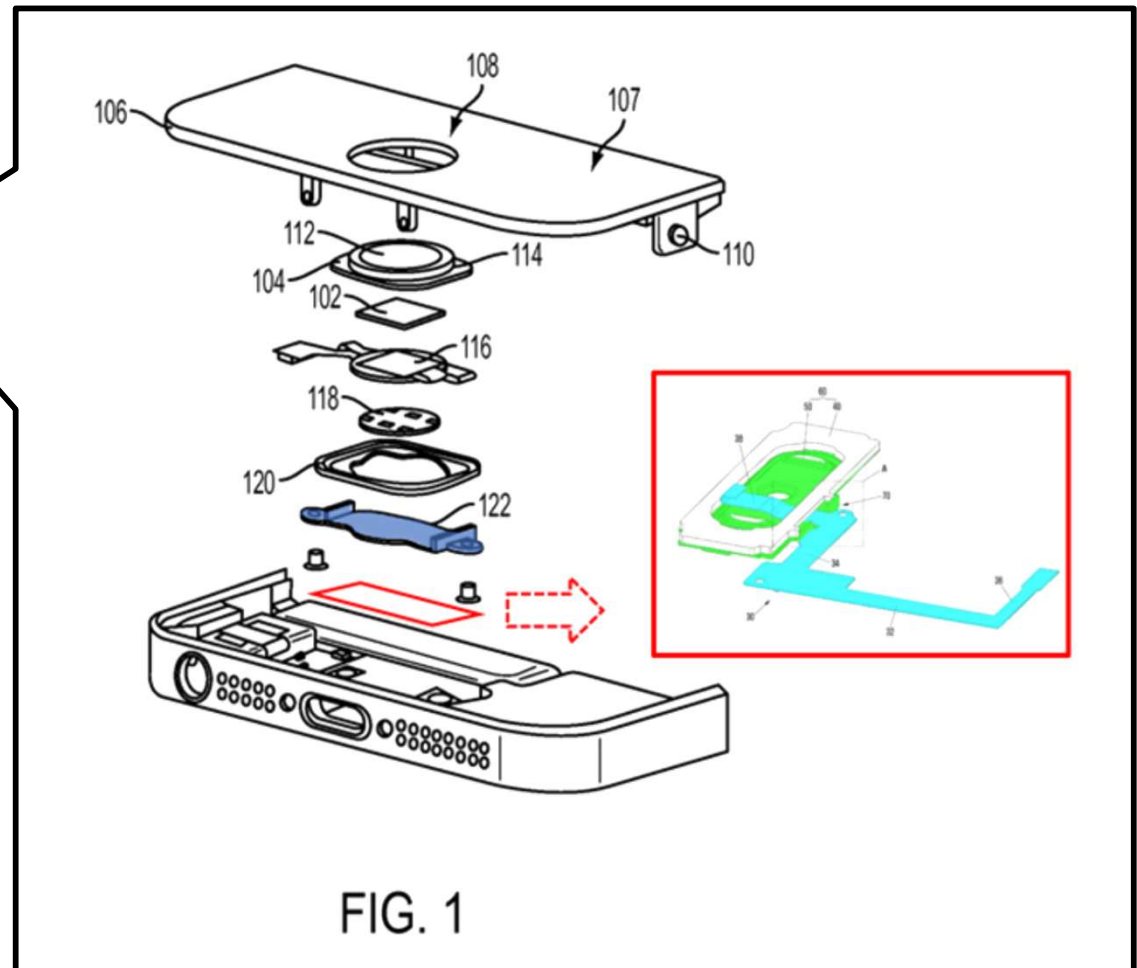
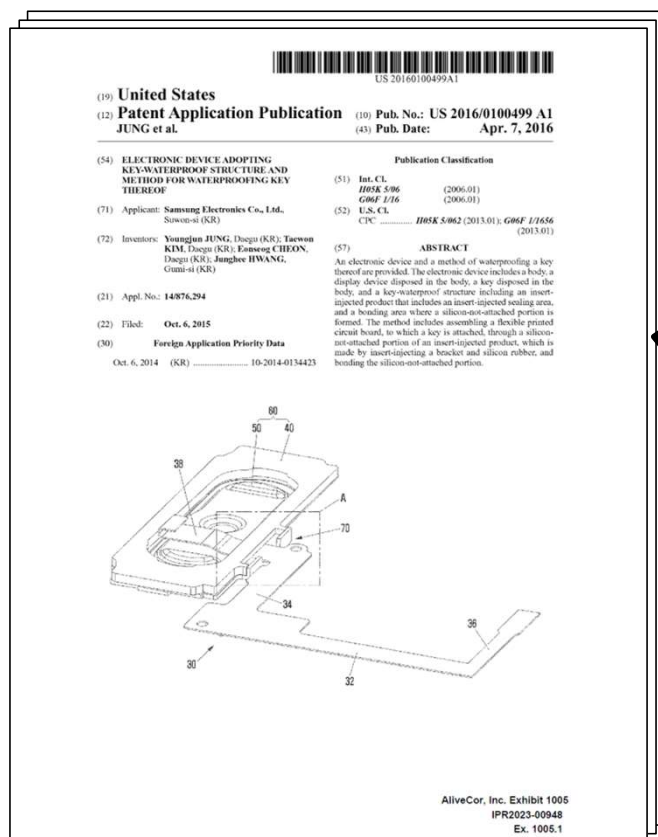


FIG. 1

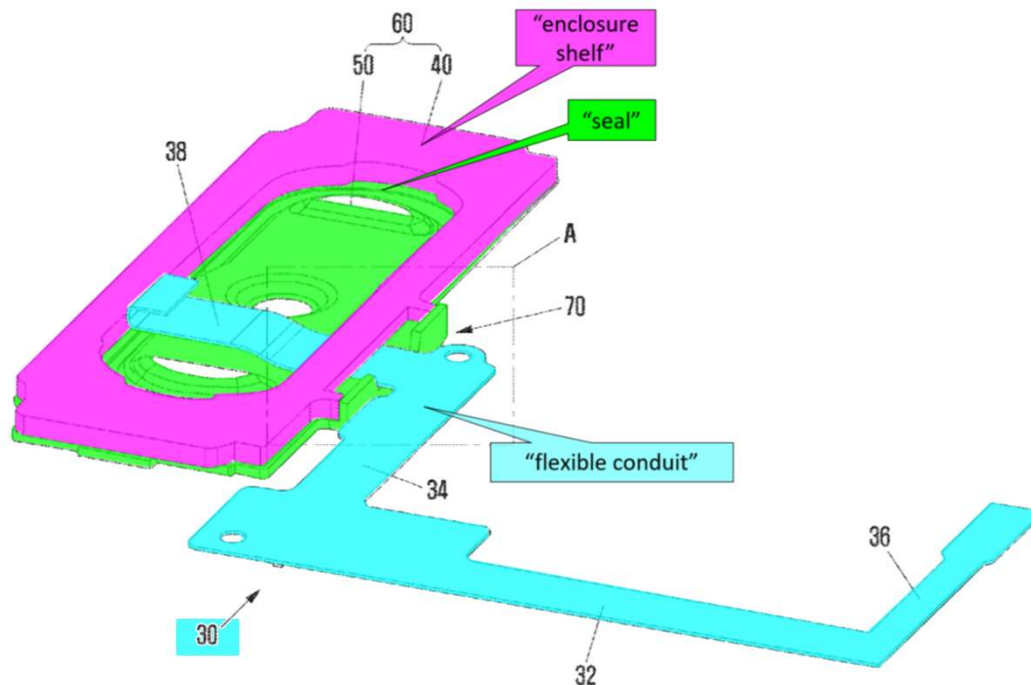
Ground 3 – Claim 1, [1.e]

[Undisputed]

[1.e] a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:



Jung

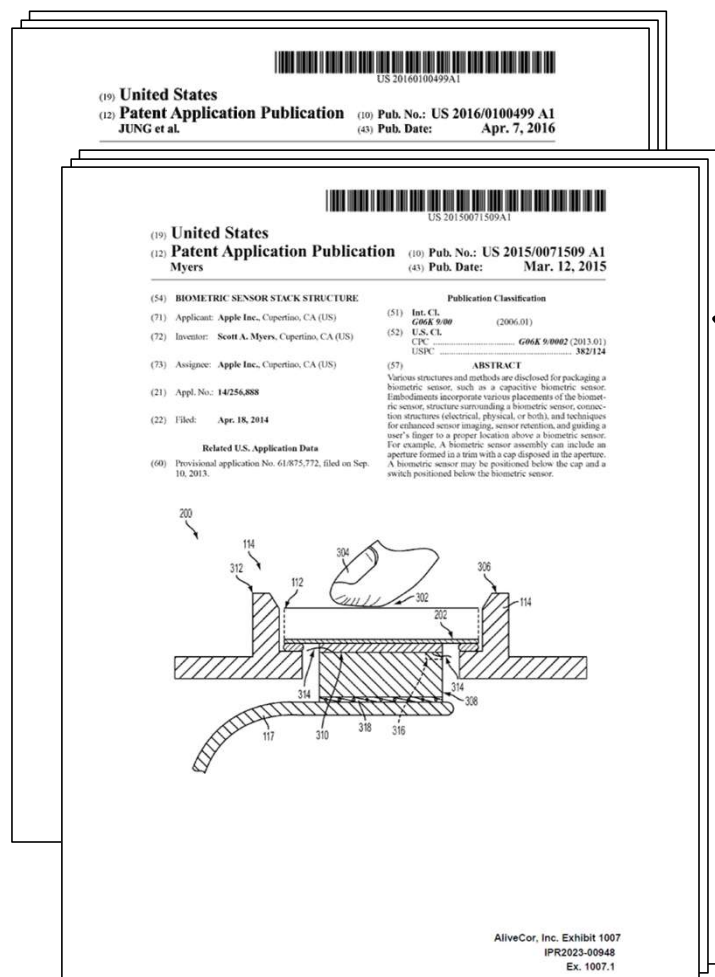


[0098] The flexible printed circuit board 30 may be shaped into a long and narrow band, and may include a central vertical portion 32, and the first bent portion 34 and the second bent portion 36, which are bent in the same direction at both ends of the vertical portion 32. In addition, a key bonding

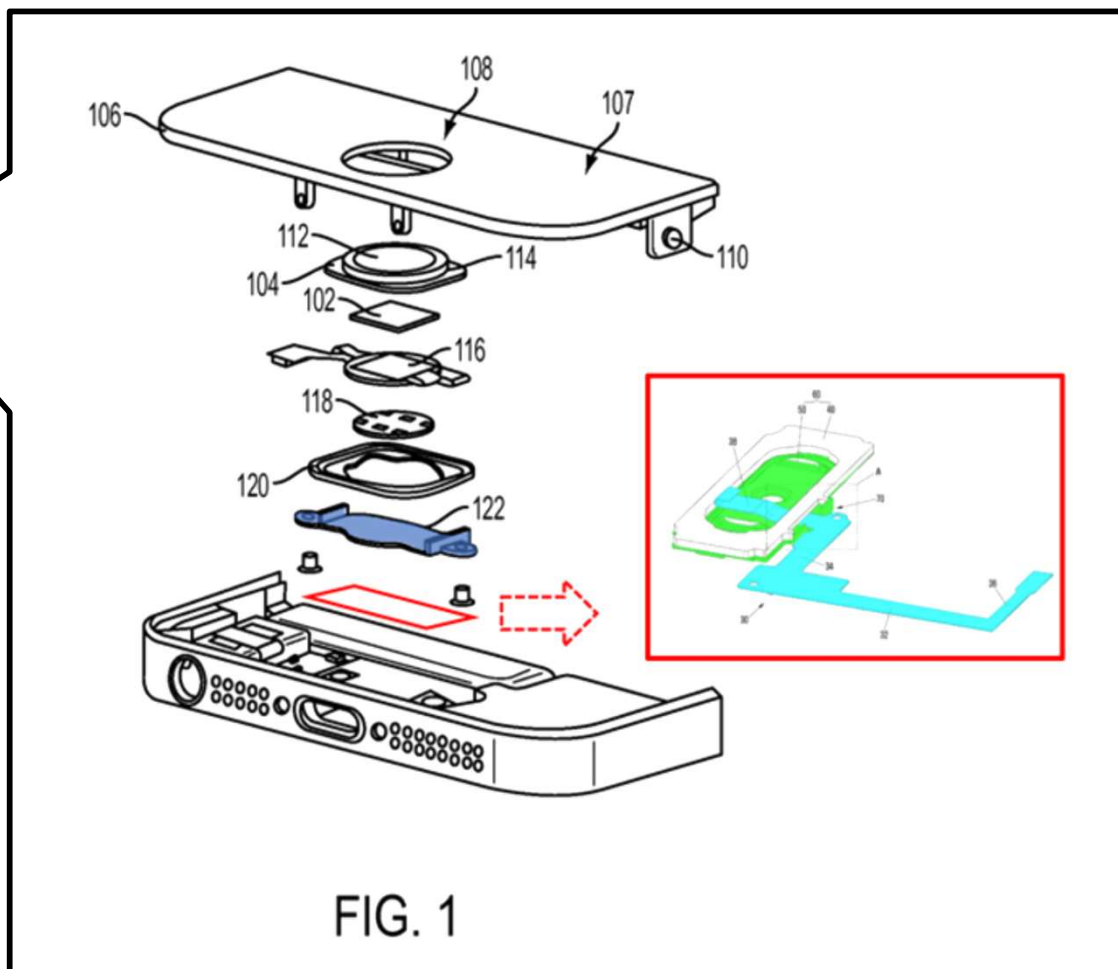
Ground 3 – Claim 1, [1.f]

