

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2024-00095

U.S. Patent No. 10,568,533 B2

**DECLARATION OF CRAIG ROSENBERG, PH.D., IN SUPPORT OF
PETITION FOR INTER PARTES REVIEW OF
UNITED STATES PATENT NO. 10,568,533 B2**

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CLAIM LISTING

<u>Claim</u>	<u>Recitation</u>
20.pre	A non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, the one or more programs including instructions for:
20.a	displaying, on the display, a first user interface indicating that the first electronic device is ready to detect biometric information;
20.b	detecting a first input with the biometric sensor that satisfies first criteria;
20.c.1	in response to detecting the first input with the biometric sensor: starting to record biometric information detected by the biometric sensor; and
20.c.2	displaying, on the display, a second user interface that is different from the first user interface, wherein the second user interface includes an indication of progress in recording the biometric information;

<u>Claim</u>	<u>Recitation</u>
20.d	after recording at least a portion of the biometric information, detecting, via the one or more input devices, that the first criteria are no longer met;
20.e	in response to detecting that the first criteria are no longer met for a first period of time, resetting the indication of progress in recording the biometric information and maintaining display of the second user interface; and
20.f	in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time, replacing display of the second user interface with the first user interface.
21.pre	The non-transitory computer-readable storage medium of claim 20,
21.a	wherein the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor.
22.pre	The non-transitory computer-readable storage medium of claim 20, wherein the one or more programs further include instructions for:

<u>Claim</u>	<u>Recitation</u>
22.a	prior to displaying the first user interface, displaying a homescreen that includes an application affordance corresponding to a health monitoring application;
22.b	detecting, via the one or more input devices, a user activation of the application affordance; and
22.c	in response to detecting the user activation of the application affordance, displaying, on the display, the first user interface.
24.pre	The non-transitory computer-readable storage medium of claim 20,
24.a	wherein the biometric sensor is a contact-based sensor, and wherein the first input with the biometric sensor satisfies the first criteria when a contact is detected on the biometric sensor.
29.pre	The non-transitory computer-readable storage medium of claim 20,
29.a	wherein the second user interface includes a graphical representation that corresponds to a visualization of the biometric information from the recorded biometric information and a timer indicating an amount of time remaining to complete the recording of the biometric information.
37.pre	The non-transitory computer-readable storage medium of claim 20,
37.a	wherein the indication of progress is a countdown timer.

I, Craig Rosenberg, Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by AliveCor, Inc. (“Petitioner”) to serve as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“PTO”) against Apple, Inc. (“Patent Owner”) regarding U.S. Patent No. 10,568,533 B2 (“the ’533 patent”) (Ex. 1001).¹ I have been asked to submit this Declaration on behalf of Petitioner.

2. I have been asked to consider whether certain references disclose or render obvious claims 20-22, 24, 29, and 37 (“the challenged claims”) of the ’533 patent. My opinions are set forth below. Based on my experience and expertise, it is my opinion that the prior art anticipates and/or renders obvious all limitations of the challenged claims, as I discuss in detail below.

3. I am not, and never have been, an employee of AliveCor. I am not receiving compensation for this declaration beyond my normal hourly fees of \$550 based on my time actually spent analyzing and documenting my opinions herein on the ’533 Patent, the asserted prior art references identified in the Petition, and the

¹ Where appropriate, I refer to exhibits that I understand are to be attached to the petition for *Inter Partes* Review of the ’533 patent.

issues related thereto. My compensation is not related to the outcome of this proceeding, and I will not receive any additional compensation based on the outcome of any IPR or other proceeding involving the '533 Patent.

4. All of my opinions set forth below are based on my own personal knowledge and professional judgment. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth in this Declaration.

II. BACKGROUND AND QUALIFICATIONS

5. My qualifications can be found in my curriculum vitae (or "CV"), which includes a summary of my professional and educational background, and which is attached to this declaration as Exhibit 1004.

6. I hold a Bachelor of Science in Industrial Engineering, a Master of Science in Human Factors, and a Ph.D. in Human Factors from the University of Washington School of Engineering. For 30 years, I have worked in the areas of human factors, user interface design, software development, software architecture, systems engineering, and modeling and simulation across a wide variety of application areas, including aerospace, communications, entertainment, and healthcare.

7. I graduated from the University of Washington in 1988 with a B.S. in Industrial Engineering. After graduation, I continued my studies at the University

of Washington. In 1990, I obtained an M.S. in Human Factors. In 1994, I graduated with a Ph.D. in Human Factors. In the course of my doctoral studies, I worked as an Associate Assistant Human Factors Professor at the University of Washington Industrial Engineering Department. My duties included teaching, writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, as well as hiring and supervising students. While studying at the University of Washington, I also worked as a human factors researcher and designed and performed advanced human factors experiments relating to virtual environments and interface design, stereoscopic displays, and advanced visualization research, which was funded by the National Science Foundation. My duties included user interface design, systems design, software development, graphics programming, experimental design, as well as hardware and software interfacing.

8. I have published twenty-one research papers in professional journals and proceedings in the areas of user interface design, computer graphics, and the design of spatial, stereographic, and auditory displays. I also authored a book chapter on augmented reality displays in the book “Virtual Environments and Advanced Interface Design” (Oxford University Press, 1995). In addition, I created one of the first virtual spatial musical instruments called the MIDIBIRD that utilized

the MIDI protocol, two six-dimensional spatial trackers, a music synthesizer, and a computer graphics workstation to create an advanced and novel musical instrument.

9. For the past 29 years, I have served as a consultant for Global Technica, Sunny Day Software, Stanley Associates, Techrizon, CDI Corporation, and the Barr Group. In this capacity, I have provided advanced engineering services for many companies.

10. I consulted for the Boeing Company for 15 years as a senior human factors engineer, user interface designer, and software architect for a wide range of advanced commercial and military programs. Many of the projects that I have been involved with include advanced software development, user interface design, agent-based software, and modeling and simulations in the areas of missile defense, homeland security, battle command management, computer aided design, networking and communications, air traffic control, location-based services, and Unmanned Aerial Vehicle (“UAV”) command and control. Additionally, I was the lead system architect developing advanced air traffic controller workstations and air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management.

11. I was also the architect of the Boeing Human Agent Model. The Boeing Human Agent Model is an advanced model for the simulation of human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers,

pilots, and UAV operators. In another project, I was the lead human factors engineer and user interface designer for Boeing's main vector and raster computer aided drafting and editing system that produces the maintenance manuals, shop floor illustrations, and service bulletins for aircraft produced by the Boeing Commercial Aircraft Company. Additional responsibilities in my time as a consultant include system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis and design, as well as UML, C++, C#, and Java software development.

12. In 1995 and 1996, I was hired as the lead human factors engineer and user interface designer for the first two-way pager produced by AT&T. Prior to this technology, people could receive pages but had no way to respond utilizing their pager. This new technology allowed users to use a small handheld device to receive and send canned or custom text messages, access and update an address book, and access and update a personal calendar. This high-profile project involved designing the entire feature set, user interface/user interaction design and specification, as well as all graphical design and graphical design standards.

13. From 1999–2001, I was the lead human factors engineer and user interface designer for a company called Eyematic Interfaces that was responsible for all user interface design and development activities associated with real-time mobile

handheld 3D facial tracking, animation, avatar creation and editing software for a product for Mattel. My work involved user interface design, human factors analysis, requirements gathering and analysis, and functional specifications.

14. I was the lead user interface designer for a company called ObjectSpeed that developed a portable handheld telephone for use in homes and businesses that had many of the same capabilities that we take for granted in mobile cellular phones. This portable multifunction device supported voice, email, chat, video conferencing, internet radio, streaming media, Microsoft Outlook integration, photo taking and sharing, etc. The ObjectSpeed device was specifically designed and developed as a portable handheld device.

15. I am the founder, inventor, user interface designer, and software architect of WhereWuz. WhereWuz is a company that produces advanced mobile software running on GPS-enabled smartphones and handheld devices. WhereWuz allows users to record exactly where they have been and query this data in unique ways for subsequent retrieval based on time or location. WhereWuz was specifically designed and developed to run on small handheld devices.

16. I am the co-founder of a medical technology company called Healium. Healium developed advanced wearable and handheld user interface technology to allow physicians to more effectively interact with electronic medical records.

17. I am the co-founder of a medical technology company called StratoScientific. StratoScientific is developing an innovative case for a smartphone that turns a standard handheld smartphone into a full featured digital stethoscope that incorporates visualization and machine learning that can be utilized for telemedicine and automated diagnosis.

18. I designed and developed a large software project for Disney World called xVR that allowed the operational employees of Disney World to utilize a handheld device to view the current and historical status of all of the guests of Disney World within multiple attractions as well as within one of their restaurants. The application could run in a real-time/live mode where it would display data collected from sensors that showed the location and status of all guests within the attraction; the application could also be run in a fast-time/simulated mode. The application was developed on a laptop computer and was specifically designed to run on a variety of devices, including laptops, PCs, smartphones, and tablets.

19. I have received several awards for my engineering work relating to interface design, computer graphics, and the design of spatial, stereographic, and auditory displays, including a \$10,000 scholarship from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation and a Link Foundation award for furthering the field of flight simulation and virtual interface design. I have

also created graphics for several popular book covers as well as animations for a movie produced by MIRAMAR.

20. Other details concerning my background, academic work, and professional history are set forth in my curriculum vitae, which is attached as Exhibit 1004 to this declaration.

III. MATERIALS REVIEWED

21. The opinions contained in this Declaration are based on the documents I reviewed, my professional judgment, as well as my education, knowledge and experience in the relevant art.

22. In forming my opinions, I reviewed and relied upon the following materials and information:

Exhibit	Description
Ex. 1001	U.S. Patent No. 10,568,533 B2 (“the ’533 patent”)
Ex. 1002	Prosecution History of U.S. Patent No. 10,568,533 B2
Ex. 1005	CN Patent Publication No. CN106901720
Ex. 1006	English Translation of CN Patent Publication No. CN10691720 and Certificate of Translation (“AHIT”)
Ex. 1007	U.S. Patent No. 7,111,157 (“Hooper”)
Ex. 1008	U.S. Patent Appl. Publ. No. 2016/0196635 (“Cho”)
Ex. 1009	U.S. Patent No. 10,685,090 (“Petterson”)
Ex. 1010	U.S. Patent Appl. Publ. No. 2015/0073285 (“Albert”)
Ex. 1011	U.S. Patent No. 7,313,435 (“Nakada”)
Ex. 1012	U.S. Patent Appl. Publ. No. 2014/0173521 (“Mayor”)

Exhibit	Description
Ex. 1013	U.S. Patent No. 7,771,320 (“Riley”)
Ex. 1014	U.S. Patent Appl. Publ. No. 2012/0116550 (“Hoffman”)
Ex. 1015	AARATHI PRASAD, JACOB SORBER, TIMOTHY STABLEIN, DENISE ANTHONY, AND DAVID KOTZ, <i>UNDERSTANDING SHARING PREFERENCES AND BEHAVIOR FOR MHEALTH DEVICES</i> , ASSOCIATION FOR COMPUTER MACHINERY (2012) (“mHealth Devices”)
Ex. 1017	U.S. Patent No. 8,152,694 (“Srinivasan”)
Ex. 1018	U.S. Patent No. 8,200,323 (“DiBenedetto”)
Ex. 1019	U.S. Patent No. 10,437,962 (“Soni”)
Ex. 1020	U.S. Patent No. 11,073,942 (“Lee”)
Ex. 1021	U.S. Patent No. 9,011,292 (“Weast”)
Ex. 1022	Complaint, <i>Apple Inc. v. AliveCor, Inc.</i> , Case No. 4:22-cv-07608-HSG, Dkt. No. 1 (N.D. Cal., Dec. 12, 2022) (“Apple’s Complaint”)
Ex. 1023	Exhibit D to Apple’s Infringement Contentions Served July 25, 2023, in <i>Apple Inc. v. AliveCor Inc.</i> , Case No. 4:22-cv-07608-HSG (“Apple’s Infringement Contentions”)
Ex. 1025	Tim Hardwick, <i>AliveCor ‘Kardia Band’ Medical Grade EKG Analyzer for Apple Watch Receives FDA Approval</i> , MacRumors (Nov. 30, 2017), https://www.macrumors.com/2017/11/30/alivecor-kardia-ekg-band-medical-fda-apple-watch/ (“Hardwick”)
Ex. 1026	Kardia by AliveCor, <i>How to record a clean EKG with KardiaBand</i> , YouTube (Nov. 30, 2017), https://www.youtube.com/watch?v=Vlc9VE6VO4&t=2s (“Kardia Video”)

23. I also reviewed any other materials I refer to in this Declaration in support of my opinions.

24. In forming my opinions, I have considered the materials listed above and any other documents cited in this Declaration. My opinions are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my appreciation of how a person of ordinary skill in the art would have understood the state of the art, the prior art, and the claims and the specification of the '533 patent at the time of the alleged invention.

IV. LEGAL STANDARDS

25. I am not an attorney, and do not offer opinions on the law in this Declaration.

26. In forming my analyses and conclusions expressed here in this Declaration, I have applied the legal principles described in the following paragraphs, which were provided to me by counsel for the Patent Owner.

27. I used my understanding of the following legal principles set forth in this section in reaching my opinions.

28. I understand that, in this proceeding, AliveCor has the burden of proving that the challenged claims are invalid by a preponderance of the evidence.

A. Anticipation

29. I have been informed that a claim is invalid as anticipated under 35 U.S.C. § 102 (AIA) if a prior art reference discloses, either expressly or inherently, all limitations of a claim as those limitations are arranged in the claim.

30. I have been informed that a limitation is disclosed inherently in a reference if it is necessarily present in the process or product described in the prior art reference. I understand that probabilities or possibilities are insufficient to show that a prior art reference inherently discloses something beyond what it discloses explicitly.

B. Obviousness

31. I have been informed that a claim is invalid as obvious under 35 U.S.C. § 103 (AIA) if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person of ordinary skill in the art. I have been informed that the following matters are relevant to determining whether the claimed invention would have been obvious: (1) the scope and content of the prior art, (2) the difference or differences between the patent claim and the prior art, (3) the level of ordinary skill in the art at the time the invention of the patent, and (4) any secondary considerations or objective indicia of non-obviousness.

32. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield

predictable results. When a claim simply arranges prior art elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, then such a combination is obvious. When a patent claims a structure already known in the prior art altered by the mere substitution of one element for another known in the field, the combination is likely to be obvious unless the combination yields an unpredictable result.

33. I have been informed that when a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation, such a variation is likely unpatentable. For the same reason, if a technique has been used to improve one device, and one of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. One question to consider is whether the improvement is more than predictably using prior art elements according to their established functions.

34. I have been informed that it may often be necessary, in a validity analysis, to consider whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. This can be accomplished by looking to interrelated teachings of multiple patents or other publications or pieces of prior art; the effects of demands known to the design community or present in the

marketplace; and the background knowledge possessed by one of ordinary skill in the art.

35. I have been informed that a validity analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim; it is appropriate to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. I have been informed that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton.