[Undisputed]

[1.f] a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

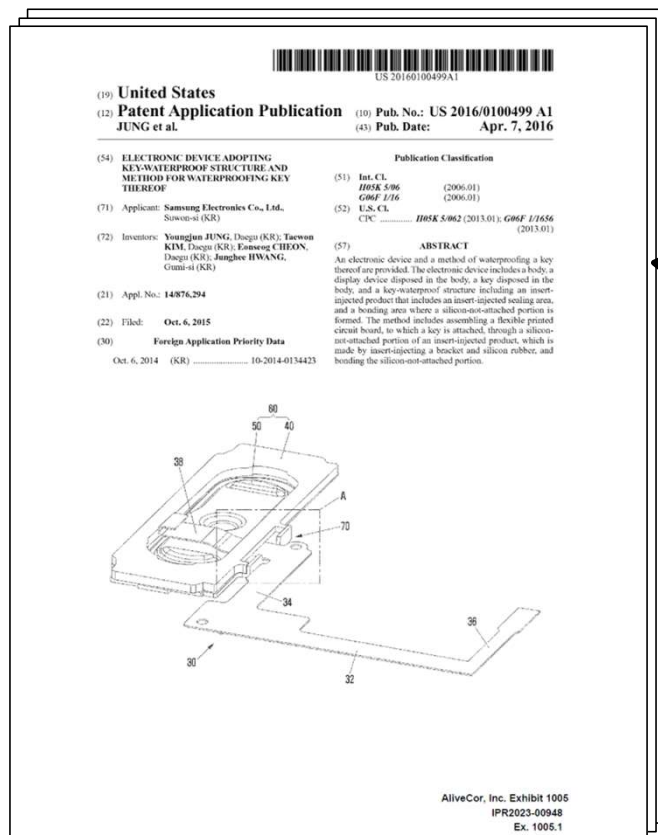


Jung, Myers



Ground 3 – Claim 4

[4] The electronic device of claim 1 , wherein the seal is an input member with an input surface; overmolded around the portion of the flexible conduit .



[0122] As described above, the electronic device adopting the key-waterproof structure and a method of waterproofing a key, according to various embodiments of the present disclosure, may be made of two processes, such as a process of forming the silicon-not-attached portion for assembling the flexible printed circuit board in the insert-injected product after the circuit board bracket and the silicon rubber are sealed through the insert injection, and a process of bonding only the silicon-not-attached portion for waterproofing after assembling the flexible printed circuit board through the silicon-not-attached portion. Therefore, according to the present disclosure, the process can be simplified, and waterproofing failure can be reduced. In addition, the assembly cost can be

Jung

Ground 3 – Claim 4

[4] The electronic device of claim 1 , wherein the seal is an input member with an input surface; overmolded around the portion of the flexible conduit .

UNITED STATES PATENT AND TRADEMARK OFFICE

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Case No. IPR2023-00948
U.S. Patent No. 10,866,619 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN
SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,866,619 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00948
Ex. 1003.1

Berger Decl.

309. Furthermore, claim 4 would have been well known to a person of ordinary skill in the art. As I explained earlier in Section VI.B (which is incorporated by reference), a person of ordinary skill in the art would have known that overmolding refers to a technique in which a one material is molded over a substrate, often by injection. A person of ordinary skill in the art would have also known that an overmolding or injection molding process is one in which a mold material such as an epoxy resin is injected around the components and then cured to create an overmolded component. Similarly, the overmolding process occurs when a mold material such as an epoxy resin or the like is injected, poured or otherwise loaded into a space such that it surrounds another component. Once injected, the mold material may be cured (such as by a heat) so that it forms a hard casing or overmold around the component.

310. A person of ordinary skill in the art would also have known that another common technique to add a seal was to use an overmolding process. For example, a

Ground 3 – Claim 4

[4] The electronic device of claim 1 , wherein the seal is an input member with an input surface; overmolded around the portion of the flexible conduit .

UNITED STATES PATENT AND TRADEMARK OFFICE

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SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,866,619 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00948
Ex. 1003.1

Berger Decl.

51. Prior to the '619 patent's earliest alleged priority date of June 19, 2017, a person of ordinary skill in the art would have known that overmolding refers to a technique in which a one material is molded over a substrate, often by injection. For example, *Aapro* (Ex-1017) is based on an application filed on January 20, 2017, and it claims priority to an application filed on January 21, 2016 (Ex-1017, Face at Items (22), (30)). *Aapro* discloses "a method for manufacturing a hand-held portable electronic device frame assembly" that includes "overmolding a frame member onto the heat spreader in the injection molding device . . ." (Ex-1017, 2:9-19). As another

Ground 3 – Claim 4, Apple's Argument #1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
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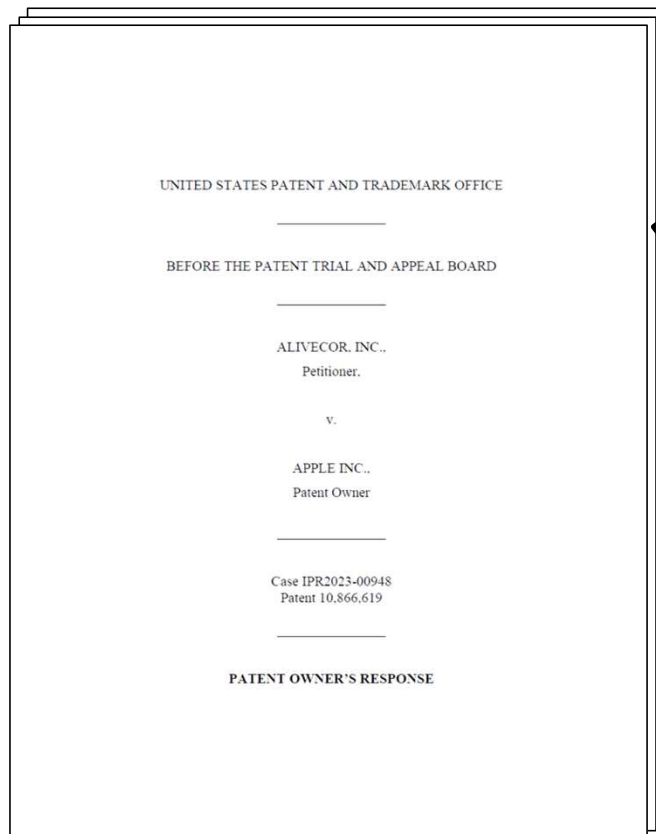
Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

overmolding. *See* Pet., 71. AliveCor relies on other expert testimony characterizing a POSITA's knowledge of overmolding as one example of a manufacturing means of effecting the assembly of components. *See* Ex-1003, ¶¶309-312. This testimony is nearly identical to the testimony offered for Ground 2 (Kim) and suffers from similar evidentiary deficiencies as those discussed in the previous section. *See* Pet., 71; Ex-1003, ¶¶309-312; *see also* *TQ Delta, LLC*, 942

Patent Owner's Response

Ground 3 – Claim 4, Apple's Argument #2



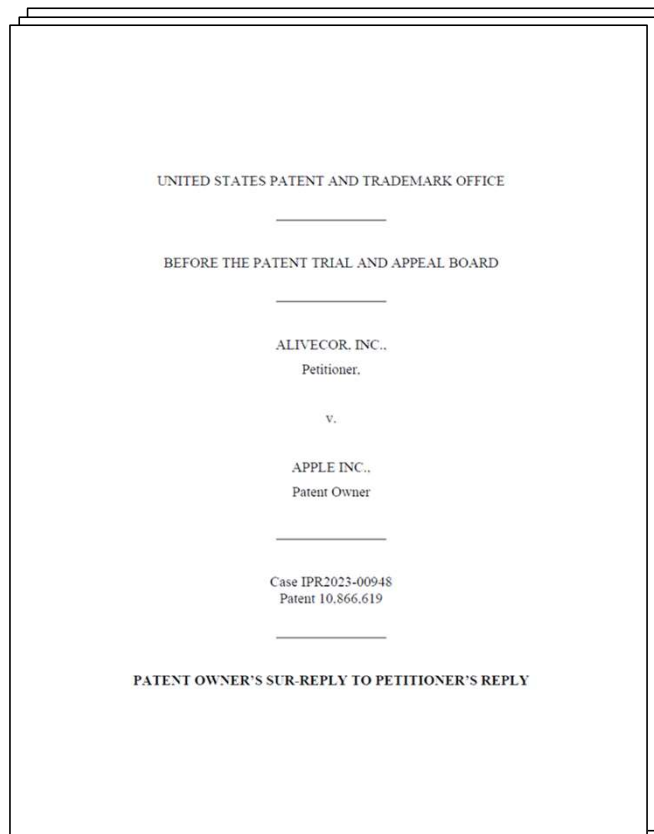
Patent Owner's Response

Dr. Berger's testimony also fails to establish that the processes in the cited paragraph of Jung accurately represent overmolding. The following disclosure cited by Dr. Berger confirms that AliveCor mapped a process performed after a sealing process to address claim 4's requirement for a *seal* to be *overmolded*:

...the electronic device adopting the key-waterproof structure and a method of waterproofing a key, according to various embodiments of the present disclosure, may be made of two processes, such as *a process of forming the silicon-not-attached portion for assembling the flexible printed circuit board in the insert-injected product after the circuit board bracket and the silicon rubber are sealed through the insert injection.* and a process of bonding only the silicon-not-attached portion for waterproofing after assembling the flexible printed circuit board through the silicon-not-attached portion.

Ex-1003, ¶307 (citing Ex-1005, [0122]) (italicized emphasis in original, underlined emphasis added)

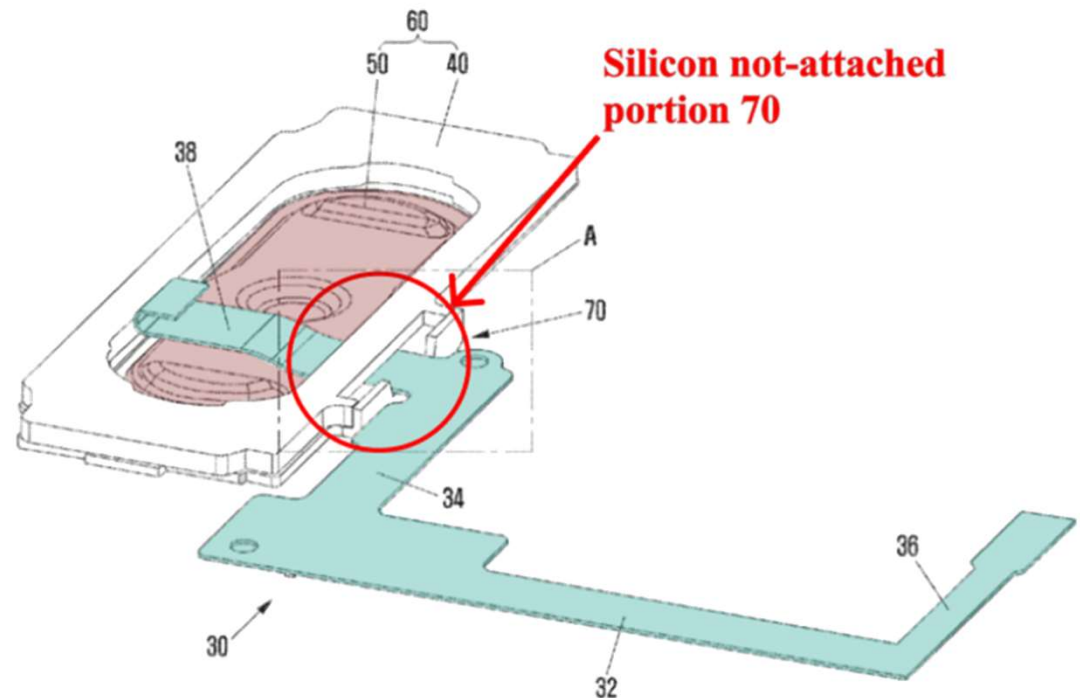
Ground 3 – Claim 4, Apple's Argument #2



Patent Owner's Sur-Reply

This is not surprising because Jung is clear that its seal 50 is a separate component from its flexible circuit board 30 and the flexible circuit board 30 is only assembled through the silicon not-attached portion 70 after insert injection has been performed. This process is clearly shown in Figures 8-11 of Jung:

...

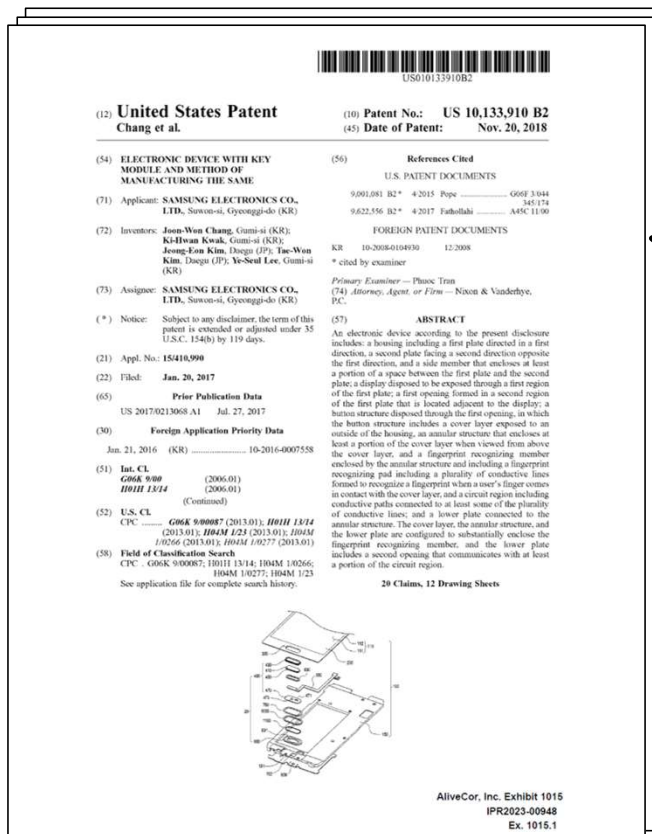


ROADMAP

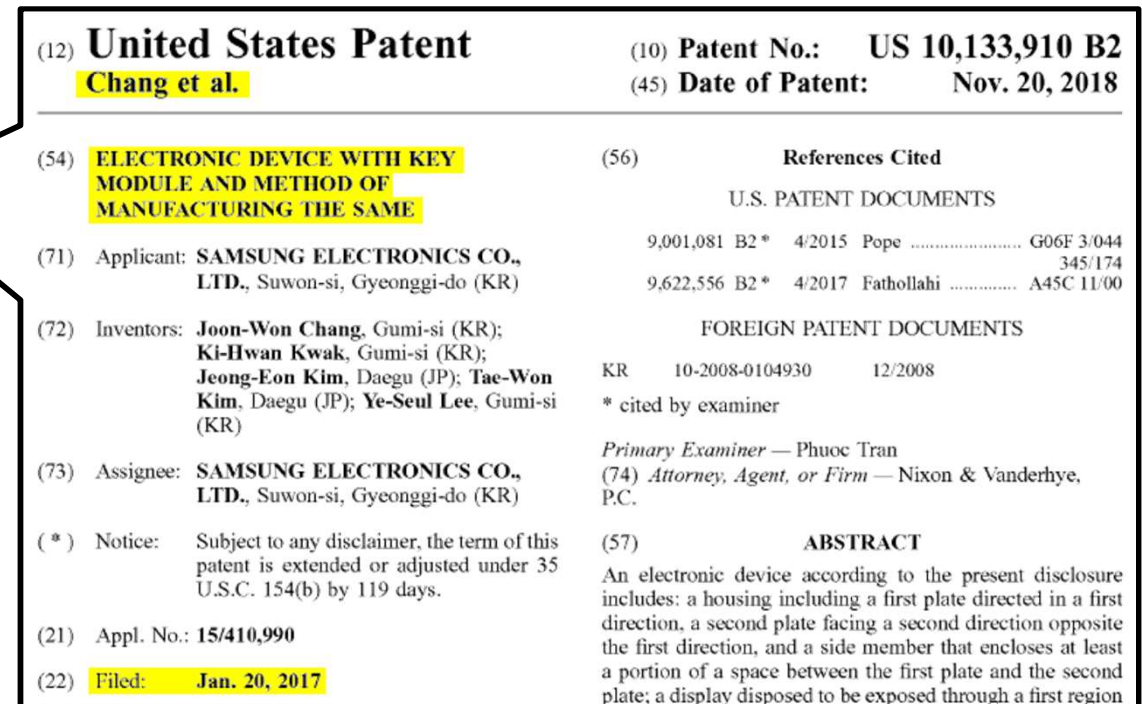
1. Overview of the Challenged Patent
2. Claim Construction
3. Kim Grounds
4. Jung + Myers Grounds
5. **Chang Grounds**

Ground 4 – Overview

Claims 1-2, 6, and 9 are unpatentable under 35 U.S.C.
§§ 102 and/or 103 over *Chang*.

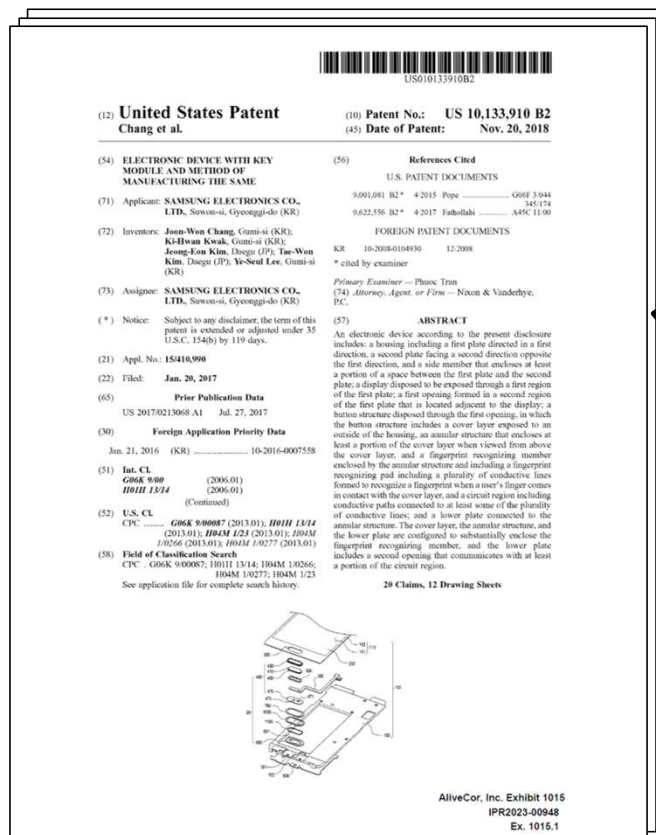


Chang

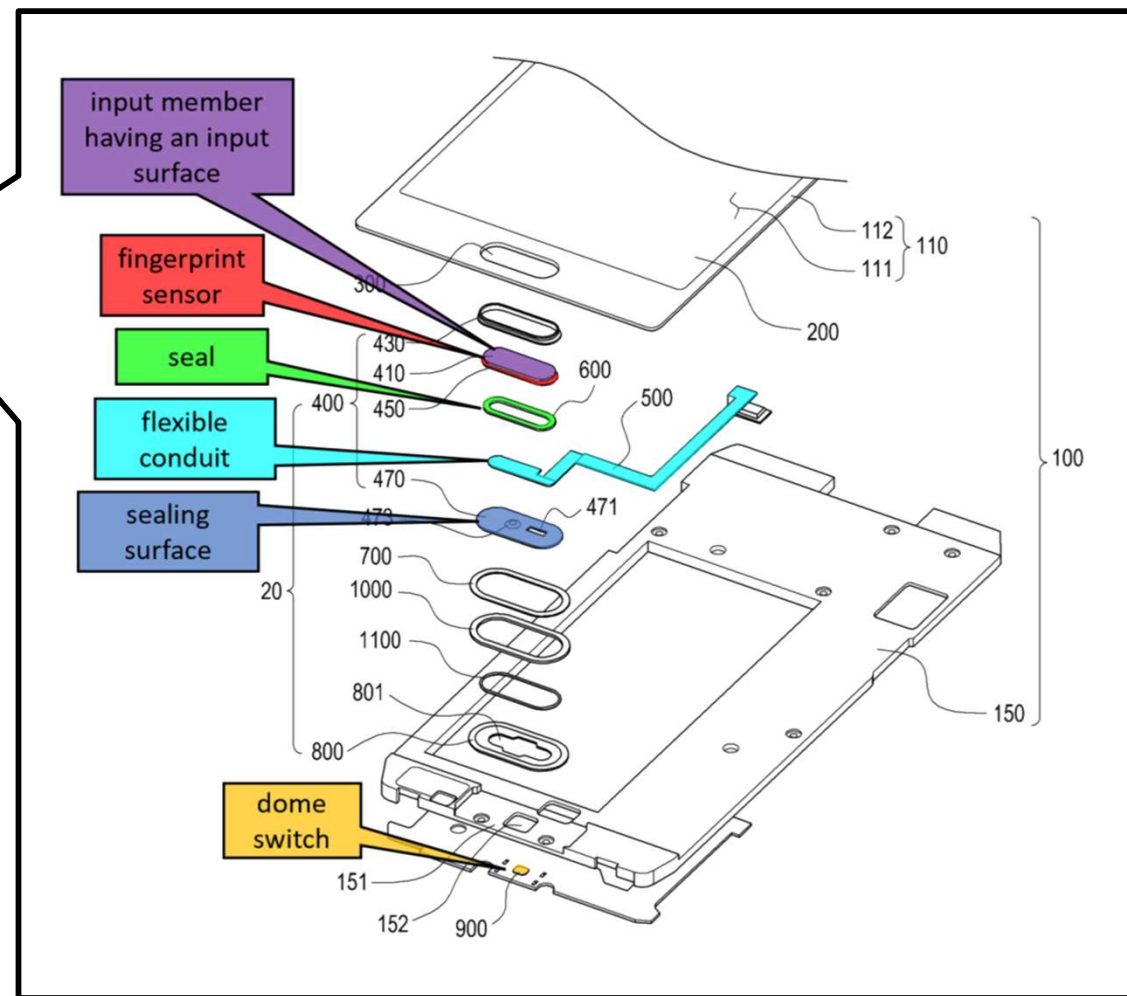


Ground 4 – Overview

Claims 1-2, 6, and 9 are unpatentable under 35 U.S.C. §§ 102 and/or 103 over *Chang*.