36. I have been informed that a claim composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. I have been informed that it can be important to identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does. I am told that one way that subject matter can be proved obvious is by noting there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. I have been informed that any need or problem known in the field of endeavor at the time of the claimed invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

37. I have been informed that one should not assume that a person of ordinary skill in the art attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem. Instead, I have been

informed that since familiar items may have obvious uses beyond their primary purposes, in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple prior art references together like pieces of a puzzle.

38. I have been informed that, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, persons of ordinary skill in the art have good reason to pursue the known options within their technical grasp. If this leads to the anticipated success, the product was likely not accomplished by innovation but by using ordinary skill and common sense. I have been informed that, in such an instance, the fact that the combination was obvious to try may show that the combination was obvious.

39. I have been informed that, when determining whether a claimed combination would have been obvious, the correct analysis is not whether a person of ordinary skill in the art, writing on a blank slate, would have chosen the particular combination of elements described in the claim. Instead, I have been informed that the correct analysis considers whether one of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to selecting the combination claimed.

40. I have been informed that, when determining whether a claimed invention is obvious, any “secondary considerations” of non-obviousness identified

by the patentee should also be considered. These secondary considerations can include:

- commercial success of the invention, causally related to the invention itself rather than to companion factors, such as advertising or attractive packaging;
- the invention taught away from the technical direction followed by those skilled in the art;
- a long-felt but unsatisfied need for the invention while the needed implementing arts and elements had long been available;
- the invention achieves results unexpected to those skilled in the art;
- copying of the invention by competitors as distinguished from their independent development;
- unsuccessful attempts by those skilled in the art to make the invention;
- acquiescence by the industry to the patent's validity by honoring the patent through taking licenses or not infringing the patent, or both; and
- skepticism, disbelief in or incredulity by those skilled in the art that the patentee's approach worked.

41. I have been informed that, for the above information to impact the obviousness of a patent claim, there must be a nexus between the alleged secondary considerations and the claims. In addition, I have been informed that the burden of introducing evidence of secondary considerations generally is on the Patent Owner. If the Patent Owner or its expert should assert secondary considerations of non-obviousness, I reserve the right to provide a Declaration addressing assertions of non-obviousness due to secondary considerations.

C. Claim Construction

42. I have been informed that claim terms are typically given their plain and ordinary meanings, as would have been understood by a person of ordinary skill in the art at the time of the earliest alleged priority date. I have further been informed that when considering the meaning of any terms in the challenged claims of the '533 patent, I should apply the plain and ordinary meaning of those terms. I have further been informed that in considering the meaning of the claims, one must consider the language of the claims, the specification, and the prosecution history of record.

43. I have been informed that, in general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim. I have further been informed that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. I have

further been informed that dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and claim body to define the claimed invention. I have further been informed that clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.

V. PERSON OF ORDINARY SKILL IN THE ART AND THE TIME OF THE ALLEGED INVENTION

44. I have been asked to assume that the '533 patent is entitled to its earliest alleged priority date of March 12, 2018 (*see* Ex. 1001, 1 (“Related U.S. Application Data” section)). Based on my knowledge and experience, I was a person of ordinary skill in the art as of March 12, 2018, and can provide opinions regarding the knowledge of a person of ordinary skill in the art as of that time. My opinions herein are, where appropriate, based on my understandings as to a person of ordinary skill in the art at that time.

45. Based on the materials and information I have reviewed and based on my experience in the technical areas relevant to the '533 patent, a person of ordinary skill in the art at the time of the alleged invention of the '533 patent would have been a person with a working knowledge of physiological monitoring technologies and human interface design. That person would have had a Bachelor of Science degree

in an academic discipline emphasizing the design of electrical, computer, or software technologies, in combination with training or at least one to two years of related work experience with capture and processing of data or information, including but not limited to physiological monitoring technologies and human interface design. Alternatively, that person could have also had a Master of Science degree in a relevant academic discipline with less than a year of related work experience in the same discipline. More education can supplement practical experience and *vice versa*.

46. I exceeded this level of skill in the art as of the earliest filing date of the '533 patent.

VI. TECHNICAL BACKGROUND

47. Below, I present a brief overview of certain technical concepts and features that would have been known to a person of ordinary skill in the art prior to and at the time of the earliest alleged priority date of the '533 patent. The technical concepts and features that I describe in this Technical Background section reflect the state of the art that a person of ordinary skill in the art would have had knowledge of and would have understood prior to and at the time of the alleged invention of the '533 patent. I rely on, and incorporate as applicable (even if not expressly mentioned below in Section IX), the following disclosures to support my opinions in this Declaration, including those opinions relating to how the prior art discloses and/or suggests the challenged claims of the '533 patent and how (and why) a person of

ordinary skill in the art would have been motivated to consider and combine the disclosures and suggestions from one or more prior art references.

A. Biometric Monitoring Devices / Activity Monitoring Devices

48. Prior to the '533 patent's earliest alleged priority date, a person of ordinary skill in the art would have been familiar with biometric monitoring devices and activity monitoring devices.

49. As an example, *mHealth Devices* (Ex. 1015) published in 2012 (Ex. 1016), explains that “mobile health (mHealth) technologies, including health text messaging, mobile phone apps, remote monitoring and portable sensors devices, have grown rapidly in the past five years and are expected to play an important role in improving access to health information, resources, and clinical care” (Ex. 1015, 117). *mHealth Devices* further identifies a few of the different devices publicly available (Ex. 1015, 117). For instance, *mHealth Devices* explains that available “mHealth devices can be used to monitor activities (Fitbit), sleep (Wakemate), emotions (Affectiva), vital signs like blood pressure (Withing's blood pressure cuff), or fetal conditions (Monica AN24)” (Ex. 1015, 117) (citations omitted). According to *mHealth Devices*, as of 2012, “users [could] collect their personal health, physical and social activity information and upload it to a vendor site, social networking website, a personal health record (Microsoft HealthVault or formerly, Google Health) or a health-provided-operator electronic health record)” (Ex. 1015, 117).

mHealth Devices recognizes that as of at least 2012, “people [could] share their experiences with their peers” and “share health information with pharmacists, insurance companies, drug companies, employers, or others involved in their healthcare” (Ex. 1015, 117).

50. As another example, *Riley* (Ex. 1013) is based on an application filed on August 31, 2007 (Ex. 1013, Face at Item (22)). *Riley* explains that “[m]odern technology has given rise to a wide variety of different electronic and/or communication devices that keep users in touch with one another, entertained, and informed” (Ex. 1013, 1:45-47). *Riley* further explains that “a wide variety of portable electronics are available for these purposes,” such as “cellular telephones,” “personally digital assistants (“PDAs”),” “watches,” “GPS systems,” etc. (Ex. 1013, 1:47-52). According to *Riley*, at least as of 2007, “many people like to carry one or more of these types of devices with them when they exercise and/or participate in athletic events” (Ex. 1013, 1:53-55).

51. *Riley* further explains that as of at least 2007, “[a]thletic performance monitoring systems also have benefited from recent advancements in electronic device and digital technology” (Ex. 1013, 1:60-62).

52. *Riley* further discloses:

Electronic performance monitoring devices enable easy and convenient monitoring of many physical or physiological characteristics associated with exercise or other athletic performances, including, for example:

speed and distance data, altitude data, GPS data, heart rate, pulse rate, blood pressure data, body temperature, etc. (Ex. 1013, 1:62-2:1).

53. Prior to the '533 Patent's earliest alleged priority date, a person of ordinary skill in the art would have also known that biometric monitoring devices / activity monitoring devices include one or more sensors that monitor or sense physical or psychological data. For instance, *Riley* further discloses that:

A person 100 involved in an athletic performance or workout activity may have one or more sensing devices 102(a), 102(b), 102(c), and 102(d) included on their person, their clothing, their footwear, their equipment, etc. These sensing devices may sense data associated with the athletic performance, including, for example, physical or physiological data associated with the athletic performance. As some more specific examples, in the environment illustrated in FIG. 1, sensors 102(a) and/or 102(b) may sense step count and data associated with such activities (e.g., for pedometer type speed and/or distance measuring), GPS data (e.g., location and/or altitude data, time data, etc.), step impact force data (e.g., for active impact attenuation control), jump height data, or the like. Sensor 102(c) may sense pulse rate, body temperature, blood pressure, hydration levels, or the like, and sensor 102(d) may sense heart rate, EKG data, and the like. Of course, any number of sensors may be provided, and such sensors may sense any desired type of athletic performance information (e.g., one or more physical or physiological parameters). (Ex. 1013, 9:10-29).

54. *Riley* further explains that “the various sensors, e.g., 102(a) through 102(d), also may be portable and carried by the person in any desired manner” (Ex. 1013, 9:59-61). For instance, *Riley* provides that one or more sensors may be: “mounted in or on an article of footwear,” “provided in or on an article of athletic apparel” (such as an arm band, or in a shirt, shorts, pants, socks headband), “carried along on a piece of athletic equipment” and/or “mounted directly on the athlete’s body.” (Ex. 1013, 9:61-10:5).

55. As yet another example, *Hoffman* (Ex. 1014) is based on an application filed on August 9, 2011 (Ex. 1014, Face at Item (22)). According to *Hoffman*, as of at least 2011, athletic monitoring devices typically “incorporate a sensor or multiple sensors for measuring parameters relating to the person being monitored, and a computing device for processing the parameters measured by the sensor(s)” (Ex. 1014, [0094]).

56. As another example, *Srinivasan* is based on an application filed on March 16, 2009 (Ex. 1017, Face at Item (22)). According to *Srinivasan*, as of at least 2009, “[w]earable devices and sensors [had] seen a tremendous global growth in a range of applications including monitoring physical activity” (Ex. 1017, 1:25-27). Just like *Hoffman*, *Srinivasan* explains that “physical activity monitoring systems incorporate a variety of sensors which store the sensor data on a wearable device” (Ex. 1017, 1:27-30).

B. Mobile Health Applications & User Interfaces

57. Prior to the '533 patent's earliest alleged priority date, a person of ordinary skill in the art would have known that wellness data collected by biometric monitoring devices and/or activity monitoring devices could be viewed electronically via mobile applications and/or websites, through computer user interfaces.

58. As an example, according to *Hoffman* “once an athletic information monitoring device record[s] athletic information for a person’s athletic activity, the person may then transfer the recorded athletic information to one or more separate devices in order to view the recorded athletic data” (Ex. 1014, ¶[0095]).

59. As yet another example, it was known at least as of 2012, that “conventional athletic performance and exercise equipment [was] capable of presenting data and information to users regarding their performances or workouts (e.g., distance, time, speed, calories burned, metabolic equivalent (“METs”), etc.)” (Ex. 1013, 40:21-25). *Riley* teaches that “athletic performance and/or tracking systems” include components for “sensing athletic performance data and/or for storing and displaying desired information (e.g., athletic performance information) to the user” (Ex. 1013, 1:23-27). *Riley* further explains that athletic performance data may be transferred to “a processing system and/or display device” to enable “data input, storage, analysis, and/or display on or by an electronic device, including

on or by conventional electronic display devices that are known and commercially available” (Ex. 1013, 1:27-36).

60. As yet another example, *DiBenedetto* (Ex. 1018) is based on an application filed on May 18, 2009 (Ex. 1018, Face at Item (22)). *DiBenedetto* explains that, as of at least 2009, “technology has resulted in the development of systems capable of transferring performance information obtained from a user during a workout to a remote computer for further analysis” (Ex. 1018, 1:41-44). *DiBenedetto* teaches that “these systems often provide a user interface that allows the user to review their past performance data” (Ex. 1018, 1:44-45).

C. Progress Indicators

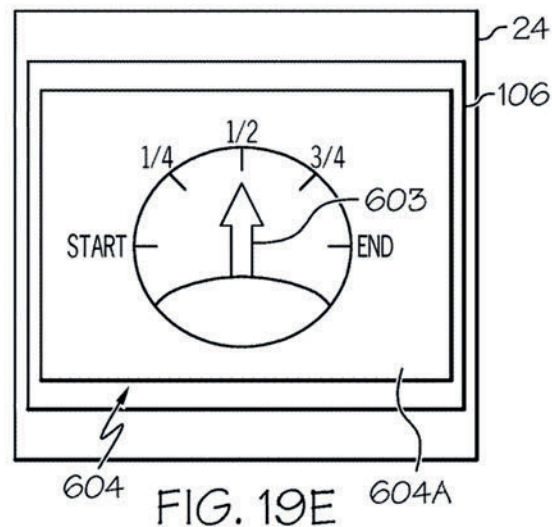
61. Prior to the ’533 patent’s earliest alleged priority date, a person of ordinary skill in the art would have known that progress indicators could be used with biometric monitoring devices to show the progress of the collection of biometric information.

62. The use of progress indicators was common and well known in user interface design. For example, a person of ordinary skill in the art would have known that progress indicators are used to visually confirm to the user that an action is in progress and that the user should standby. Without the progress indicator, a user does not know whether the device is performing the requested task and/or when the user

can stop interacting with the device. That is, progress indicators provide a user with a visual confirmation that the device is doing what it is supposed to be doing.

63. For example, such progress indicators are generally used during file transfers, software updates, and/or software installations. Progress indicators are also common and well known when the user is asked to interact with a device for a set time period. For example, in medical applications such as glucose metering, a user must interact with the device for a set period so that an accurate test can be logged.

64. For example, and as described by *Soni* (Ex. 1019), it was well known at least as early as 2010 that progress indicators or status updates help the patient to know how he/she is performing in the execution of the collection procedure (Ex-1019, Abstract; Cl. 1). Indeed, *Soni* discloses a status indicator (e.g., 604 as shown in Figure 19E, below) that indicates how far along the patient is and how far along he/she has to go in completing the collection procedure that is running on the device (Ex. 1019, 60:34-50).



D. User Interface Timeouts

65. Prior to the '533 patent's earliest alleged priority date, a person of ordinary skill in the art would have known that various timeout durations and display modes could be used in conjunction with user interfaces to maximize the relevance of the displayed information. In addition, it was well known to use user interface timeouts to save battery when using a mobile device. In some examples, user interface timeouts may result in a new screen and/or reduced functionality whereas in others the device may enter a standby or sleep state.

66. As an example, *Weast* (Ex. 1021) is based on an application filed January 18, 2012 and issued April 21, 2015 (Ex. 1021, Cover). *Weast* explains that, at least as of 2012, a “wearable electronic athletic device assembly” may include a “display that may include an indicator system” where “performance data can be

displayed or otherwise conveyed to the user” via “an LCD screen” (Ex. 1021, 7:41-46). *Weast* explains that “a sleep mode may correspond to a mode in which the display is not activated,” where “the sleep mode may correspond to a mode in which one or more displays are deactivated after a specified amount of time of no user interaction (e.g., no pressing of one or more buttons or other interactions with input mechanisms on the device)” (Ex. 1021, 30:24-34). For example, “a user may press a button to view an amount of calories burned,” “the display on the device may indicate the amount of calories burned and subsequently turn off if no further user interaction is received” (Ex. 1021, 30:35:39). *Weast* also explains that “a sleep mode may correspond to a deactivated display mode while an inactive or low power mode may correspond to deactivation of one or more additional components after a certain amount of non-active time” (Ex. 1021, 30:41-44). A sleep mode need not be based on an amount of inactivity time.

67. *Weast* also teaches that “[a] timeout period for entering a sleep or inactive mode may differ for different functionalities or information displays,” where, for example, “a link or pair function may have a longer timeout period since it may take a longer amount of time to establish a link than to enter a tag” (Ex. 1021, 30:46-50). *Weast* also teaches that a “the timeout period may differ between different device modes such as between the information display mode or loop and the action mode or loop” (Ex. 1021, 30:50-53). *Weast* further discloses:

The sleep mode may include a state in which both of the display and indicator system are not illuminated. By depressing the input button, a user can check on activity progress. In response to depressing the input button, the indicator system can illuminate in an animated fashion with individual light members being progressively illuminated until the light members reach a number corresponding to the user's activity level. If a user does not press the button on the device or otherwise interact with the device (e.g., movement of the device, using any input elements of the device, etc.), the device may enter the sleep mode or an inactive state after a predetermined amount of time (e.g., 4 seconds, 30 seconds, 1 minute, 2 minutes, etc.), which may be user-configurable. The device may further provide a time countdown display as part of the process of diagram 4500. The time countdown may indicate an amount of time remaining for the evaluation period. For example, the evaluation time period may start at 24 hours and count down from there. If the evaluation period is over (e.g., the amount of time remaining is 0), the device may display an evaluation completion messages instead of the countdown message. In some examples, the time countdown or evaluation completion message might always be the first information interface to be displayed on a first button press or other user interaction of the day or of an activity time period (e.g., a goal time period). In other examples, the time countdown or evaluation completion message might always be displayed first based on other rules including upon detecting the first button press or user interaction of the hour, minute, 12 hours, morning, afternoon, evening and the like. Yet other triggers may include particular buttons or other specified input mechanisms being pressed and/or types of input including an amount of time a

button is pressed, a pattern of button pressing (e.g., 4 short button presses within 5 seconds or 1 short button press followed by a 2 second button press or the like). (Ex. 1021, 30:54-31:21).

68. *Weast* underscores that “[s]uch display rules may be used to maximize relevance of displayed information to the user” (Ex. 1021, 31:21-22).

69. Prior to the ’533 patent’s earliest alleged priority date, a person of ordinary skill in the art would have also know that various timeout durations and display mode could be used in conjunction with user interfaces to save on battery life and computing resources.

70. For example, *Lee* (Ex. 1020) is based on an application filed November 14, 2016, and published June 15, 2017 (Ex. 1020, Cover). *Lee* explains that, at least as of 2016, it was known to operate a portable electronic device in a low-power mode due to limited power supply, and the need to save on battery power by optimizing transitioning between the low-power mode and a normal mode (Ex. 1020, 1:44-56). *Lee* discloses that a “general touch controller may remain in the active mode 1002 over a time-out interval of about 30 seconds when the touch input by the user's finger 11 is released while the general touch controller is in the active mode 1002,” “[t]he general touch controller may enter an idle mode 1003 after the time-out interval (see reference numeral 1014)” (Ex. 1020, 18:32-43). As is demonstrated by *Lee*, it was well known to turn off or power down a device due to the lack of interaction. Such

actions were enacted to preserve battery power (Ex. 1020, Abstract, 1:51-59).

71. *Lee* explains that an aspect of the disclosure is “to provide a touch recognition method and an electronic device for rapidly performing a mode transition and minimizing power consumption by using a pressure sensor” (Ex. 1020, 1:59-63). *Lee* explains that another aspect of the disclosure is “to provide a touch recognition method and an electronic device for providing sufficient touch responsiveness despite a user’s fast and hard touch input” (Ex. 1020, 1:63-67).

72. *Lee* describes that the “touch controller 150” may directly control the touch panel and the pressure sensor (Ex. 1020, 8:30-34). The touch controller “may operate in [a] first or second mode,” where the “first mode may correspond to an idle mode (or a standby mode” and the “second mode may correspond to an active mode (or an enabled mode)” (Ex. 1020, 8:35-45).

73. With reference to FIG. 2A (reproduced below), *Lee* describes “a mode transition of the touch controller” (Ex. 1020, 8:54-60).

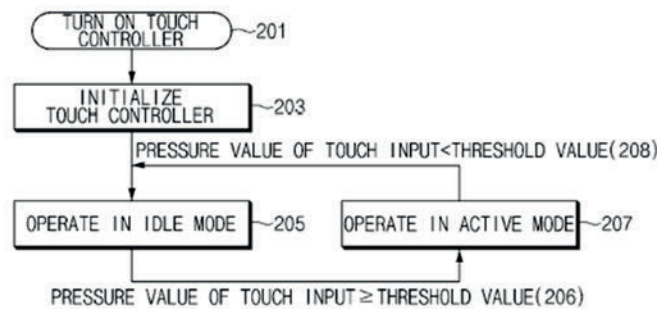
Ex. 1020, FIG. 2A

FIG. 2A

74. *Lee* describes that the touch controller “may operate in an idle mode” in which the touch controller “may scan whether a touch input is received by the touch panel 112, with low sensing sensitivity” or “low sensing power” (Ex. 1020, 9:7-13).

75. With reference to FIG. 2B (reproduced below), *Lee* further describes “a mode transition of the touch controller” (Ex. 1020, 9:64-10:12). When “a user’s finger touches the display 110,” “the touch panel 112 may receive a touch input in response to the touch, and the pressure sensor 113 may detect a pressure value of the touch input” (Ex. 1020, 9:64-10:12). The touch controller “may switch the operating mode from the idle mode 210 to an active mode 220 when the pressure value of the touch input is higher than or equal to the threshold value” (Ex. 1020, 10:4-12).

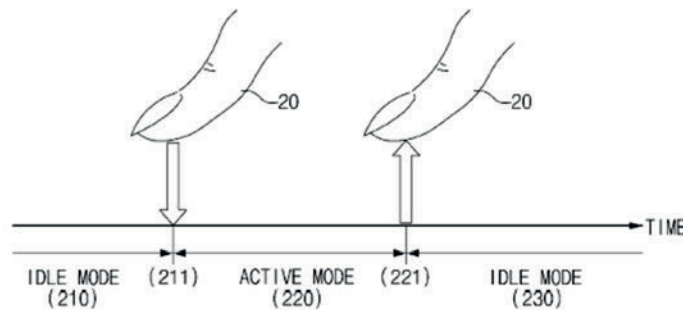
Ex. 1020, FIG. 2B

FIG. 2B

76. *Lee* further explains that the user may then “move the finger 20 over the display 110 and then release the touch,” and, the touch controller “operating in the active mode” may “immediately switch the operating mode from the active mode 220 to and idle mode 230 when a pressure value of the touch input is lower than the threshold value” (Ex. 1020, 10:12-23).

E. EKG Analyzers

77. Prior to the '533 patent's earliest alleged priority date, a person of ordinary skill in the art would have known that EKG analyzer accessories were available and worked in conjunction with user interfaces of mobile and/or wearable devices.

78. For example, *Hardwick* (Ex. 1025) was published November 30, 2017 (Ex. 1025, 1), and details an “EKG Kardia Band,” referring to it as “the first medical-

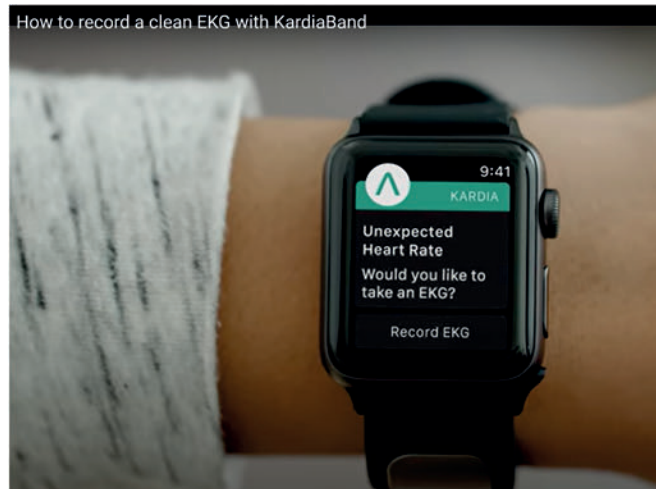
grade accessory for Apple Watch” (Ex. 1025, 1). *Hardwick* explains that the “Kardia Band for Apple Watch has an integrated metallic sensor in the strap that enables it to communicate with the company’s app to take EKG recordings,” “much like AliveCor’s existing KardiaMobile device” (Ex. 1025, 1).

79. *Hardwick* further explains that “[u]sers need only navigate to the Apple Watch-compatible Kardia app, start a reading, place their thumb on the sensor, and wait for the 30-second analysis to finish” (Ex. 1025, 1). *Hardwick* also indicates that, “[d]uring this time, they can also speak into the Apple Watch’s microphone to note the presence of palpitations or shortness of breath, or any dietary habits that could be linked to heart-rate fluctuations” (Ex. 1025, 1). According to *Hardwick*, the “[r]ecordings are stored and viewed in the Kardia iPhone app, and can also be sent to the user’s doctor” (Ex. 1025, 1).

80. *Hardwick* also includes a YouTube video (“*Kardia Video*”, Ex. 1026) also published November 30, 2017 (Ex. 1027), which includes an overview of recording an EKG using the KardiaBand (Ex. 1026).

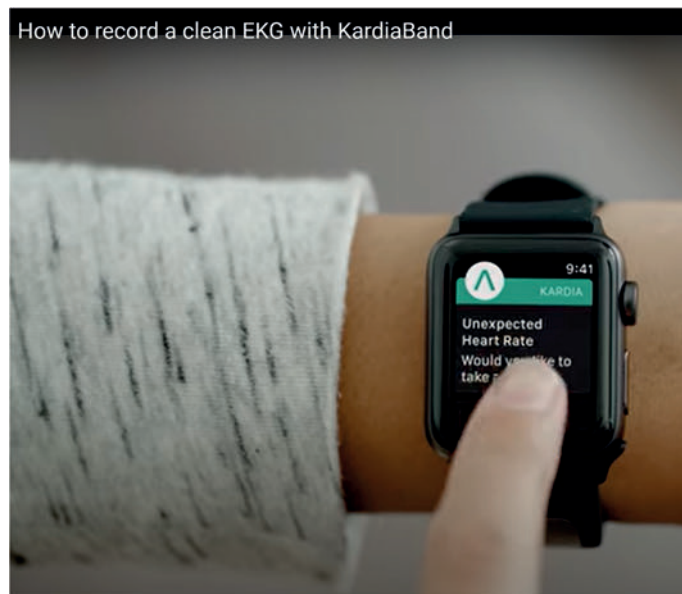
81. At 0:38 of the *Kardia Video*, a device appears to prompt a user to “Record EKG” via a user interface of the device (Ex. 1026, 0:38).

Ex. 1026, 0:38



82. At 0:41 of the *Kardia Video*, the user appears to select “Record EKG” via the user interface (Ex. 1026, 0:41).

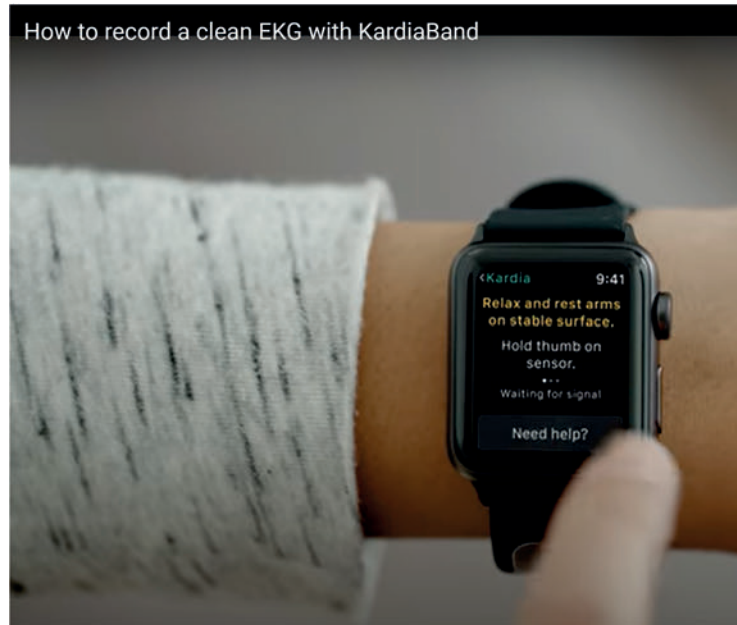
Ex. 1026, 0:41



83. At 0:42 of the *Kardia Video*, the device appears to show a user interface instructing the user to “Hold thumb on sensor” and that the device is “Waiting for

signal” (Ex. 1026, 0:42).

Ex. 1026, 0:42



84. At 0:43 of the *Kardia Video*, the user appears to have placed their thumb onto the sensor, and the device appears to be indicating via the user interface that it is recording an EKG (Ex. 1026, 0:43). The user interface shows a “30” in the bottom left corner, appearing to indicate that 30 seconds remain for the recording (Ex. 1026, 0:43). The user interface also appears to show an indication of the EKG in the middle (Ex. 1026, 0:43).

Ex. 1026, 0:43



85. At 0:44 of the *Kardia Video*, the user appears to still have their finger placed on the sensor, and the device appears to be indicating via the user interface that it is continuing to record an EKG (Ex. 1026, 0:44). The user interface shows a “29” in the bottom left corner, appearing to indicate that 29 seconds remain for the recording (Ex. 1026, 0:44). The user interface also appears to show an indication of the EKG in the middle (Ex. 1026, 0:44).

Ex. 1026, 0:44



86. At 0:16 of the *Kardia Video*, the user appears to still have their finger placed on the sensor, and the device appears to be indicating via the user interface that it is continuing to record an EKG (Ex. 1026, 0:16). The user interface shows a “22” in the bottom left corner, appearing to indicate that 22 seconds remain for the recording (Ex. 1026, 0:16). The user interface also appears to show an indication of the EKG in the middle (Ex. 1026, 0:16).