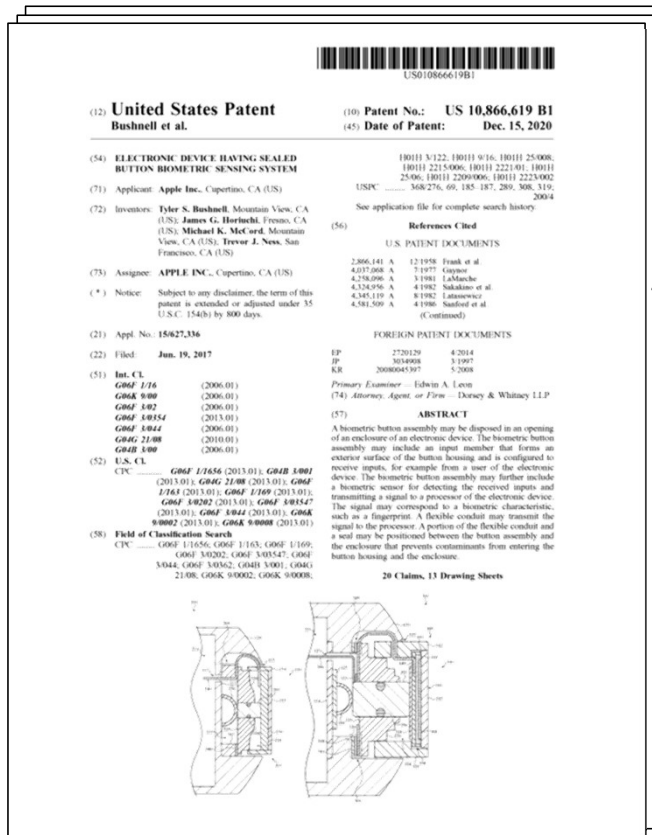


Chang



Ground 4 – Disputes

Claims 1-2, 6, and 9 are unpatentable under 35 U.S.C. §§ 102 and/or 103 over *Chang*.



'619 Patent

1. An electronic device comprising:
an enclosure having an enclosed volume and an opening formed in a sidewall;
a processor positioned in the enclosed volume;
a button assembly within the opening, the button assembly comprising:
an input member having an input surface; and
a biometric sensor positioned below the input member and configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;
a seal positioned between a sealing surface of the button assembly and the enclosure; and
a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:
a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

[1.pre] ✓

[1.a] ✓

[1.b] ✓

[1.c] ✓

[1.d] ✓

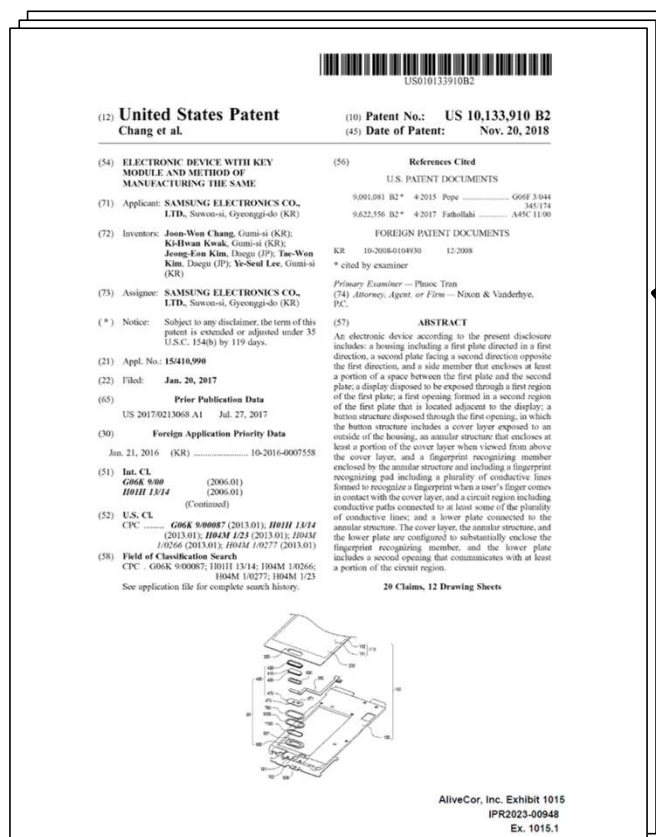
[1.e] ✓

[1.f]

Ground 4 – Claim 1, [1.pre]

[Undisputed]

[1.pre] An electronic device comprising:



Chang

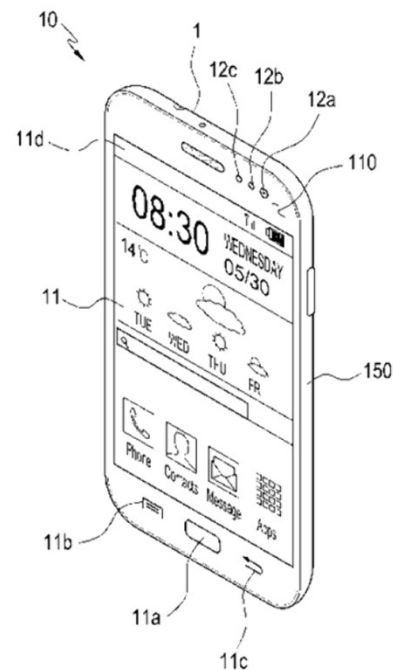
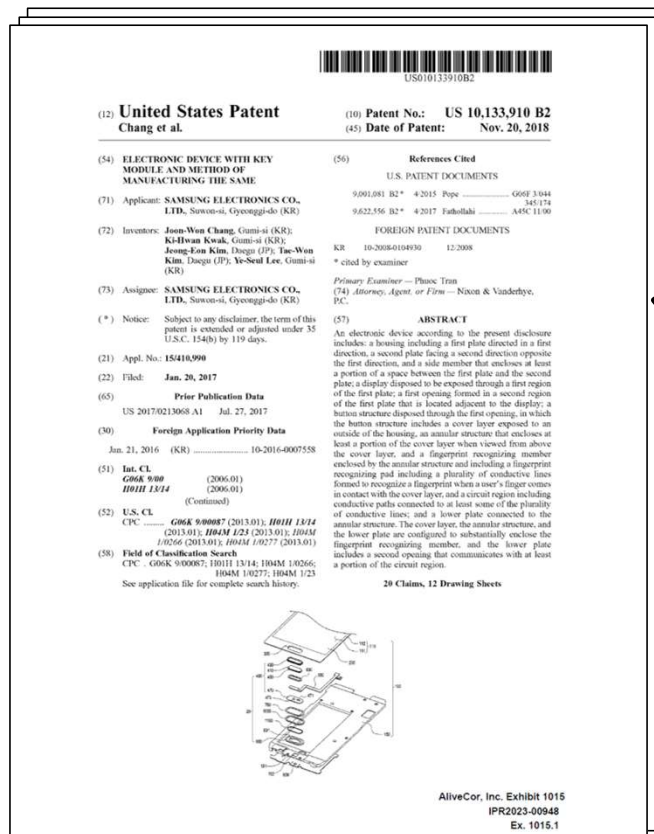


FIG. 1

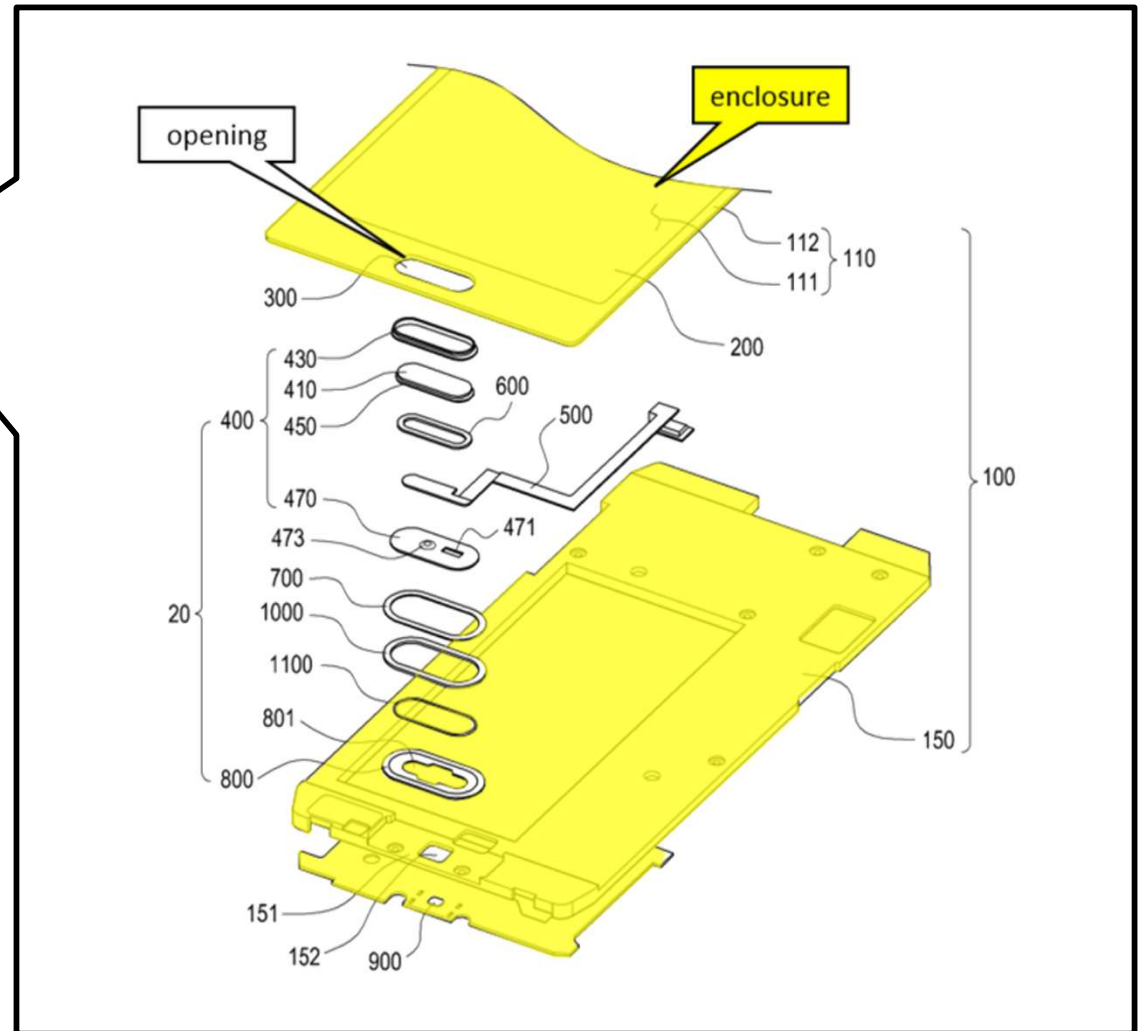
Ground 4 – Claim 1, [1.a]

[Undisputed]

[1.a] an enclosure having an enclosed volume and an opening formed in a sidewall;



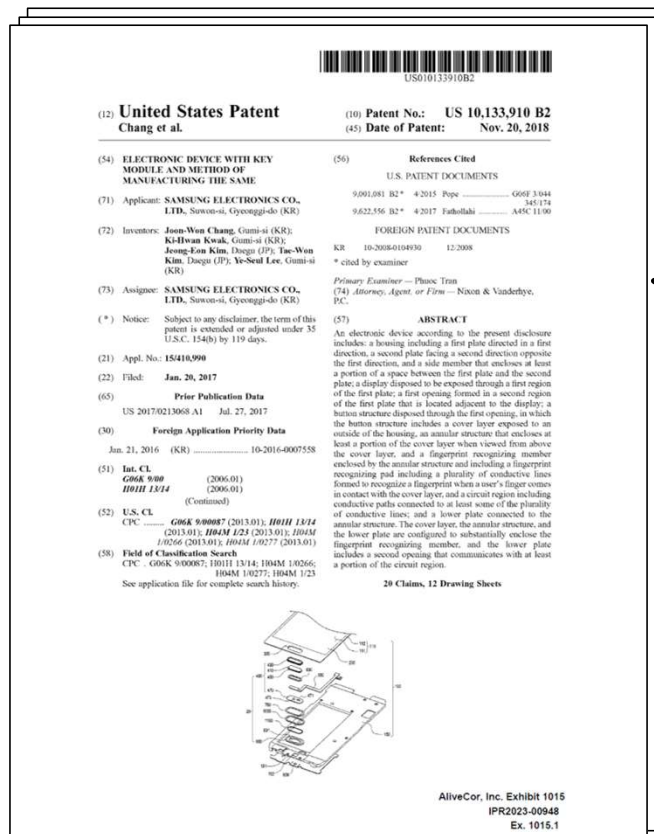
Chang



Ground 4 – Claim 1, [1.a]

[Undisputed]

[1.a] an enclosure having an enclosed volume and an opening formed in a sidewall;



In the present embodiment, the key module is described with reference to the above-described home key by way of an example, but is not limited thereto, and when the key module is a key module that is driven for data input, it may be variously applied to various keys such as a side key, in addition to the above-mentioned home key 11a. In the present embodiment, descriptions will be made with reference to a key module that is provided with a waterproof function.