VII. SUMMARY OF THE '533 PATENT

A. The '533 Patent's Specification

87. The '533 patent generally relates to “user interfaces for health monitoring” (Ex. 1001, Abstract) and more specifically to “user interfaces for using an input device while recording biometric information for health monitoring” (Ex. 1001, Abstract). The '533 patent explains that “[u]sing electronic devices enable a user to quickly and easily capture biometric information used to monitor the user’s health” (Ex. 1001, 1:39-41). The '533 patent recognizes that “[m]onitoring health, such as heart health using heart rhythm and heart rate information,” “using electronic devices is an effective method of providing and maintaining awareness of one’s health” (Ex. 1001, 1:36-39). The '533 patent purports to identify problems relating to a user’s ability to manage health monitoring using electronic devices, alleging that “[s]ome techniques” “are generally cumbersome and inefficient” (Ex. 1001, 1:45-

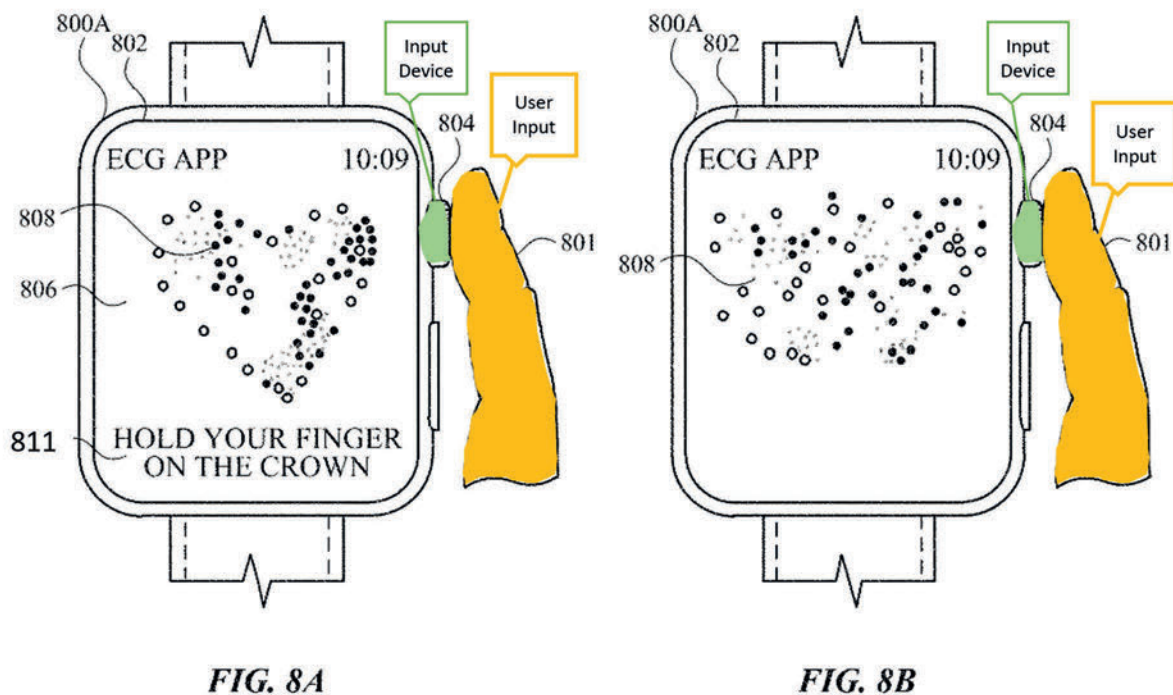
47). More specifically, the '533 patent alleges that “some existing techniques use a complex and time-consuming interface, which may include multiple key presses or keystrokes” (Ex. 1001, 1:47-49). The '533 patent goes on to allege that “[e]xisting techniques require more time than necessary, wasting user time and device energy,” stating that the “latter consideration is particularly important in battery-operated devices” (Ex. 1001, 1:49-52).

88. The '533 patent purports to solve these alleged problems by disclosing “user interfaces for health monitoring” (Ex. 1001, Abstract, 1:53-55). The specification describes an electronic device with a display and one or more input devices including a biometric sensor that is capable of displaying user interfaces, and detecting and recording biometric information (Ex. 1001, 4:35-60). In connection with Figures 10A-10J, the specification describes “exemplary user interfaces for health monitoring” (Ex. 1001, 71:35-75:26).

89. Figure 8A illustrates an “electronic device 800A” displaying a “user interface 806” on a “display 802”, where the “user interface 806” is “of an ECG application” (Ex. 1001, 60:30-67). Figure 8A is reproduced below. The “user interface 806 displays a notification message 811” “indicating to the user that an action must be performed (by the user) on the device to proceed with an ECG recording” (Ex. 1001, 61:2-7).

90. Figure 8B illustrates the “electronic device 800A” “detect[ing] a user input 801 on [an] input device” (Ex. 1001, 61:28-42). The “user input 801 is a continuous touch or contact on the input device that is below a threshold amount (e.g., an input that does not ‘click’ the input device)” (Ex. 1001, 61:28-42). Figure 8B is reproduced below.

Ex. 1001, Figs. 8A, 8B (annotated)



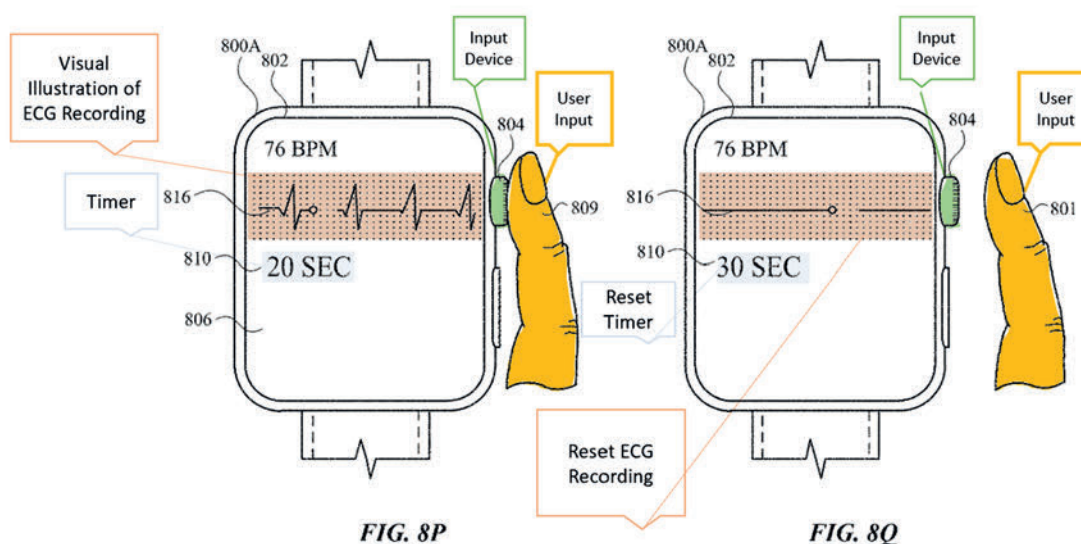
91. Figure 8P illustrates the “electronic device 800A displaying, on display 802, user interface 806 of the ECG application while performing an ECG recording corresponding to a user input 809 on input device 804 (e.g., after an initial threshold time period (e.g., 5 seconds) has passed from the initiation of the recording)” (Ex. 1001, 64:62-67). A “tachogram 816” is also displayed, “corresponding to a visual

illustration of the ECG recording” (Ex. 1001, 65:3-6). Figure 8P is reproduced below.

92. The ’533 patent explains that “the required duration of an ECG recording is 30 seconds” (Ex. 1001, 64:67-65:1).

93. FIG. 8Q illustrates the electronic device “los[ing] detection of user input 809 on input device 804,” where, “in response to (e.g., immediately in response to or within a short period of time, such as 1 second) losing detection of the user input on input device 804,” the electronic device “resets the ECG recording (e.g., terminates the previous recording and prepares to start a new recording” (Ex. 1001, 65:7-14). The “remaining time indicated in timer 810” is rewound “back to (e.g., count back up to) the initial duration in response to losing detection of the user input on input device 804” (Ex. 1001, 65:16-23). Figure 8Q is reproduced below.

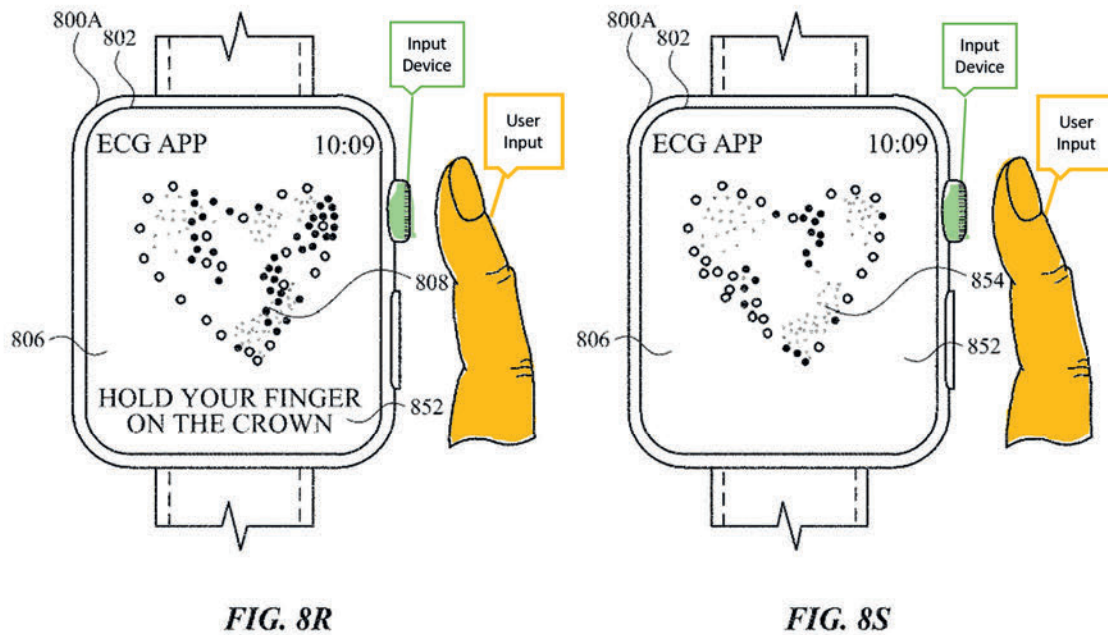
Ex. 1001, Figs. 8P, 8Q (annotated)



94. FIG. 8R illustrates the electronic device “requesting that the user restore the input on input device 804” “upon detecting that the user input on input device 804 has not been restored for at least a predetermined period of time (e.g., 2.5 seconds)” (Ex. 1001, 65:24-39). The electronic device “transitions from [sic] the user interface of FIG. 8Q to the user interface of FIG. 8R upon detecting that the user input on input device 804 has not been restored for a first predetermined period of time” (Ex. 1001, 65:40-47). Figure 8R is reproduced below.

95. FIG. 8S illustrates the electronic device transitioning to “the user interface of FIG. 8S” “upon detecting that the user input on user input device 804 has not been restored for a second predetermined period of time (e.g., which is the same as or different from the first predetermined period of time) after the first predetermined period of time has passed” (Ex. 1001, 65:65-75:2). Figure 8S is reproduced below.

Ex. 1001, Figs. 8R, 8S (annotated)



B. The '533 Patent's Prosecution History

96. Below is a brief summary of the '533 patent's prosecution history. This summary is not intended to address or summarize the '533 patent's entire prosecution history. Rather, it is intended to summarize the parts that may be relevant to my analysis below.

97. U.S. Patent App. No. 16/143,959 was filed September 27, 2018, and claims priority to U.S. Provisional Application Nos. 62/657,870, filed April 15, 2018, 62/657,881, filed April 15, 2018, 62/643,699 filed March 15, 2018, and 62/641,994 filed on March 12, 2018, (Ex. 1001, Cover).

98. On April 17, 2019, the Examiner issued an Office Action. (Ex. 1002,

645-655).

99. On July 12, 2019, the Applicant held an interview with the Examiner, in which the two primary cited references were discussed (Ex. 1002, 609-610). The Interview Summaries from both the Examiner and the Applicant are reproduced below.

Ex. 1002, 610

<i>Applicant-Initiated Interview Summary</i>	Application No. 16/143,959	Applicant(s) SOLI et al.	
	Examiner MICHAEL J LAU	Art Unit 3792	AIA (FITF) Status Yes

All participants (applicant, applicants representative, PTO personnel):

(1) MICHAEL J. LAU. (3) Carl Layno.
(2) Randy Omid. (4) Minsu Chung.

Date of Interview: 12 July 2019.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: Yamaguchi 2015/0099991 and Eom 2018/0049696.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Clarified that the first and second periods of time are separate from the recording progress time. Both parties agreed amendments to make the clarification would overcome the prior art..

Ex. 1002, 582-3

II. Interview Summary

Applicant thanks Examiner Lau and Supervisory Patent Examiner Layno for the courtesy of the telephonic interview conducted on July 12, 2019 with Applicant's representatives Randy Omid and Minsu Chung.

During the interview, the rejection under 35 U.S.C. § 103 of claim 1 was discussed in relation to cited references U.S. Pub. No. 2015/0099991 ("Yamaguchi") and U.S. Pub. No. 2018/0049696 ("Eom"). In particular, features of claim 1 concerning "a first input with the biometric sensor that satisfies first criteria," "in response to detecting that the first criteria are no longer met for a first period of time, resetting the indication of progress ...," and "in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time, replacing display of the second user interface with the first user interface" was discussed in relation to the cited references.

The Examiners indicated that, based on the discussion with Applicant's representatives, further consideration is required before making a decision on the arguments presented. Of particular note,

Applicant explained that "detecting that the first criteria are no longer met for a first period of time" and "detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time" are features that concern the "**first input** with the biometric sensor"—claim 1 recites "detecting a first input with the biometric sensor **that satisfies first criteria**." (Emphasis added.) Applicant also explained that the "indication of progress" describes a feature that is displayed in "the second user interface" of claim 1 (e.g., a user interface element of "the second user interface")—"wherein the second user interface includes an indication of progress in recording the biometric information." Applicant notes that these features have been described in greater detail by new claims 21, 39, and 57, which are submitted herein.

No agreement was reached with respect to the allowability of the claims.

100. On July 17, 2019, the Applicant filed a response to the April 17, 2019 Office Action, making no amendments to claims 1-20 and adding claims 21-57 (Ex. 1002, 576-607). The Applicant argued that the two primary cited references failed to teach the limitations of the independent claims (Ex. 1002, 576-607).

101. Specifically, the Applicant explained that a teaching by one of the references of "output[ting] a failure notice which indicates that the measurement has failed," is not a disclosure or suggestion of "detecting for two different types of events that can cause the measurement of the biometric information to fail prior to

completion” (Ex. 1002, 588). The Applicant, referring to FIGs. 8P and 8Q, explained that claim 1 “describes, ‘after recording at least a portion of the biometric information, detecting, via the one or more input devices, that the first criteria are no longer met,’ **either** (1) ‘resetting the indication of progress in recording the biometric information and maintaining display of the second user interface’ ‘in response to detecting that the first criteria are no longer met for a first period of time’; **or** (2) replacing display of the second user interface with the first user interface’ ‘in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time’” (Ex. 1002, 588 (emphasis in original)). The Applicant then argued that a “linear process” “fails to disclose or suggest either of these limitations of claim 1, let alone both limitations,” taking the position that “outputting a failure notice ‘[i]f the measurement fails,’ as described in *Eom*, does not disclose or suggest ‘detecting that the first criteria are no longer met **for a first period of time**’ and ‘detecting that the first criteria are no longer met **for a second period of time that is longer than the first period of time**’” (Ex. 1002, 588 (emphasis in original)).

102. The Examiner issued a Notice of Allowance on October 31, 2019 (Ex. 1002, 80-86). The Examiner’s Reasons for Allowance are reproduced below (Ex. 1002, 85).

Ex. 1002, 85***Reasons for Allowance***

5. The following is an examiner's statement of reasons for allowance: Claims 1-57 are allowable over the prior art because the examiner found that none of the cited prior art discloses the replacement of display of the second user interface with the first user interface are no longer met for a second period of time that is longer than the first period of time.

103. The claims were renumbered as shown below. Originally filed claim 19 issued as claim 20, originally filed claim 22 issued as claim 21, originally filed claim 23 issued as claim 22, originally filed claim 25 issued as claim 24, originally filed claim 30 issued as claim 29, and originally filed claim 38 issued as claim 37 (Ex. 1002, 90).

Ex. 1002, 90

Index of Claims 	Application/Control No. 16/143,959	Applicant(s)/Patent Under Reexamination SOLI et al.
	Examiner MICHAEL J LAU	Art Unit 3792

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS									
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47									
CLAIM		DATE							
Final	Original	04/10/2019	10/23/2019						
1	1	✓	=						
2	2	✓	=						
3	3	✓	=						
4	4	✓	=						
5	5	✓	=						
6	6	✓	=						
7	7	✓	=						
8	8	✓	=						
9	9	✓	=						
10	10	✓	=						
11	11	✓	=						
12	12	✓	=						
13	13	✓	=						
14	14	✓	=						
15	15	✓	=						
16	16	✓	=						
17	17	✓	=						
18	18	✓	=						
20	19	✓	=						
39	20	✓	=						
19	21		=						
21	22		=						
22	23		=						
23	24		=						
24	25		=						
25	26		=						
26	27		=						
27	28		=						
28	29		=						
29	30		=						
30	31		=						
31	32		=						
32	33		=						
33	34		=						
34	35		=						
35	36		=						
36	37		=						
37	38		=						
38	39		=						
40	40		=						
41	41		=						
42	42		=						

104. The Examiner issued a Corrected Notice of Allowability on December 13, 2019, following the filing of an Information Disclosure Statement by the Applicant on November 7, 2019 (Ex. 1002, 70, 74).

105. On November 8, 2022, Applicant filed a Request for Certificate of Correction, seeking correction of the following errors (Ex. 1002, 54-57).

Ex. 1002, 54-57

In the drawings, Sheet 46, FIG. 8A, delete the reference numeral "810" and insert the reference numeral -- 811 --, therefor.

In Column 42, Line 5, delete "first page 616" and insert -- second page 616 --, therefor.

In Column 54, Line 28, delete "the second electronic device (e.g., 600b)" and insert -- the second electronic device (e.g., 600B) --, therefor.

In Column 54, Line 35, delete "the second electronic device (e.g., 600b)" and insert -- the second electronic device (e.g., 600B) --, therefor.

In Column 61, Line 3, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Line 8, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Lines 31-32, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Lines 41-42, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 65, Lines 36-37, delete "forming animation forming animation 808" and insert -- forming animation 808 --, therefor.

In Column 72, Lines 33-34, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 100, Line 55, Claim 7, delete "The first electronic device of claim 6" and insert -- The first electronic device of claim 8 --, therefor.

In Column 101, Lines 13-14, Claim 10, delete "a timer indicating the amount of time" and insert -- a timer indicating an amount of time --, therefor.

In Column 101, Line 26, Claim 12, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 101, Line 30, Claim 13, delete "The first electronic device of claim 11" and insert -- The first electronic device of claim 12 --, therefor.

In Column 101, Line 31, Claim 13, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 101, Line 37, Claim 14, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 101, Line 43, Claim 15, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 102, Line 6, Claim 19, delete "the second criteria being no longer met" and insert -- the first criteria being no longer met --, therefor.

In Column 103, Line 8, Claim 26, delete "medium of claim 25" and insert -- medium of claim 27 --, therefor.

In Column 103, Line 36, Claim 29, delete "indicating the amount of time" and insert -- indicating an amount of time --, therefor.

In Column 103, Line 50, Claim 31, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 103, Line 55, Claim 32, delete "medium of claim 30" and insert -- medium of claim 31 --, therefor.

In Column 103, Line 56, Claim 32, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 103, Line 63, Claim 33, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 104, Line 3, Claim 34, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 104, Line 37, Claim 38, delete "the second criteria" and insert -- the first criteria --, therefor.

In Column 105, Line 33, Claim 45, delete "The method of claim 44" and insert -- The method of claim 46 --, therefor.

In Column 105, Line 57, Claim 48, delete "the amount of time" and insert -- an amount of time --, therefor.

In Column 106, Line 9, Claim 50, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 106, Line 13, Claim 51, delete "The method of claim 49" and insert -- The method of claim 50 --, therefor.

In Column 106, Line 14, Claim 51, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 106, Line 19, Claim 52, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 106, Line 25, Claim 53, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 106, Line 52, Claim 57, delete " the second criteria" and insert - - the first criteria - - , therefor.

106. The Examiner issued a Certificate of Correction on December 27, 2022, approving all of the above-requested corrections with the exception of the change in claim dependency related to claim 46 (Ex. 1002, 23).

107. On November 30, 2022, Applicant filed a Request to Correct Inventorship, requesting that Heather E. Daniel and Stephen O. Lemay be added as co-inventors (Ex. 1002, 49). The Examiner granted the Request to Correct Inventorship on January 6, 2023, but noted that the dependency issue related to claim 46 remained (Ex. 1002, 21).

108. On June 16, 2023, Applicant filed another Request for Certificate of Correction, seeking correction of the following errors (Ex. 1002, 14-19).

Ex. 1002, 14-19

In the drawings, Sheet 46, FIG. 8A, delete the reference numeral "810" and insert the reference numeral -- 811 --, therefor.

In Column 42, Line 5, delete "first page 616" and insert -- second page 616 --, therefor.

In Column 54, Line 28, delete "the second electronic device (e.g., 600b)" and insert -- the second electronic device (e.g., 600B) --, therefor.

In Column 54, Line 35, delete "the second electronic device (e.g., 600b)" and insert -- the second electronic device (e.g., 600B) --, therefor.

In Column 61, Line 3, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Line 8, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Lines 31-32, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 61, Lines 41-42, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In Column 65, Lines 36-37, delete "forming animation forming animation 808" and insert -- forming animation 808 --, therefor.

In Column 72, Lines 33-34, delete "a notification message 810" and insert -- a notification message 811 --, therefor.

In the Claims, Claim 7, cancel the text beginning with "7. The first electronic device of claim" in Column 100, Line 55 and ending in "the graphical animation," in Column 100, Line 64 and insert the following claim:

7. The first electronic device of claim 6, wherein the plurality of moving objects of the graphical animation transitions from the first shape to a second shape different from the first shape as the display transitions from the first user interface to the second user interface.

In the Claims, Claim 8, cancel the text beginning with "8. The first electronic device of claim" in Column 100, Line 65 and ending in "the second user interface." in Column 101, Line 2 and insert the following claim:

8. The first electronic device of claim 7, wherein the one or more programs further include instructions for: while displaying the second user interface and recording the biometric information, displaying, within the graphical animation that is in the second shape, a visual representation of the recorded biometric information, wherein the recorded biometric information is filtered and scaled such that the visual representation of the recorded biometric information can be displayed within the graphical animation.

In Column 101, Line 3, Claim 9, delete "The first electronic device of claim 8" and insert -- The first electronic device of claim 7 --, therefor.

In Column 101, Lines 13-14, Claim 10, delete "a timer indicating the amount of time" and insert -- a timer indicating an amount of time --, therefor.

In Column 101, Line 26, Claim 12, delete "the second criteria is met" and insert -- the second criteria are met --, therefor.

In Column 101, Line 30, Claim 13, delete "The first electronic device of claim 11" and insert - - The first electronic device of claim 12 - -, therefor.

In Column 101, Line 31, Claim 13, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 101, Line 37, Claim 14, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 101, Line 43, Claim 15, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 102, Line 6, Claim 19, delete "the second criteria being no longer met" and insert - - the first criteria being no longer met - -, therefor.

In the Claims, Claim 26, cancel the text beginning with "26. The non-transitory computer-readable storage medium of claim" in Column 103, Line 7 and ending in "the graphical animation." in Column 103, Line 17 and insert the following claim:

26. The non-transitory computer-readable storage medium of claim 25, wherein the plurality of moving objects of the graphical animation transitions from the first shape to a second shape different from the first shape as the display transitions from the first user interface to the second user interface.

In the Claims, Claim 27, cancel the text beginning with "27. The non-transitory computer-readable storage medium of claim" in Column 103, Line 18 and ending in "the second user interface." in Column 103, Line 23 and insert the following claim:

27. The non-transitory computer-readable storage medium of claim 26, wherein the one or more programs further include instructions for:
while displaying the second user interface and recording the biometric information, displaying, within the graphical animation that is in the second shape, a visual representation of the recorded biometric information, wherein the recorded biometric information is filtered and scaled such that the visual representation of the recorded biometric information can be displayed within the graphical animation.

In Column 103, Line 24, Claim 28, delete "The non-transitory computer-readable storage medium of claim 27" and insert - - The non-transitory computer-readable storage medium of claim 26 - -, therefor.

In Column 103, Line 36, Claim 29, delete "indicating the amount of time" and insert - - indicating an amount of time- -, therefor.

In Column 103, Line 50, Claim 31, delete "the second criteria is met" and insert - - the second criteria are met- -, therefor.

In Column 103, Line 55, Claim 32, delete "medium of claim 30" and insert - - medium of claim 31 - -, therefor.

In Column 103, Line 56, Claim 32, delete "the second criteria is met" and insert - - the second criteria are met - -, therefor.

In Column 103, Line 63, Claim 33, delete "the second criteria is met" and insert - - the second criteria are met- -, therefor.

In Column 104, Line 3, Claim 34, delete "the second criteria is met" and insert - - the second criteria are met - - , therefor.

In Column 104, Line 37, Claim 38, delete " the second criteria" and insert - - the first criteria - - , therefor.

In the Claims, Claim 45, cancel the text beginning with "45. The method of claim" in Column 105, Line 33 and ending in "the graphical animation." in Column 105, Line 42 and insert the following claim:

45. The method of claim 44, wherein the plurality of moving objects of the graphical animation transitions from the first shape to a second shape different from the first shape as the display transitions from the first user interface to the second user interface.

In the Claims, Claim 46, cancel the text beginning with "46. The method of claim" in Column 105, Line 43 and ending in "the second user interface." in Column 105, Line 47 and insert the following claim:

46. The method of claim 45, further comprising:
while displaying the second user interface and recording the biometric information, displaying, within the graphical animation that is in the second shape, a visual representation of the recorded biometric information, wherein the recorded biometric information is filtered and scaled such that the visual representation of the recorded biometric information can be displayed within the graphical animation.

In Column 105, Line 48, Claim 47, delete "The method of claim 46" and insert - - The method of claim 45 - - , therefor.

In Column 105, Line 57, Claim 48, delete "the amount of time" and insert - - an amount of time- - , therefor.

In Column 106, Line 9, Claim 50, delete "the second criteria is met" and insert - - the second criteria are met - - , therefor.

In Column 106, Line 13, Claim 51, delete "The method of claim 49" and insert - - The method of claim 50 - - , therefor.

In Column 106, Line 14, Claim 51, delete "the second criteria is met" and insert - - the second criteria are met - - , therefor.

In Column 106, Line 19, Claim 52, delete "the second criteria is met" and insert - - the second criteria are met - - , therefor.

In Column 106, Line 25, Claim 53, delete "the second criteria is met" and insert - - the second criteria are met - - , therefor.

In Column 106, Line 52, Claim 57, delete " the second criteria" and insert - - the first criteria - - , therefor.

109. The Examiner issued a Certificate of Correction on July 11, 2023 (Ex. 1002, 1).

C. Claim Construction of the '533 Patent

110. I have been informed that claim terms are typically given their plain and ordinary meanings, as would have been understood by a person of ordinary skill in the art at the time of the earliest alleged priority date. I have further been informed that when considering the meaning of any terms in the challenged claims of the '533 Patent, I should apply the plain and ordinary meaning of those terms. I have further

been informed that in considering the meaning of the claims, one must consider the language of the claims, the specification, and the prosecution history of record.

111. I have been informed that in general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim. I have further been informed that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. I have further been informed that dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and claim body to define the claimed invention. I have further been informed that clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.

VIII. SUMMARY OF THE PRIOR ART

A. *AHIT* (Ex. 1006)

112. *Chinese* Patent Publication No. CN106901720A (“*AHIT*”, Ex. 1006) is titled “The Acquisition Method of Electrocardiogram (ECG) Data, Device and Wearable Device.” *AHIT* was filed by Applicant, Anhui Huami Information

Technology Co. Ltd. (“AHIT”), and broadly relates to an acquisition method of electrocardiogram (ECG) data applied on a wearable device (Ex. 1006, Abstract).

113. *AHIT* was filed on February 22, 2017, and published June 17, 2017 (Ex. 1006, Cover). Thus, I have been informed that I should assume *AHIT* is prior art under at least 35 U.S.C. § 102(a) (AIA).

114. *AHIT* discloses an “acquisition method of electrocardiogram (ECG) data, device and wearable device,” where the “wearable device includes multiple ECG sensor electrodes” (Ex. 1006, Abstract).

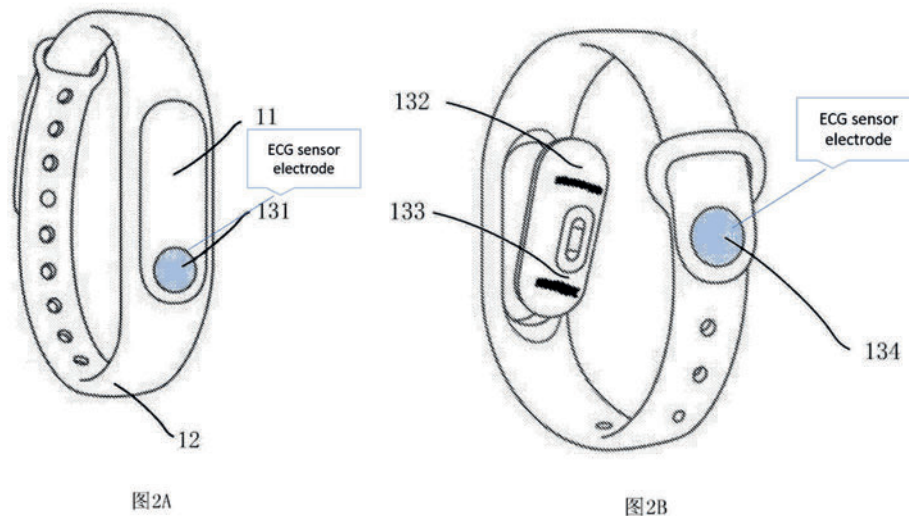
115. *AHIT* describes that “[w]earable ECG monitoring class product is [sic] increasingly popularized,” and addresses drawback associated with “wearable cardioelectric monitor[s]” that rely upon an “application program of [a] mobile phone (APP)” by providing a “triggering mode of electrocardiogram (ECG) data” that is “simple, direct[], and quick[]” (Ex. 1006, p. 3).

116. *AHIT* describes a user performing a “trigger action,” which is identified by the wearable device as “the multiple ECG sensor electrodes of collection are interconnected” such that “at least one closed-loop path” is formed (Ex. 1006, Abstract). “Electrocardiogram (ECG) data” is “gather[ed]” after the trigger action is identified (Ex. 1006, Abstract).

117. FIGs. 2A and 2B of *AHIT*, reproduced below, illustrate an example structural representation of wearable devices of the invention (Ex. 1006, p. 4). The

wearable device can include ECG electrodes 131, 132, 133, and 134 (Ex. 1006, p. 4).

Ex. 1006, Figs. 2A, 2B (annotated)



118. *AHIT* explains that the “wearable device” can have a “display screen,” that, “when the wearable device acquires the ECG data,” can “display a preset icon or control” “to prompt the user that the ECG data has been started to be collected” or may also “display ECG data acquisition progress” (Ex. 1006, pp. 5, 9).