Chang

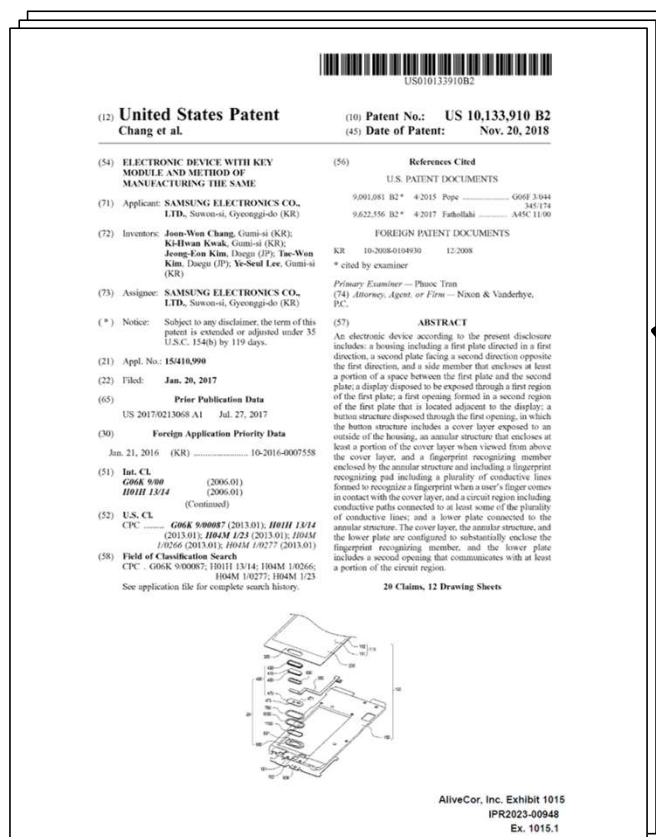
[Undisputed]



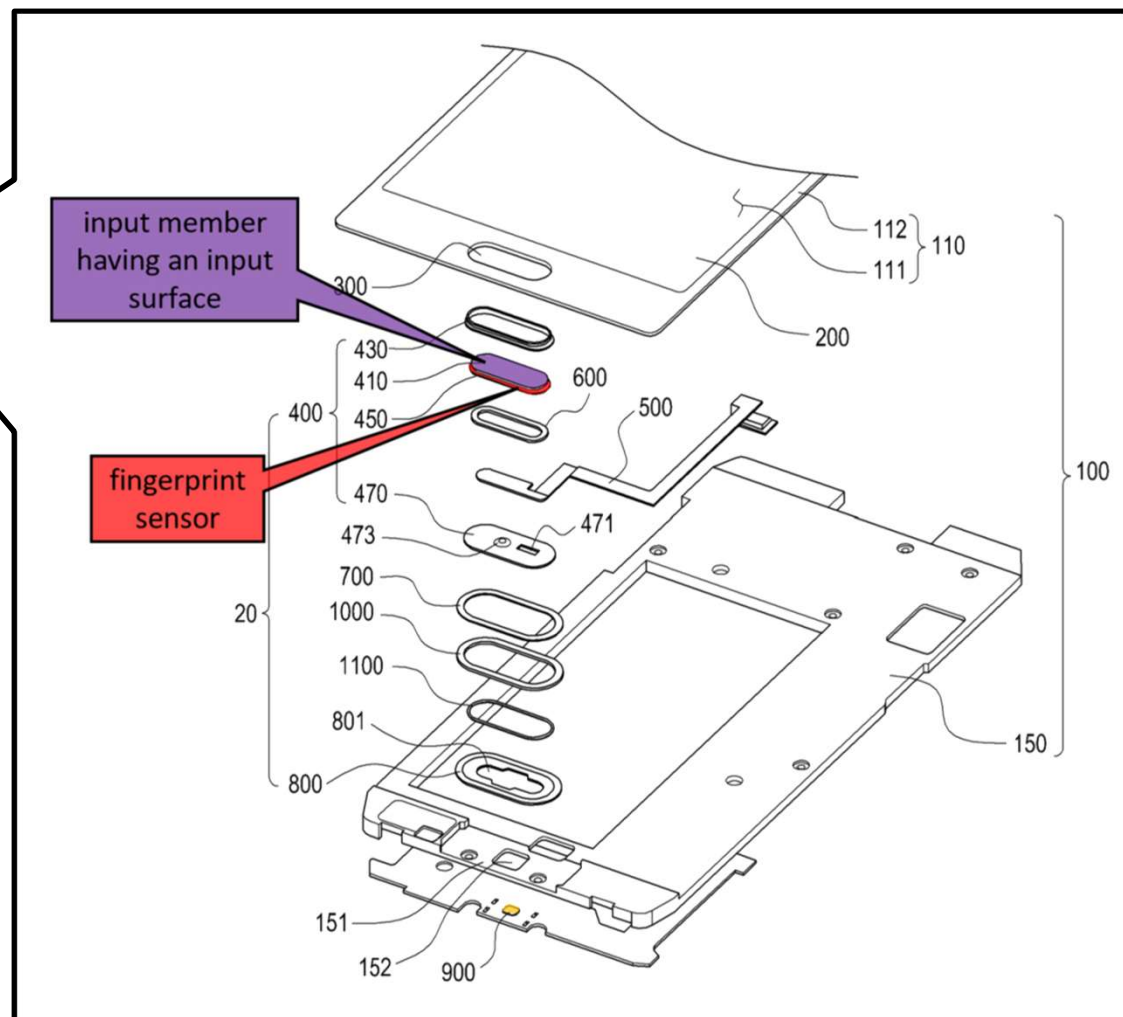
Ground 4 – Claim 1, [1.c]

[Undisputed]

[1.c.ii] ... a biometric sensor positioned below the input member ...



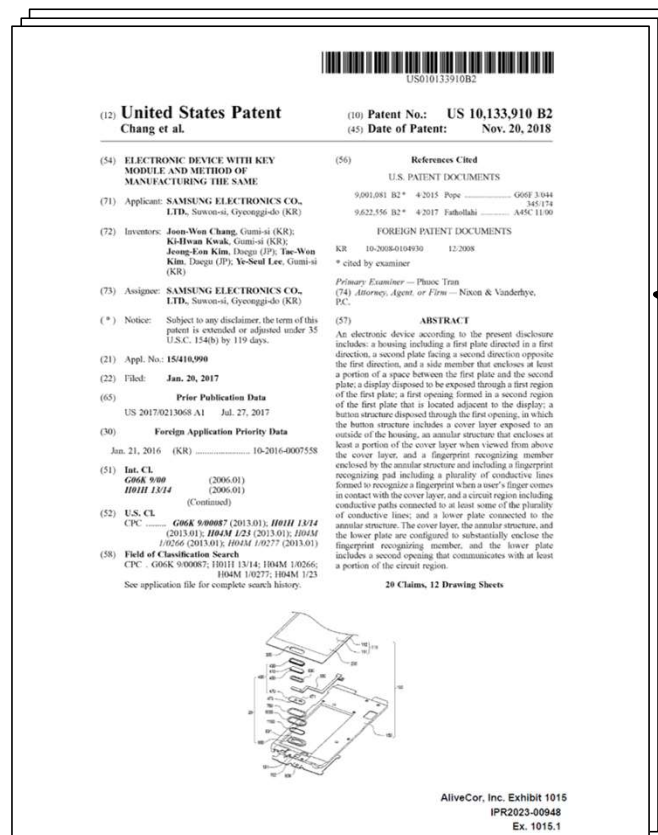
Chang



Ground 4 – Claim 1, [1.c]

[Undisputed]

[1.c.ii] ... a biometric sensor ... configured to produce an output signal in response to a touch on the input surface, the output signal corresponding to a biometric characteristic;



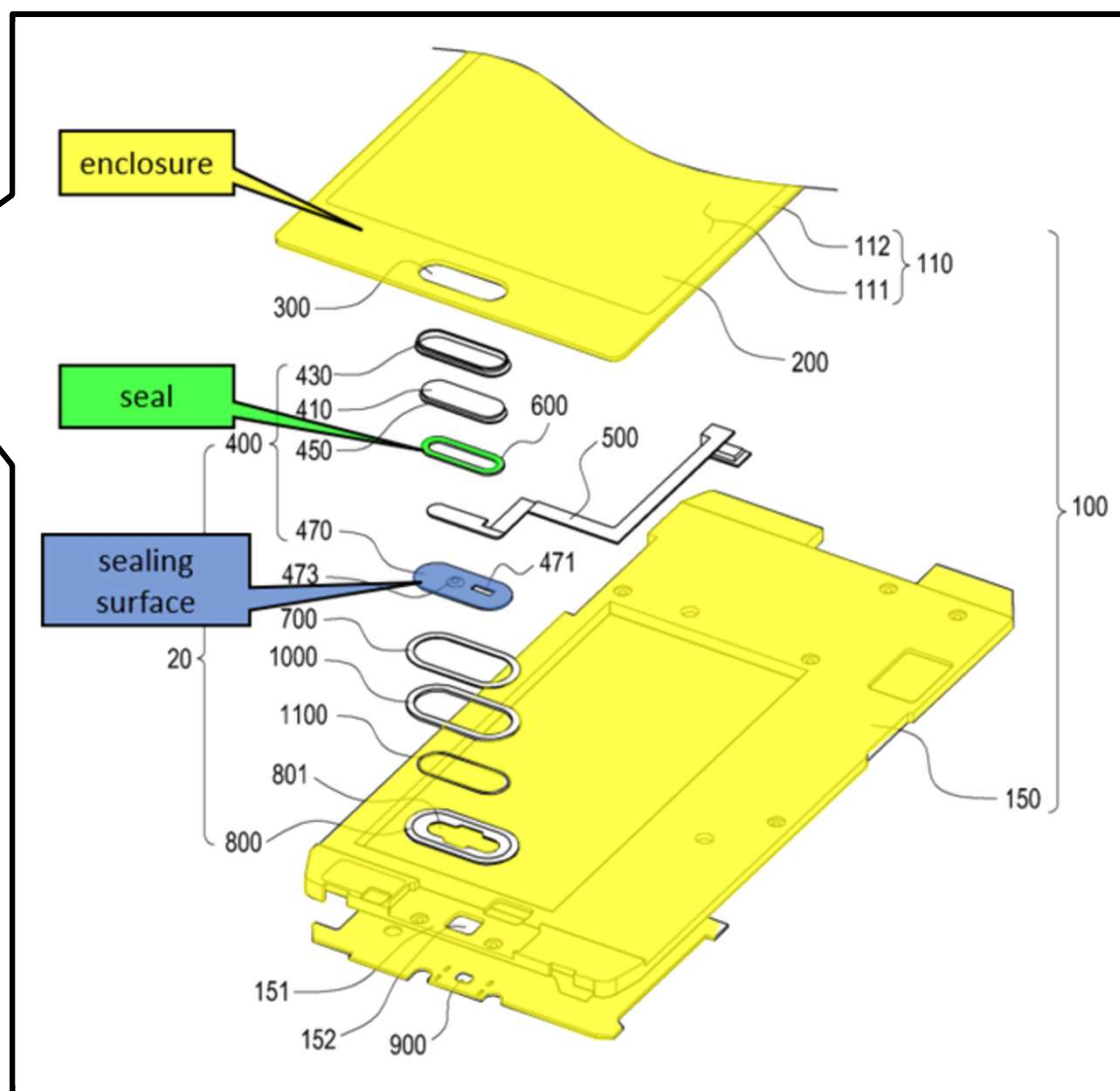
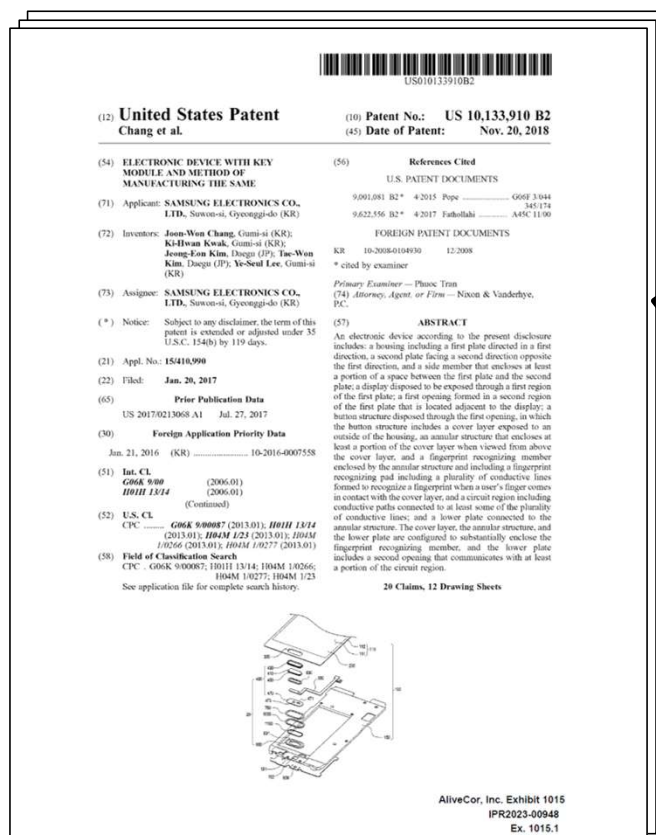
Chang