119. *AHIT* further explains that, “through the above prompts, users can know their own operation is correct, and in the event of operational errors to correct their mistakes, such as re-touch the electrode” (Ex. 1006, p. 5).

120. *AHIT* describes using a “processing module 55” that “is configured to detect whether the current ECG data is valid ECG data,” if a “determination module 54 determines that the acquisition duration does not reach the preset threshold” (Ex.

1006, p. 9). The “predetermined threshold value can be 30 seconds” (Ex. 1006, p. 9).

121. *AHIT* the wearable device “continues to gather electrocardiogram data” while the “collection duration is not up to predetermined threshold value,” and, when the “collection duration reaches [the] predetermined threshold value,” stops collecting the ECG data so as to “reach” and “not waste the purpose of the wearable device resource” (Ex. 1006, p. 5).

122. The wearable device “cease[s] to collect the current ECG if the current ECG data is invalid ECG data and store the collected ECG data” (Ex. 1006, p. 9). If “the current ECG data is valid ECG data, the current ECG data is collected,” and a “collection duration of the ECG is continuously counted” by a “statistics module 53” (Ex. 1006, p. 9).

B. *Hooper* (Ex. 1007)

123. United States Patent No. 7,111,157 (“*Hooper*,” Ex. 1007) is titled “Spurious Input Detection For Firmware.”

124. *Hooper* was filed May 8, 2002 and issued September 19, 2006 (Ex. 1007, Cover). Consequently, I have been informed that I should assume *Hooper* is prior art under at least 35 U.S.C. § 102(a) (AIA).

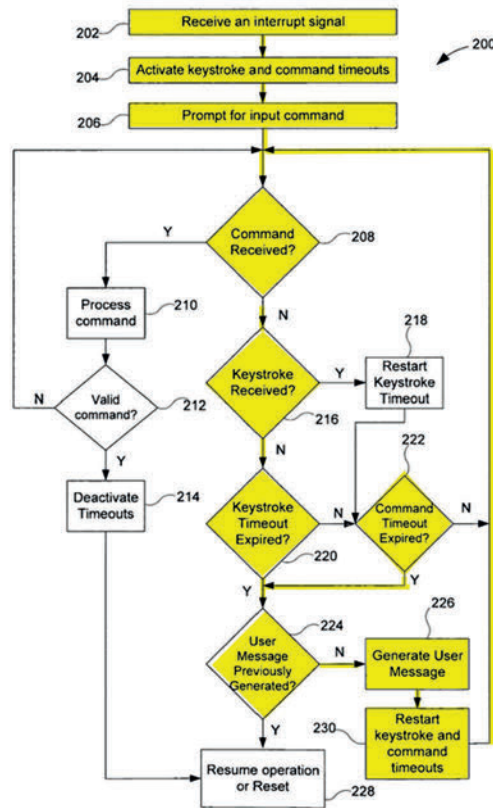
125. *Hooper* generally relates to “detecting and handling spurious input” (Ex. 1007, Abstract). *Hooper* describes a device that, “upon receipt of an input

signal,” “activates command and keystroke timeouts” (Ex. 1007, Abstract). *Hooper* describes that the “keystroke timeout may have a shorter duration than the command timeout and may be reset upon receipt of a keystroke” (Ex. 1007, Abstract). A “user message” may be generated by the device “[a]t the first expiration of either the keystroke or command timeouts,” and the device “resumes initialization or resets” “[a]t the second expiration of either the keystroke or command timeouts” (Ex. 1007, Abstract).

126. *Hooper*, with reference to FIG. 2 (reproduced below), describes a device that prompts for an input command via a graphical user interface (GUI) that invites a user to enter a command (Ex. 1007, 5:11-17).

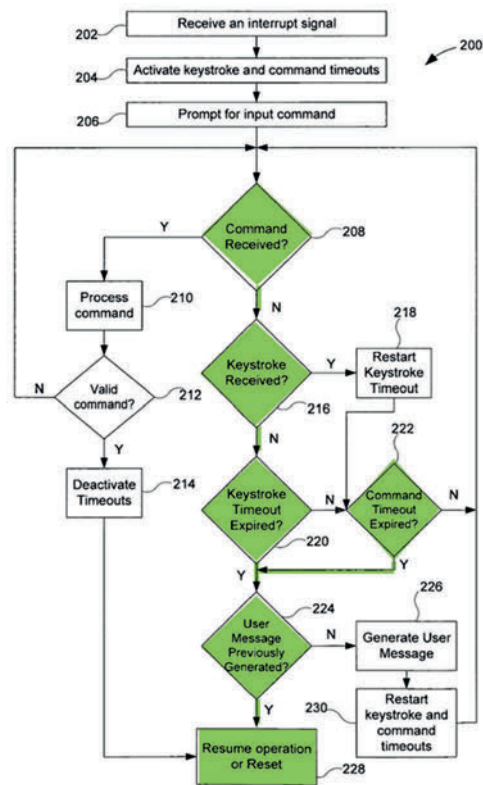
127. *Hooper* describes that, upon a first expiration of either the keystroke or command timeouts, the device may generate a user message for viewing by a user, where the “user message may comprise a message warning the user that if the user does not enter a valid command, such as within a certain time period, that device will resume operation or reset” (Ex. 1007, 6:15-25; FIG. 2 (annotated in yellow below)).

Ex. 1007, Fig. 2 (annotated)



128. *Hooper* describes that, upon a second expiration of either the keystroke or command timeouts, which were restarted after the user message was generated, the device “restarts” the program (Ex. 1007, 6:15-25; FIG. 2 (annotated in green below)).

Ex. 1007, Fig. 2 (annotated)



C. *Petterson* (Ex. 1009)

129. United States Patent No. 10,685,090 (“*Petterson*,” Ex. 1009) is titled “Devices, Systems, and Methods for Physiology Monitoring.”

130. *Petterson* was filed August 31, 2017, claiming priority to a U.S. Provisional Patent Application filed August 1, 2016, published March 1, 2018, and issued June 16, 2020 (Ex. 1009, Cover). Therefore, I have been informed that I should assume *Petterson* is prior art under at least 35 U.S.C. § 102(a) (AIA).

131. *Petterson* relates generally to “applications, devices, systems, and methods” “for monitoring, recording, and tracking cardiac health related metrics

using an associated computing device” (Ex. 1009, Abstract). *Petterson* describes “software applications [that] may monitor record, and track physiological data such as cardiac electrical activity, heart rate, and blood pressure” (Ex. 1009, Abstract).

132. *Petterson* explains that the “use of smartphones, tablet computers, wearable computers, and ‘smart’ accessories is becoming increasingly prevalent,” and that the “increased prevalence of computing power and devices offers many opportunities for improved ways of monitoring health and placing health management more in the control of the patient” (Ex. 1009, 1:12-21). *Petterson* further explains that “[h]eart rate measurement, blood pressure measurement, and electrocardiography are widely used techniques for diagnosing the cardiovascular health of a patient” (Ex. 1009, 1:22-27).

133. *Petterson* describes “a platform” having “patient application” with “a software module for receiving sensed data from a sensor configured to sense a physiologic parameter of a patient” (Ex. 1009, 1:38-41). The “platform comprises the sensor” and “the sensor is configured to operably couple with a mobile computing device” (Ex. 1009, 1:67-2:2). The sensor may be “integrated with the mobile computing device,” and may comprise “two ECG electrodes” (Ex. 1009, 2:2-5).

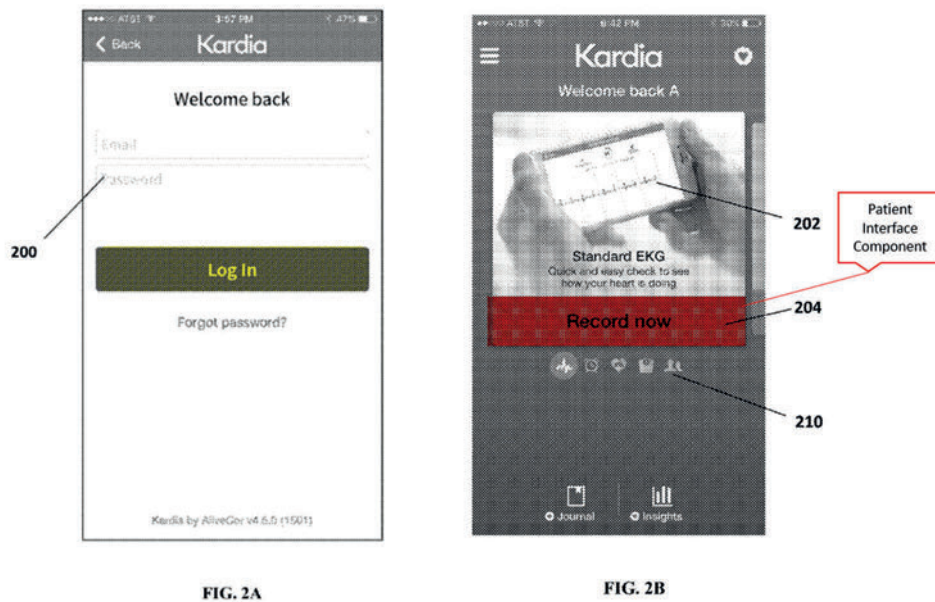
134. *Petterson* explains that “one or more sensors (or ‘sensing devices’) are configured to monitor one or more physiologic parameters of an individual” (Ex.

1009, 6:6-16). The “sensing device, located with a patient, is configured to communicate with one or more remote computing devices” (Ex. 1009, 6:9-16). The “sensing device” may be, in some embodiments, “integrated with a patient computing device,” where “one or more ECG electrodes [are] integrated into a housing and/or processor of a computing device such as a smartphone or smartwatch” (Ex. 1009, 6:17-23).

135. *Petterson* describes a “patient application” “configured to receive, organize, and/or track patient data including sensed physiologic parameters,” including “a sensed ECG of a patient” (Ex. 1009, 6:64-7:3). In *Petterson*, the “patient application comprises one or more interfaces (e.g., a graphical interface, an audio interface, a video interface)” that “enable the patient to: for example, obtain physiological information from a sensing device or from other health-based software applications (e.g. Apple Health), store sensed data from a sensing device” (Ex. 1009, 7:55-61).

136. FIG. 2A of *Petterson* (reproduced below) shows an “initial home screen interface encountered by a patient when he or she has not yet signed into a patient application that is operating on a computing device” (Ex. 1009, 8:20-23). FIG. 2B (reproduced below) shows “a patient interface component” “that provides the patient with the ability to select to record an ECG” using “an ECG sensing device” “configured to interact with the software application” (Ex. 1009, 9:7-15).

Ex. 1009, Figs. 2A, 2B (annotated)



137. FIG. 3 of *Petterson* (reproduced below) shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41).

Ex. 1009, Fig. 3 (annotated)

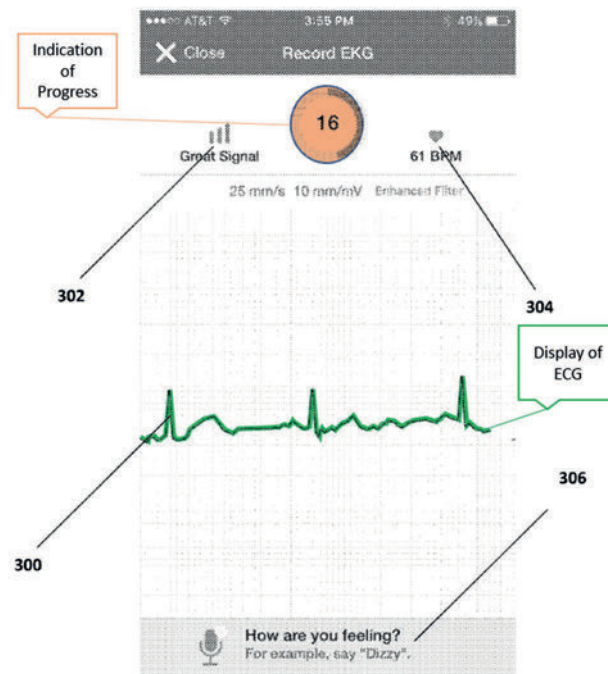


FIG. 3

D. Albert (Ex. 1010)

138. United States Patent Publication No. 2015/0073285 (“*Albert*”, Ex. 1010) is titled “Universal ECG Electrode Module for Smartphone.”

139. *Albert* was filed September 5, 2014, claiming priority to a U.S. Provisional Application filed September 6, 2013, and was published March 12, 2015 (Ex. 1010, Cover). Therefore, I have been informed that I should assume *Albert* is prior art under at least 35 U.S.C. § 102(a) (AIA).

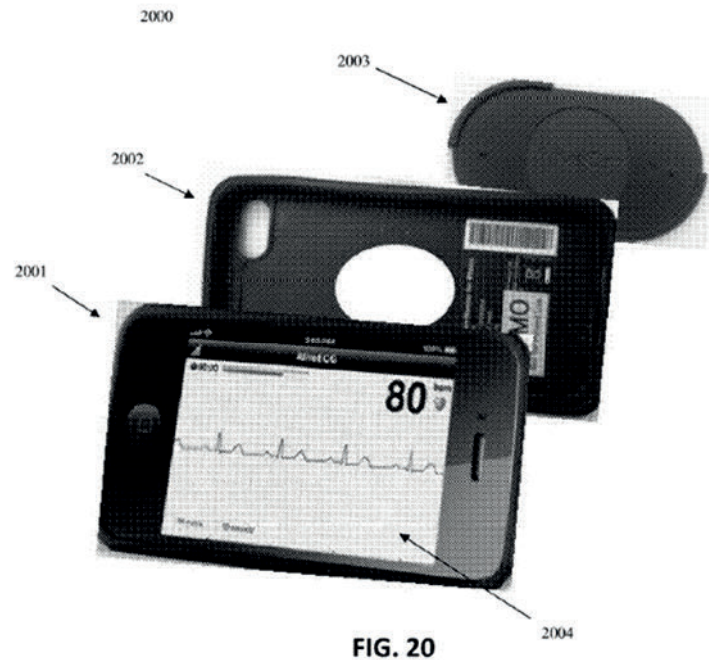
140. *Albert* generally relates to “[a]pparatuses and methods for sensing an electrocardiogram (ECG) of a subject using an ECG module that may removably connect to a mobile telecommunications device” and “wirelessly communicate with

the mobile telecommunications device” (Ex. 1010, Abstract). *Albert* describes “ECG sensing devices for use with mobile telecommunications devices such as smartphones, tablet computers, smart watches, wearable computing devices, and the like so that the mobile telecommunications device may receive biological signals measured directly from a patient” (Ex. 1010, ¶ [0006]).

141. *Albert* explains that “[e]lectrocardiogram (ECG) monitoring is often highly useful in maintaining optimal cardiac function in both healthy and non-healthy subjects,” and that “[s]uch monitoring can generate data that can be used by the subject as well as healthcare professionals to guide preventative and therapeutic treatment decision making” (Ex. 1010, ¶ [0004]).