According to an example embodiment, the mutual contact faces between the flexible conductive member 500 and the circuit region 453 may be designed to be bonded with a Thin FPCB Antenna (TFA) or hot bar soldering structure or an FPCB contact structure. With this bonding, the flexible conductive member 500 and the circuit region 453 may be electrically connected to each other, and may transfer a signal or a pressure, which is transferred from the fingerprint recognizing member 450, to the inside of the electronic device 10.

Ground 4 – Claim 1, [1.d]

[Undisputed]

[1.d] a seal positioned between a sealing surface of the button assembly and the enclosure;

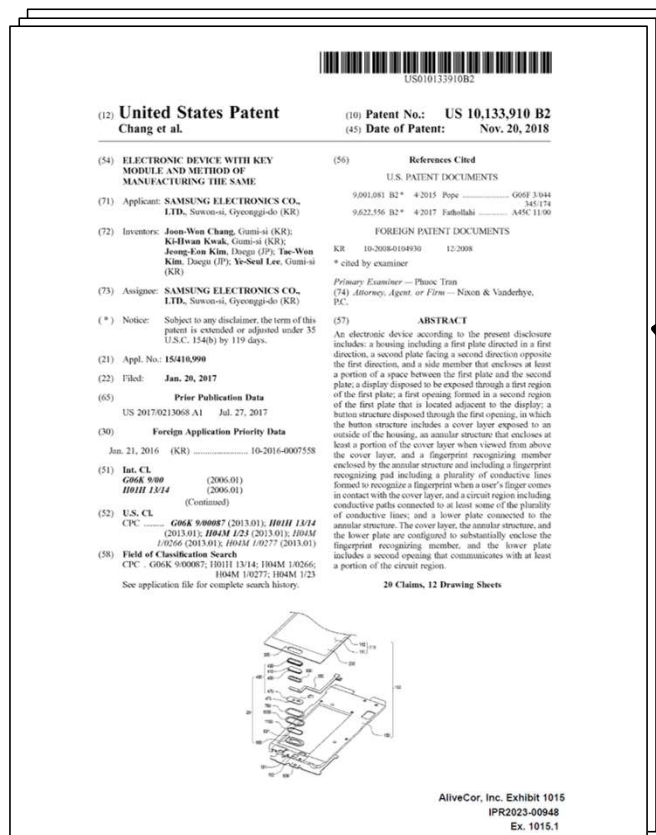


Chang

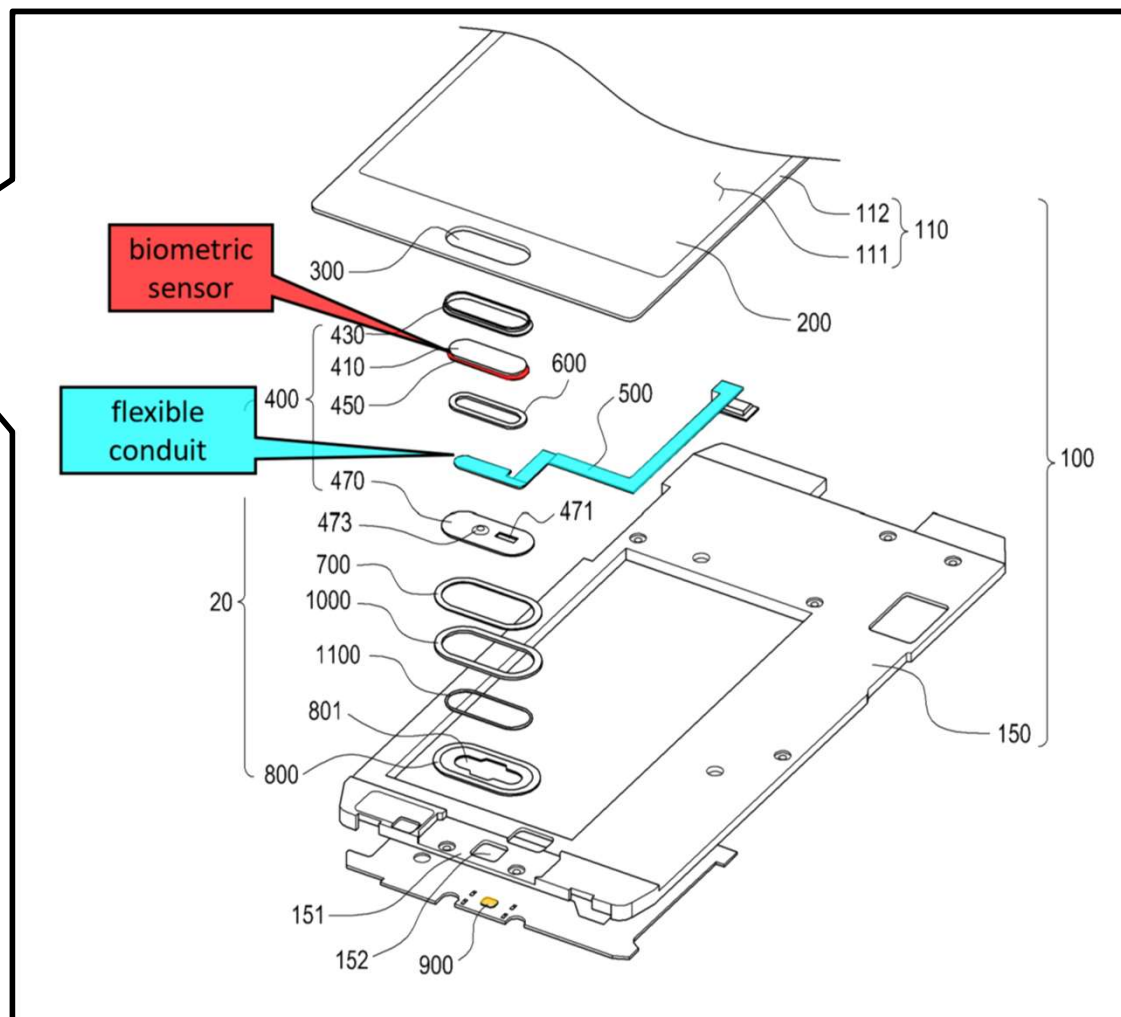
Ground 4 – Claim 1, [1.e]

[Undisputed]

[1.e] a flexible conduit coupled to the biometric sensor and configured to transmit the output signal to the processor; wherein:

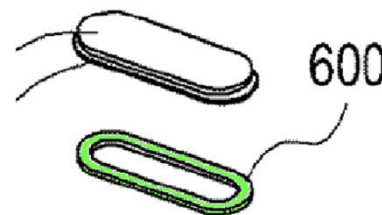
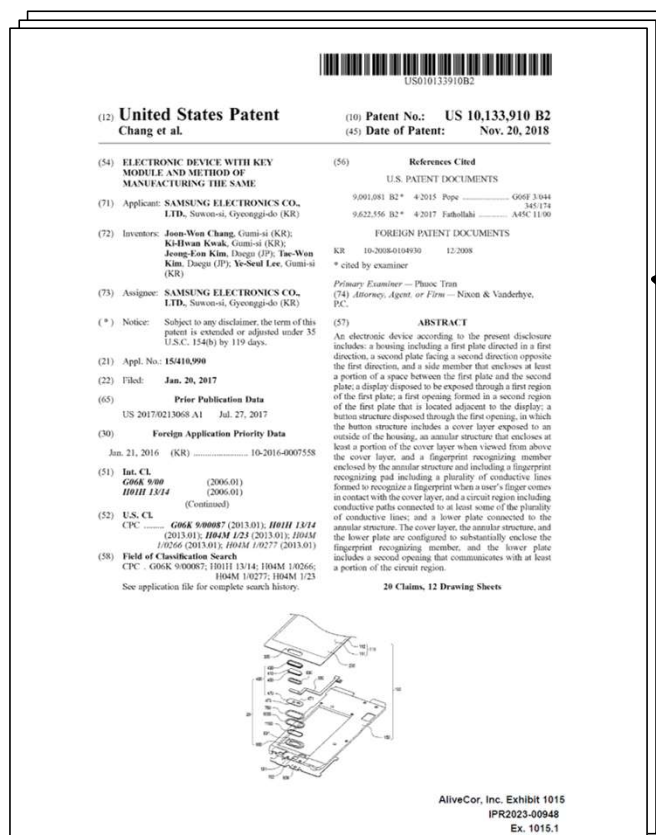


Chang



Ground 4 – Claim 1, [1.f]

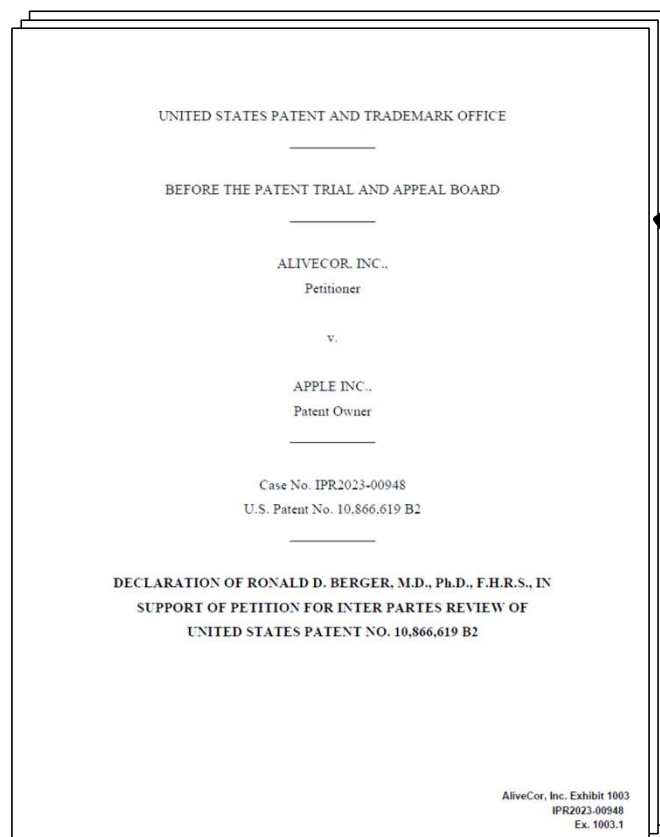
[1.f] a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.