142. *Albert* describes “connecting a universal ECG electrode module to a mobile telecommunications device using a base unit,” and “using the universal ECG electrode module to detect and transmit ECG data” (Ex. 1010, ¶ [0089]). The “mobile telecommunications device may include any appropriate wireless telecommunications device” (Ex. 1010, ¶ [0091]). The “ECG electrode module” may include “two or more electrodes, or connectors for two or more electrodes, configured to be contacted by or to a patient/subject to sense an ECG signal from the patient/subject” (Ex. 1010, ¶ [0098]).

Ex. 1010, FIG. 20



143. With reference to FIG. 20 (reproduced above), *Albert* describes an ECG sensing system 2000 in which a “mobile device 2001 has a display 2004,” and the display “displays an ECG wave” (Ex. 1010, ¶ [0142]). An “ECG module 2003 can removably attach to a base unit 2002” (Ex. 1010, ¶ [0142]).

E. *Cho* (Ex. 1008)

144. United States Patent Publication No. 2016/0196635 (“*Cho*,” Ex. 1008) is titled “Information Display Method and Electronic Device For Supporting the Same.”

145. *Cho* was filed January 4, 2016, and published July 7, 2016 (Ex. 1008, Cover). Therefore, I have been informed that I should assume *Cho* is prior art under at least 35 U.S.C. § 102(a) (AIA).

146. *Cho* generally relates to “[a]n electronic device and information display method” where the “electronic device includes” a “processor configured to functionally connect with [a] memory and [a] display,” and the “processor controls to display” an object “associated with collected sensing information related to a human body” (Ex. 1008, Abstract).

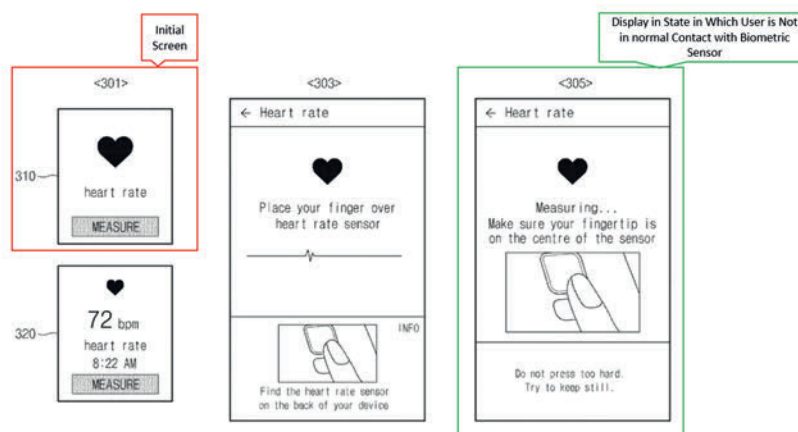
147. *Cho* describes drawbacks of prior systems including “passively display[ing] information stored in [an electronic device’s] memory irrespective to situations or intention of users in a process of displaying information” (Ex. 1008, ¶[0004]). *Cho* explains that such passive displaying results in degradation in the “process of recognizing information” and “visibility of users,” as well as a lowering of “the degree of understanding of users” (Ex. 1008, ¶[0005]).

148. *Cho* explains a need for “provid[ing] an adaptive information display method for enhancing degree of understanding of information and improving visibility for displayed information by more dynamically displaying user related information and an electronic device for supporting the same” (Ex. 1008, ¶[0006]).

149. *Cho* describes, with reference to FIG. 3A (reproduced below), a “state 301” that is “associated with an initial screen of a biometric information display

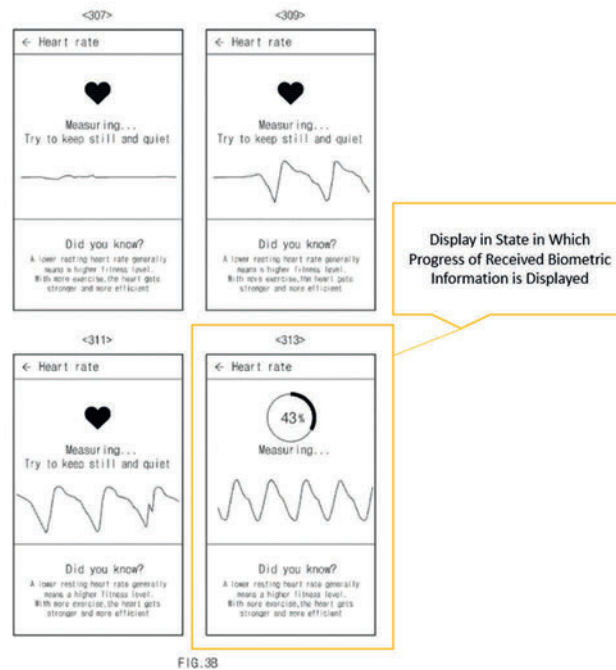
function,” where a “heartbeat application” is activated “by a user input” (e.g., a touch) or a “certain condition (e.g., a condition in which a finger is in contact with a PPG sensor” (Ex. 1008, ¶[0113]). *Cho* describes, in state 305, if a finger of a user is not in normal contact with the biometric sensor, “the electronic device may display guide information for guiding the user to bring his or her body with the biometric sensor” (Ex. 1008, ¶[0114]). In other words, after a period of time or abnormal activity, *Cho* teaches changing a screen to provide additional information to the user indicating how to perform the test properly.

Ex. 1008, FIG. 3A (annotated)



150. *Cho* further demonstrates, with reference to FIG. 3B (reproduced below), in a state 313, the display of “a progress rate of processing received biometric signal information” (Ex. 1008, ¶[0125]).

Ex. 1008, FIG. 3B (annotated)



F. *Mayor* (Ex. 1012)

151. United States Patent Publication No. 2014/0173521 ("*Mayor*," Ex. 1012) is titled "Shortcuts for Application Interfaces."

152. *Mayor* was filed December 17, 2012, and published June 19, 2014 (Ex. 1012, Cover). Therefore, I have been informed that I should assume *Mayor* is prior art under at least 35 U.S.C. § 102(a) (AIA).

153. *Mayor* provides "a shortcut [that] can be created that allows a user to directly access a graphical user interface or subscreen of an application" (Ex. 1012, Abstract). *Mayor* discloses enabling a user to "select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut" (Ex. 1012, Abstract, ¶ [0003]). *Mayc*

for by the implementations disclosed include creation of an “application user interface shortcut for directly invoking or accessing an application user interface” (Ex. 1012, ¶ [0004]).

154. With reference to FIG. 1 (reproduced below), *Mayor* describes a “graphical user interface 100 for invoking applications on a mobile device,” where “GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶ [0021]).

Ex. 1012, FIG. 1 (annotated)

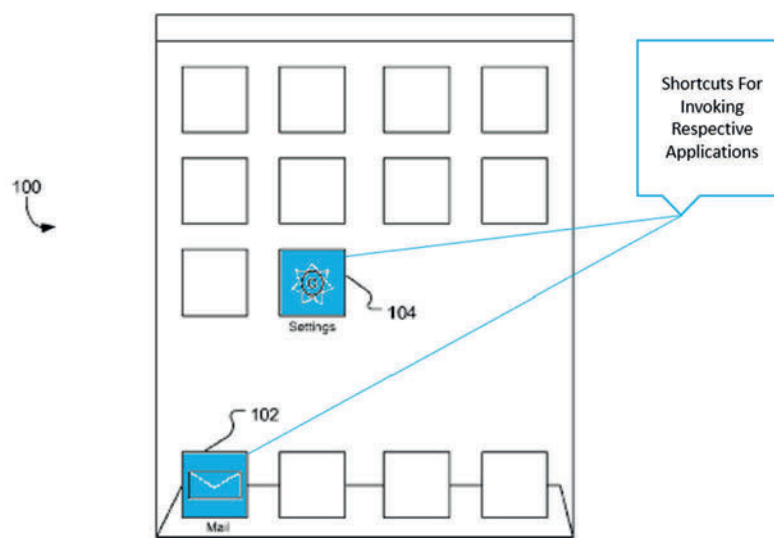


FIG. 1

155. *Mayor* discloses that “graphical objects 102 and 104 can be icons or images that, when selected by a user, cause invocation of a corresponding application that is installed on the mobile device” (Ex. 1012, ¶ [0021]). For example,

“[g]raphical object 102” “can be selected to invoke an email application on the mobile device,” and “[g]raphical object 104 can be selected to invoke a settings application or function of the mobile device” (Ex. 1012, ¶ [0021]).

156. With reference to FIG. 9 (reproduced below), *Mayor* depicts an example graphical user interface “for invoking applications and GUI shortcuts on a mobile device,” where the “graphical user interface 900” includes “GUI shortcut 902 and/or GUI shortcut 904” (Ex. 1012, ¶ [0036]). *Mayor* explains that “GUI shortcut 902 can be selected to invoke” a “‘Friends’ email folder” (Ex. 1012, ¶ [0036]). When “GUI shortcut 902 is invoked (e.g., selected by a user),” an application identifier associated therewith “can be used by the mobile device to invoke the application” (Ex. 1012, ¶ [0037]).

Ex. 1012, FIG. 9 (annotated)

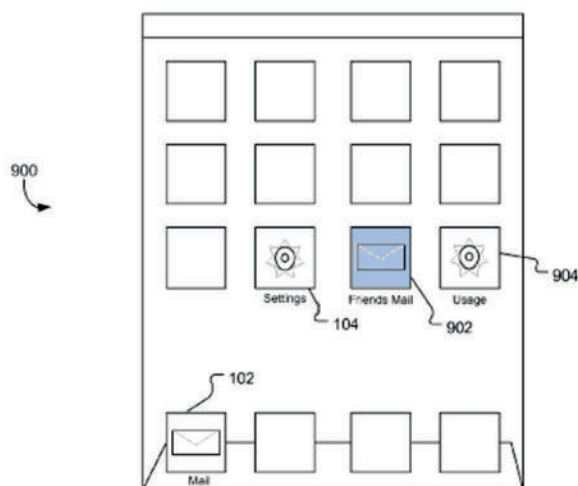


FIG. 9

157. With reference to FIG. 10B (reproduced below), *Mayor* discloses an example process “for invoking an application using a graphical user interface shortcut” (Ex. 1012, ¶ [0046]).

Ex. 1012, FIG. 10B (annotated)

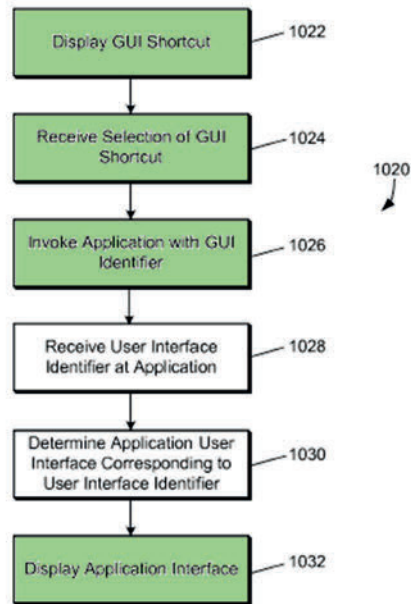


FIG. 10B

G. *Nakada* (Ex. 1011)

158. United States Patent No. 7,313,435 (“*Nakada*,” Ex. 1011) is titled “Bioelectric Impedance Measuring Apparatus.”

159. *Nakada* was filed August 12, 2004, claiming priority to a Japan Patent Application filed September 5, 2003, and issued December 25, 2007 (Ex. 1011,

Cover). Therefore, I have been informed that I should assume *Nakada* is prior art under at least 35 U.S.C. § 102(a) (AIA).

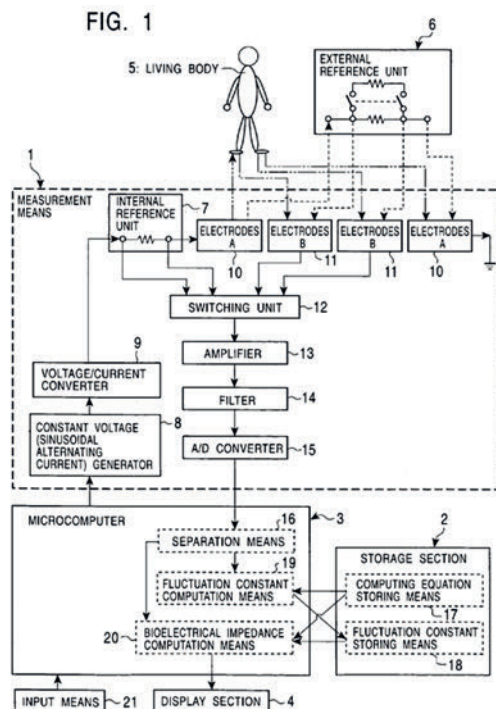
160. *Nakada* generally relates to “an apparatus capable of carrying out an accurate bioelectrical impedance measurement” (Ex. 1011, Abstract). According to *Nakada*, the object of the invention is to “more accurately” “determin[e] whether contact of a living body with electrodes used at the time of the bioelectrical impedance measurement is normal or not” (Ex. 1011, 3:32-37).

161. Specifically, *Nakada* discloses an apparatus “comprising an impedance measurement unit” “which comprises electrodes to contact with a living body” and “measur[es] a bioelectrical impedance” (Ex. 1011, 3:42-48). The apparatus also includes “a determination unit for determining the contact condition of a living body with the electrodes” that uses “a parameter associated with the phase difference of the living body” (Ex. 1011, 3:42-48).

162. *Nakada* describes that “the resistance component in a bioelectrical impedance to be measured in [an] impedance measurement unit is represented by R and the reactance component in the bioelectrical impedance is represented by X,” and that “the parameter associated with the phase difference of the living body is a value represented by X/R ” (Ex. 1011, 3:49-55). *Nakada* defines “the condition for determination of the contact in the determination unit” as “ $a < X/R < b$ ” where “a and b are real numbers” (Ex. 1011, 3:56-59).

163. *Nakada* provides an example of a “body fat meter using the bioelectrical impedance measuring apparatus,” in FIG. 1 below (Ex. 1011, 6:18-20).

Ex. 1011, Fig. 1

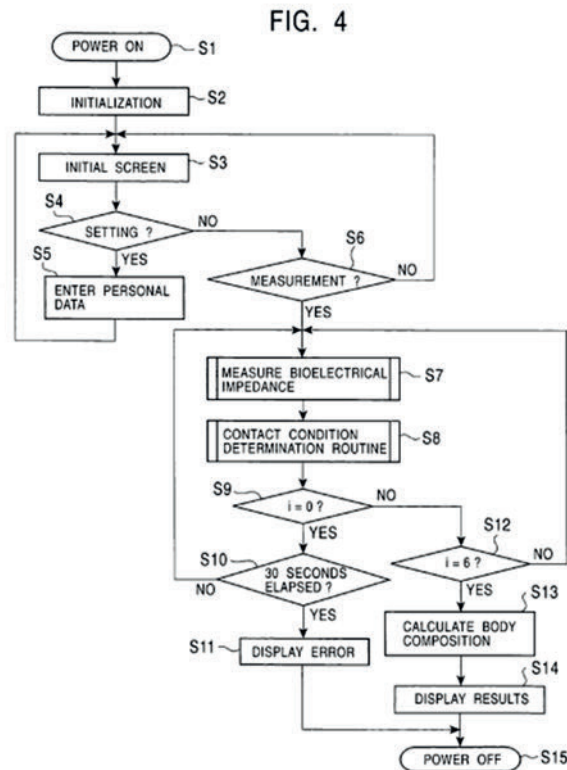


164. *Nakada* discloses that the “body fat meter comprises measuring means 1 a storage section 2, a microcomputer 3, and a display section 4” (Ex. 1011, 6:18-20). The “measurement means 1” includes “electrodes A10” and “electrodes B11” (Ex. 1011, 6:21-28).