According to an example embodiment, the first sealing member 600 may be disposed between the fingerprint recognizing member 450 and the lower plate 470 and/or between the fingerprint recognizing member 450 and the annular structure 430. Alternatively, the first sealing member 600 may be designed in an annular shape (e.g., a loop or ring shape), which corresponds to the entire shape of the key module 20 and includes an opening so as to allow the flexible conductive member 500 to extend therethrough.

Chang

Ground 4 – Claim 1, [1.f]

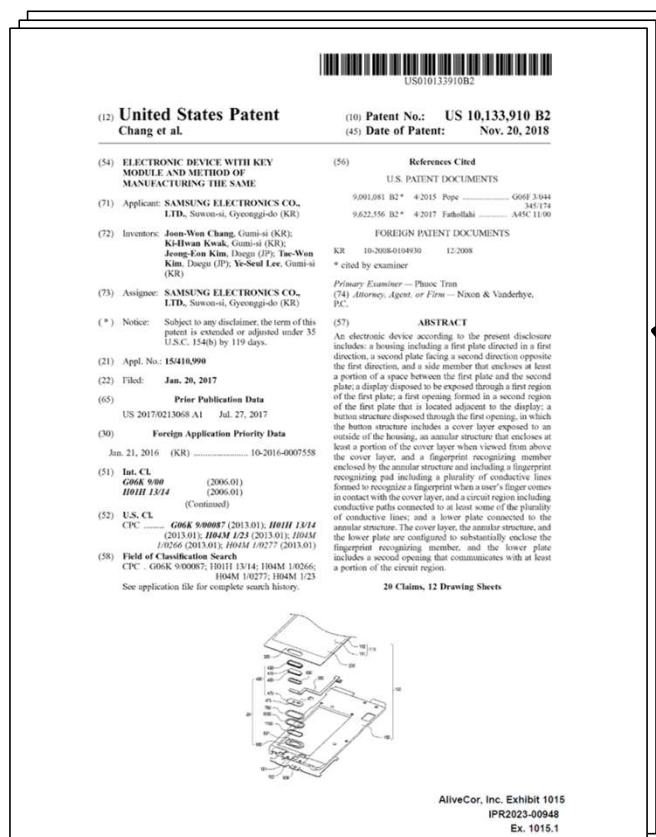


Berger Declaration

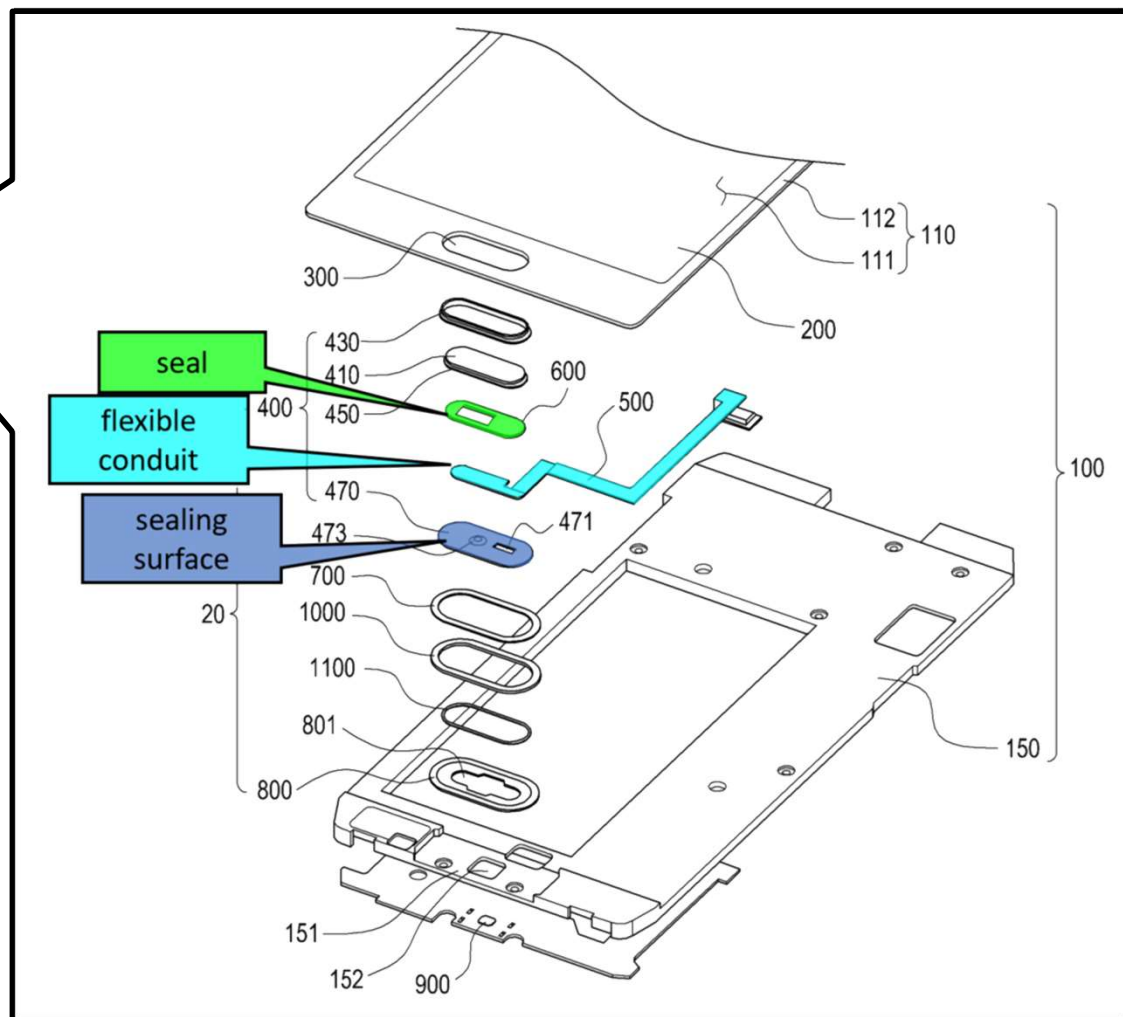
400. For example, *Chang* teaches that its button structure “may be variously modified and designed according to the structural shape or design of the electronic device 10 and the user’s convenience” (Ex-1015, 10:32-42). In addressing the design characteristics which should be considered while adapting the depicted configuration, *Chang* teaches that the disclosed design is “not limited to the ring shape, and may be subjected to a design change to various shapes as long as they may prevent respective components from being separated to the outside and safely fix the respective components” (Ex-1015, 10:59-11:3). Of particular relevance, *Chang* teaches that the “second opening 471 is provided in a rectangular shape having a size that allows the flexible conductive member 500 to pass therethrough, but may be implemented in various shapes such that *various shapes of conductive members 500 may pass therethrough*” (Ex-1015, 11:36-42 (emphasis added)). The configuration depicted below would allow for the maximum sealing surface, while still providing an open in the size and shape of “circuit region 453” located on fingerprint recognizing member 450 (*see, e.g., Ex. 1015, Fig. 7A*).

Ground 4 – Claim 1, [1.f]

[1.f] a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.

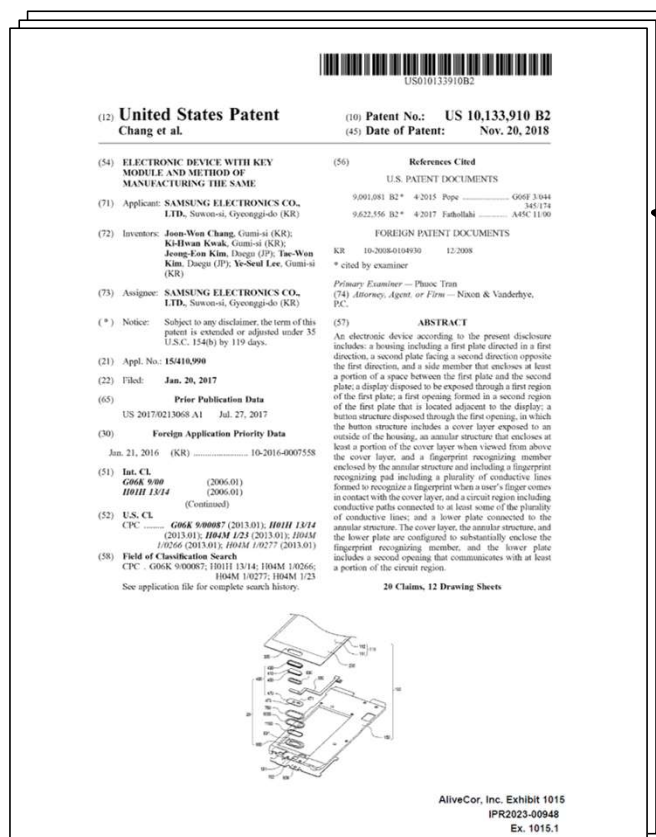


Chang

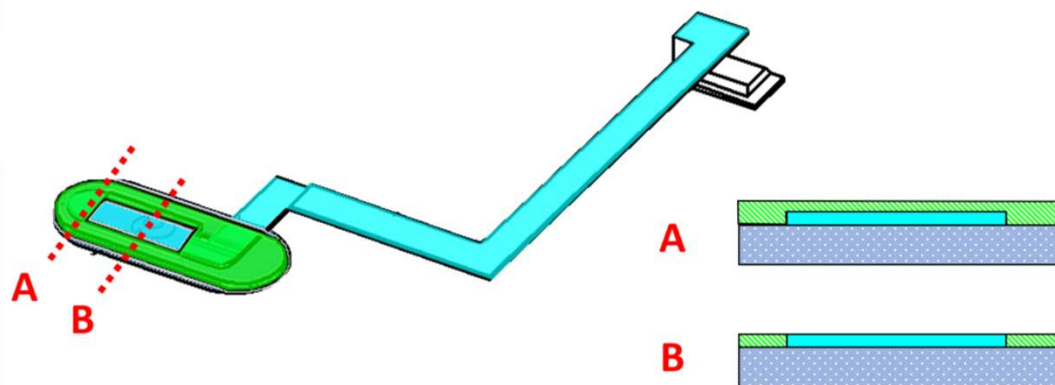


Ground 4 – Claim 1, [1.f]

[1.f] a portion of the flexible conduit is sandwiched between the seal and the sealing surface or between the seal and the enclosure.



Chang



Ground 4 – Claim 1, Apple's Argument #1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

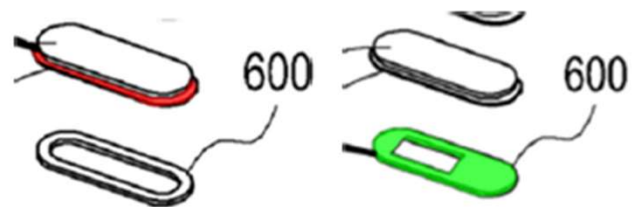
APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

Patent Owner's Response

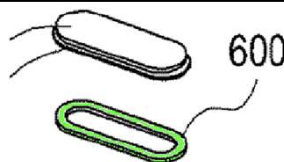
As to the second anticipation challenge (based on the Chang Combination), AliveCor's combination demands altering the original annular structure of sealing member 600 (below, left) with a solid structure that includes a rectangular window (below, right). APPLE-2009, ¶48.



Pet., 92 (left; annotations in original); Pet., 94 (right; annotations in original)

To support this alteration, AliveCor mischaracterizes Chang as referring to the altered structured as an “[a]lternative” embodiment.” See Pet., 96 (citing Ex-1015,

Ground 4 – Claim 1, Apple's Argument #1



According to an example embodiment, the first sealing member 600 may be disposed between the fingerprint recognizing member 450 and the lower plate 470 and/or between the fingerprint recognizing member 450 and the annular structure 430. Alternatively, the first sealing member 600 may be designed in an annular shape (e.g., a loop or ring shape), which corresponds to the entire shape of the key module 20 and includes an opening so as to allow the flexible conductive member 500 to extend therethrough.

AliveCor

“*Chang* teaches the sealing member 600 may be constructed in a ring shape (Figure 3) but explains that is an “[a]lternative” embodiment Given that, a POSITA would have understood that *Chang* also teaches a sealing member 600 that is not designed in an annular or ring shape[.]”

(-00948, Paper 2, 96; -00949, Paper 2, 92)

Apple

“[T]he word ‘[a]lternatively’ in the cited portion refers to alternative arrangements of components (e.g., sealing member 600, recognizing member 450, lower plate 470) within *Chang*’s key module.”

(-00948, Paper 16, 25; -00949, Paper 16, 24)

Ground 4 – Claim 1, Apple's Argument #2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

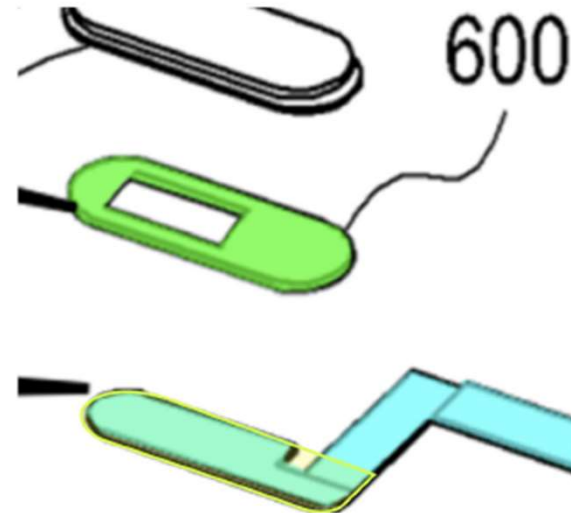
v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

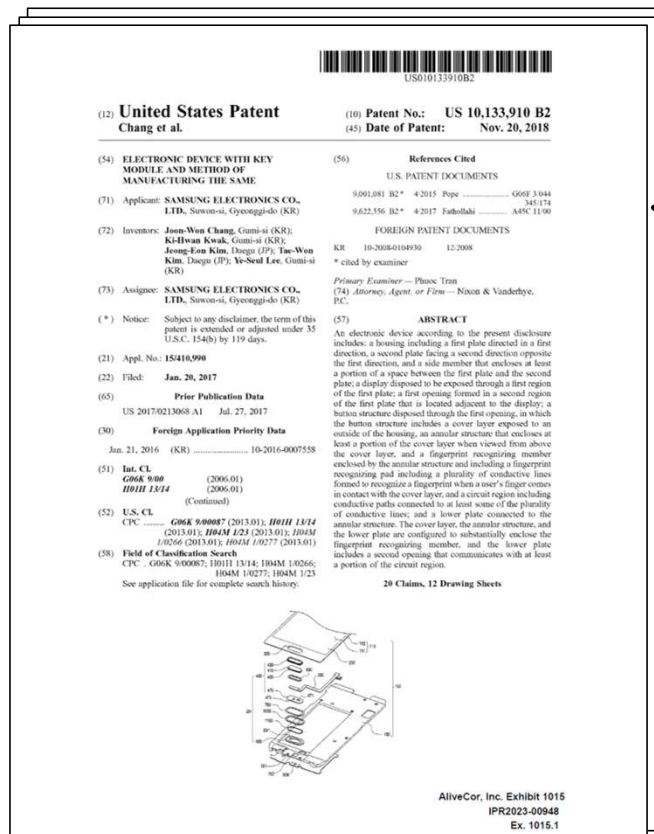
Patent Owner's Response



Pet., 98 (excerpt of annotated figure; highlights added)

AliveCor is wrong in suggesting (through the portrayal of the “condensed configuration” in the Petition) that the circular portion of the conductive member 500 could have fit within the rectangular window of the altered sealing member 600. APPLE-2009, ¶116. As a threshold issue, the fit of the circular portion of the

Ground 4 – Claim 1, Apple's Argument #2

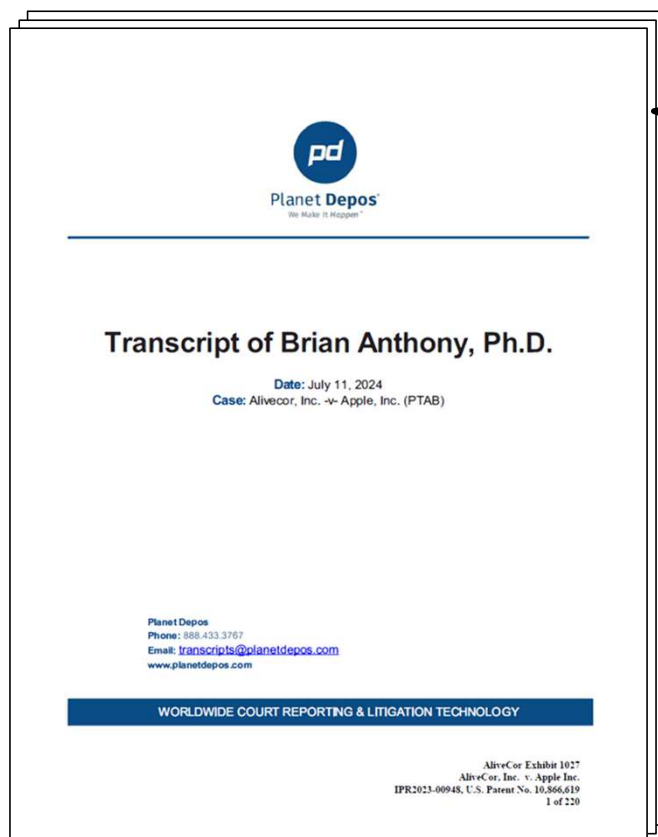


According to an example embodiment, the circuit region 453 may be disposed below the fingerprint recognizing pad 451. Conductive routes connected at least some of the plurality of conductive lines of the fingerprint recognizing pad 451 may be included. For example, the circuit region 453 may be a printed circuit board (PCB), and may include a plurality of contact points formed on the lower portion thereof to be electrically contacted with another printed circuit board.

Chang

AliveCor, Inc. Exhibit 1015
IPR2023-00948
Ex. 1015.1

Ground 4 – Claim 1, Apple's Argument #2



Anthony Tr.

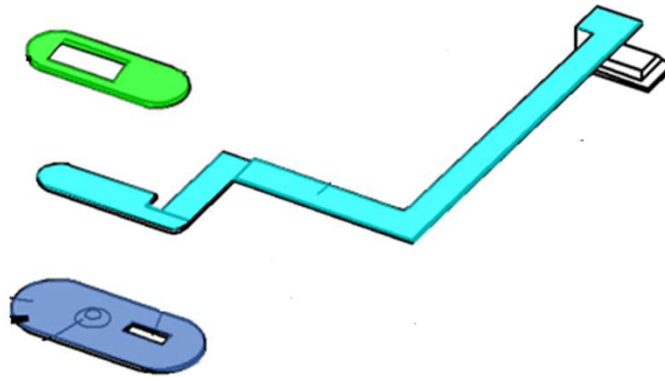
A . . . So certainly a POSITA would understand the need to connect things and be familiar with multiple ways to do so.

Ex. 1015 (Chang), 10:13-21

According to an example embodiment, the circuit region 453 may be disposed below the fingerprint recognizing pad 451. Conductive routes connected at least some of the plurality of conductive lines of the fingerprint recognizing pad 451 may be included. For example, the circuit region 453 may be a printed circuit board (PCB), and may include a plurality of contact points formed on the lower portion thereof to be electrically contacted with another printed circuit board.

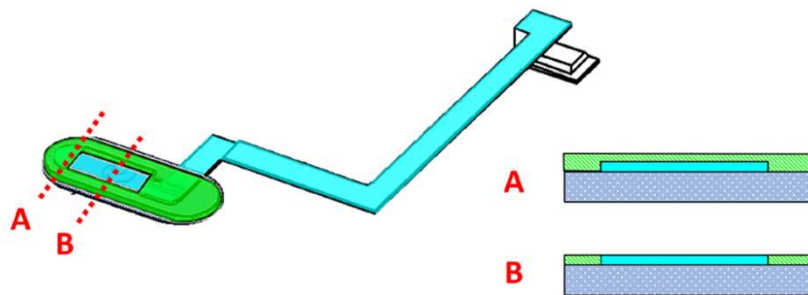
Ground 4 – Claim 1, Apple's Argument #3

Chang:



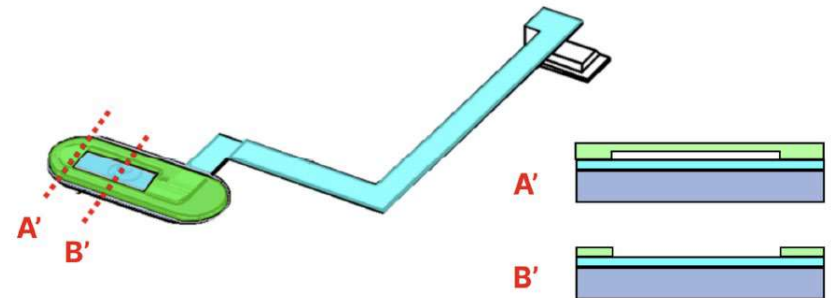
Ex. 1015, altered Fig. 3 (-00948, Paper 2, 98; -00949, Paper 2, 94)

AliveCor:



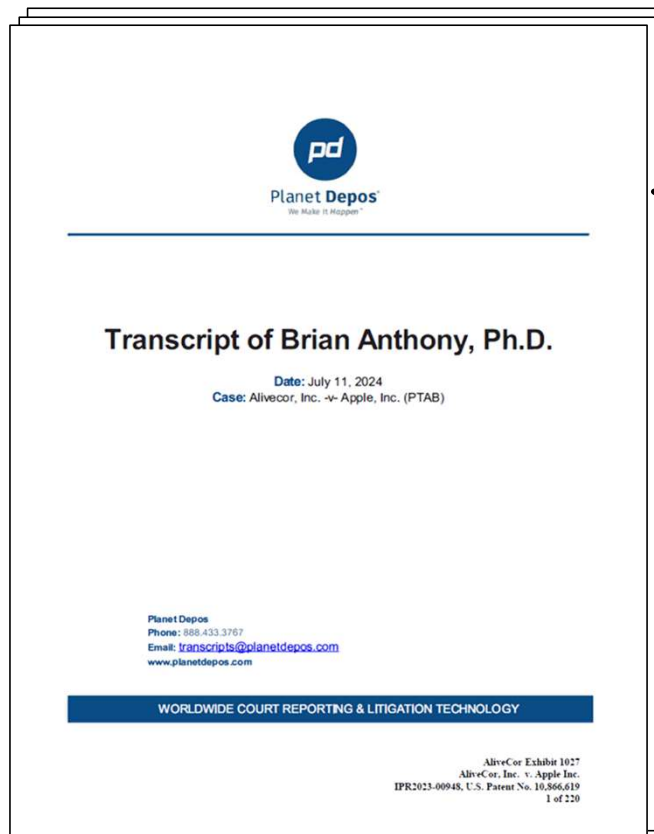
(-00948, Paper 2, 99; -00949, Paper 2, 95)

Apple:



(-00948, Paper 16, 60; -00949, Paper 16, 59)

Ground 4 – Claim 1, Apple's Argument #3



[A] So [there were] multiple techniques with which to bond the flexible conductive member 500 and the circuit region 453 to be electrically connected to each other and may transfer a signal or a pressure which is transferred from the fingerprint recognizing member 450 to the inside of the electronic device.

Anthony Tr.

Ground 4 – Claim 1, Apple's Argument #4

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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v.

APPLE INC.,
Patent Owner

Case IPR2023-00948
Patent 10,866,619

PATENT OWNER'S RESPONSE

(3) The Chang Combination Fails to Satisfy The *Sandwiched* Arrangement Recited in Limitation [1.f]

Beyond the deficiencies discussed above, Ground 4 still fails because AliveCor's application of Chang to limitation [1.f] is substantively flawed. The Petition fails to establish that Chang's button assembly would have been assembled such that a circular portion of flexible conductive member 500 (mapped to the *flexible conduit*) is *sandwiched* between the sealing member 600 (mapped to the *seal*) and the lower plate 470 (mapped to the *sealing surface*) as required by limitation [1.f]. See Pet., 91-101. And this mapping remains deficient regardless

Patent Owner's Response