165. With reference to FIG. 4, reproduced below, *Nakada* discloses a “contact condition determination routine” which checks “whether the contact condition is normal,” and, if “the contact condition is not normal” and “30 seconds have not yet elapsed,” the measurement continues” (Ex. 1011, 9:45-57). If “the

contact condition is not normal” and “30 seconds have already elapsed,” the device “determines that an accurate measurement could not be made” and “displays an error on the display section” (Ex. 1011, 9:45-57).

Ex. 1011, Fig. 4



IX. THE PRIOR ART RENDERS OBVIOUS CLAIMS 20-22, 29, AND 37 OF THE '533 PATENT

A. Ground 1: *AHIT*, *Hooper*, and *Cho* Render Obvious Claims 20-21, 24, 29, and 37 of the '533 patent.

166. *AHIT*, *Hooper*, and *Cho* render obvious claims 20-21, 24, 29, and 37 of the '533 patent.

Motivation to Combine AHIT, Hooper, and Cho

167. There are numerous reasons why a person of ordinary skill in the art would have been specifically motivated to combine *AHIT*, *Hooper*, and *Cho*.

168. First, *AHIT*, *Hooper*, and *Cho* are generally directed to the field of electronic device design. That is, *AHIT* relates to a “technical field of wearable devices,” where the “wearable device” receives input performed by a user and takes action based on the same (Ex. 1006, ¶¶1, 6-10). *Hooper* relates to a “data processing device” that detects and handles input received from a user (Ex. 1007, 2:15-41). *Cho* relates to “[a]n electronic device and information display method” where the “electronic device includes” a “processor configured to functionally connect with [a] memory and [a] display,” and the “processor controls to display” an object “associated with collected sensing information related to a human body” (Ex. 1008, Abstract). These references, like the ’533 patent, are directed to user interface design and processing to reduce wasted time and wasted energy (Ex. 1001, 1:36-41 *see also* 11:41-42 (“There is a need for electronic devices that provide efficient methods and interfaces for managing health monitoring.”)).

169. *Hooper* provides a solution to the problem to be solved by the ’533 patent (e.g., providing “electronic devices that provide efficient methods and interfaces for managing health monitoring”) by detecting and handling interrupts so

as to avoid a situation where the device is indefinitely suspended (Ex. 1007, 1:55-2:18).

170. Second, *AHIT* expressly discloses the importance of keeping a user informed and conveniently capturing biometric information. For example, *AHIT* describes a scenario where, “if the wearable device comprises a screen, then when collecting ECG data, the wearable device may display a preset icon via the screen or control the wearable device to vibrate, so as to prompt the user that collecting the ECG data has been started, or may display a progress of collecting the ECG data via the screen” (Ex. 1006, ¶39). *AHIT* explains that, as a benefit of such prompts, “a user is enabled to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39). As discussed above in section VI, it was well known to persons of skill in the art that a prompt to correct an action, such as a required action to complete a test or an action, would be time limited so as to avoid wasted processing resources and/or battery resources.

171. In view of the explicit teaching in *AHIT* of providing a prompt to the user, a person of ordinary skill in the art would have turned to *Hooper* which expressly discloses displaying a prompt for the user to perform an action to proceed once an interruption has occurred. While *Hooper* describes an interrupt signal in terms of an initialization of a computer, the person of ordinary skill in the art would

have understood that *Hooper* discloses methods for addressing interruptions to any process so as avoid a method from being indefinitely stopped. (Ex. 1007, 2:2-5). That is, *Hooper* is directed to solving the problem of an indefinite suspension of a computational process based on an input or a lack of input that interrupts a process. (Ex. 1007, 1:55-59).

172. In order to address interruptions, *Hooper* discloses a “data processing device” that “prompts for an input command” in response to an interrupt signal (Ex. 1007, 2:25-37). *Hooper* further discloses providing a new or altered user interface to the user when there is an interruption, prompting a user to take action. For example, *Hooper* discloses that a “command line or a graphical user interface (GUI)” may be displayed via the external console, where the “command line or graphical user interface (GUI)” “invites a user to enter a command” (Ex. 1007, 5:11-17).

173. In view of the explicit teaching of providing a prompt to the user, a person of ordinary skill in the art would have also turned to *Cho* which expressly discloses an electronic device for “provid[ing] an adaptive information display method for enhancing degree of understanding of information and improving visibility for displayed information by more dynamically displaying user related information” (Ex. 1008, ¶6). That is, *Cho* is directed to solving the problem of

actively displaying information specific to a situation or the intentions of the user so as to ensure the user can understand.

174. In order to actively display information and ensure the user can understand the situation, *Cho* discloses an “electronic device” that is able to “determine a biometric contact state” and “display guide information for guiding the user” to properly contact a biometric sensor of the device (Ex. 1008, ¶115). That is, *Cho* discloses prompts to begin a measurement and when an error or interrupt is detected (Ex. 1008, ¶¶[0113-0115]).

175. Lastly, *AHIT*, *Hooper*, and *Cho* share similar goals. *AHIT* describes keeping a user informed as to device status, including the benefit of enabling a user “to learn whether his/her operations are correct, and ***promptly*** correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39 (emphasis added)). *Hooper* describes drawbacks associated with conventional systems, whereby the system may not resume initialization in the absence of input from a user, and that an uninformed user “may not be aware that the device is waiting for a valid user command,” or “may believe that the device is malfunctioning and that a service call is required” (Ex. 1007, 2:43-64). *Hooper* discloses, as a solution, displaying a warning message in order to prevent the system from waiting indefinitely for a valid user command (Ex. 1007, 3:40-51). *Cho* discloses “provid[ing] an adaptive information display method for enhancing degree

of understanding of information and improving visibility for displayed information by more dynamically displaying user related information" (Ex. 1008, ¶[0006]). As was well known, allowing a system to wait indefinitely for a valid command wastes resources and, in a battery powered device, results in unnecessary battery usage. For example, as evidenced by *Lee* discussed above in section VI, it was well known to turn off or power down a device due to the lack of interaction. As a result, the person of ordinary skill in the art would have combined these references so as to provide the user of *AHIT* with a first duration of time to correct a fault, such as by displaying the instructions of *Cho* and resetting after a second duration. The person of ordinary skill in the art had a reasonable expectation of success in the combination based on the explicit teaching of the references and the knowledge of the person of ordinary skill in the art (*see, e.g., VI*).

176. A person of ordinary skill in the art would have been motivated to combine *Hooper's* prompt for an input command with *AHIT's* instruction to prompt the user by way of a user interface screen because providing such information to the user is advantageous to inform the user that the device is properly functioning, and to avoid a situation where the user does not provide requisite input within a reasonable amount of time. Such a prompt not only ensures that the test in *AHIT* proceeds in such a way that the test is completed but it also ensures that the system of *AHIT* is not interrupted indefinitely. For tests or operations that require a

particular action on the part of the user, such as interaction for a specific duration, *Hooper's* prompts advantageously avoid a situation where the user does not provide requisite input within a reasonable period of time. A person of ordinary skill in the art would have understood a prompt, such as the *Hooper* prompt, ensures that the test in *AHIT* proceeds in such a way that the test is completed by the user and, because the *Hooper* prompt will timeout, ensures that the system of *AHIT* is not interrupted indefinitely if the test fails.

177. A person of ordinary skill in the art would have been further motivated to combine *Hooper's* determination and notification that the device is waiting for a command via displaying a user message in accordance with *AHIT's* screen informing the user of whether his/her operations are correct in order to keep the user informed as to device status and prevent a situation where the desired testing process does not complete. For example, in *AHIT*, a user provides a trigger action to enable collecting ECG data (Ex. 1006, ¶¶39-40). *AHIT* explains that “support for diagnosis of heart diseases” is provided by way of the “simple, direct, and quick” trigger method, that includes enabling a user “to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶¶39-40). That is, *AHIT* looks to provide a simple, direct, and quick method that requires keeping a user informed as to the need for further input if necessary, so that the collected data can be used as

intended. Indeed, the person of ordinary skill in the art would want to assist the user in any way to complete the test given the importance of the test to the user's health and wellness. Similarly, in *Hooper*, the user has provided an interrupt signal (e.g., an affirmative action or the lack of an action) to interrupt initialization for system configuration, maintenance, diagnostic testing, or the like (Ex. 1007, 2:36-45). A conventional system, according to *Hooper*, may "wait indefinitely for user input" (Ex. 1007, 2:52-54). Such indefinite waiting impairs system operation and, as such, the person of ordinary skill in the art would avoid indefinite waiting and/or interruptions (Ex. 1007, 3:16-18). Accordingly, the person of ordinary skill in the art would have implemented the timeout of *Hooper*.

178. A person of ordinary skill in the art would have been motivated to combine *Cho*'s detection that the first criteria were not met with *AHIT*'s screen prompting the user to take corrective action in order to achieve *AHIT*'s stated goal of obtaining a desired amount of ECG data without wasting wearable device resources and without frustrating the user (Ex. 1006, ¶56). The person of ordinary skill in the art would take such an action because a user needs to engage an electrode for the full collection period and, thus, if there is an interruption with the collection, the person of ordinary skill in the art would have known to prompt the user to reengage the electrode for the full time and, thus, the full collection period. *AHIT* discloses such a duration as the wearable device may "display a progress of

collecting the ECG data via the screen” (Ex. 1006, ¶39) and “stop[] collecting ECG data when the collecting duration reaches the preset threshold” (Ex. 1006, ¶56). *AHIT* explains that, via the screen, the user is enabled “to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39). *AHIT* does not explicitly teach the mechanism that allows the user to learn of and otherwise correct his/her operations. *Cho* provides instructions on how the user should properly engage the electrodes.

179. A person of ordinary skill in the art would have looked to *Cho*, which expressly discloses “provid[ing] an adaptive information display method for enhancing degree of understanding of information and improving visibility for displayed information by more dynamically displaying user related information” (Ex. 1008, ¶[0006]). That is, *Cho* describes, if a finger of a user is not in normal contact with the biometric sensor, “the electronic device may display guide information for guiding the user to bring his or her body with the biometric sensor” (Ex. 1008, ¶[0114]). In other words, after a period of time or abnormal activity, *Cho* teaches changing a screen to provide additional information to the user indicating how to perform the test properly. The person of ordinary skill in the art would have understood the importance of providing a user instructions or guidance on how to correct problems with a task in progress because the person of ordinary skill in the

art would have understood that the user would not want their task to be unsuccessful and the provision of such guidance was well known in user interface design.

180. A person of ordinary skill in the art would have been motivated to combine the first period of time of *Hooper* with the system of *AHIT* to achieve *AHIT*'s stated goal of obtaining a desired amount of ECG data without wasting wearable device resources and without frustrating the user (Ex. 1006, ¶56). The person of ordinary skill in the art would have known that the use of the time periods would ensure a user could achieve a full data collection process if so desired, but also avoid the situation where the device is stalled indefinitely waiting for input. The person of ordinary skill in the art would have turned to *Hooper*, which also discloses the use of timeouts to ensure prompt action is taken by the user after an interruption. For example, *Hooper* discloses that the device “presents a user message after expiration of a first time period if the data processing device does not receive a valid input command during the first time period and a user message has not been previously presented” (Ex. 1007, 2:62-66). That is, *Hooper* discloses a “first time period” during which the device is waiting for a valid input command and the display of the user interface has not changed (Ex. 1007, 2:62-66). In view of the disclosures of at least both *AHIT* and *Hooper*, it would have been obvious to the person of ordinary skill in the art that once there is an interruption to the operation of *AHIT*'s ECG collection (e.g., a lack of input), the system will generally transition to an error

state and provide the user with time (and/or notification) to fix the error without completely resetting.

181. A person of ordinary skill in the art would have been motivated to combine the second period of time of *Hooper* with the system of *AHIT* to achieve *AHIT*'s stated goal of obtaining a desired amount of ECG data without wasting wearable device resources and without frustrating the user (Ex. 1006, ¶56). The person of ordinary skill in the art would have known that the use of the time periods would ensure a user could achieve a full data collection process if so desired, but also avoid the situation where the device is stalled indefinitely waiting for input. That is, a person of ordinary skill in the art would have been motivated to combine *Hooper*'s second period of time with *AHIT*'s screen for prompting the user to promptly correct his/her mistakes during incorrect operations, in order to achieve *AHIT*'s stated goal of obtaining a desired amount of ECG data without wasting wearable device resources. To supply such a teaching, a person of ordinary skill in the art would have turned to *Hooper*, which discloses that, upon a second expiration of either the keystroke or command timeouts, which were restarted after the user message was generated, the device “restarts” the program (Ex. 1007, 6:15-25; FIG. 2). That is, *Hooper* discloses that the system “resumes initialization of the hardware device after expiration of a second time period if the data processing device does not receive a keystroke within the second time period” (Ex. 1007, 2:22-3:3). At the

conclusion of the second expiration of timeouts, *Hooper* discloses resetting or continuing operations (Ex. 1007, 3:4-13) A person of ordinary skill in the art would have understood that resuming initialization or resetting the data processing device would replace the display.

182. A person of ordinary skill in the art would have been motivated to combine *Cho*'s visualization of the biometric information and a timer indicating an amount of time remaining with *AHIT*'s user interface to provide additional information indicating to the user how the test was progressing and because the use of a progress indicator in user interface design was well known at the time (see VI.C).

183. A person of ordinary skill in the art would have been motivated to combine *Hooper*'s user message with a warning regarding remaining time, for example a countdown timer, for entering a command with *AHIT*'s screen in order to keep a user informed as to the status of the device. A person of ordinary skill in the art would have understood that *Hooper*'s user message, which includes "a message warning the user that if the user does not enter a valid command, such as within a certain time period, that device will resume operation or reset" (Ex. 1007, 6:15-25), included a countdown timer because a warning that the valid command should be entered "within a certain time period" implies that there is a countdown in progress. A person of ordinary skill in the art would have understood that keeping the user

informed with respect to how much time is remaining to provide input would provide valuable information to the user and enable the user to provide the requisite input to achieve the full collection of data without wasting resources.

184. For at least the reasons outlined above in the section entitled *Motivation to Combine AHIT, Hooper, and Cho*, and those discussed further below, it is my opinion that a person of ordinary skill in the art would have been motivated to combine the teachings of *AHIT*, *Hooper*, and *Cho*.

Claim 20, Element [20.pre]: A non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, the one or more programs including instructions for:

185. To the extent that element [20.pre] is found to be limiting, *AHIT* discloses this claim element.

186. Specifically, *AHIT* discloses a non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, where the one or more programs cause the device to perform the elements of claim 20.

187. For example, *AHIT* generally relates to “a method, an apparatus, and a wearable device for collecting electrocardiogram data,” where “the wearable device comprises multiple ECG sensor electrodes” (Ex. 1006, Abstract).

188. The first electronic device, or wearable device of *AHIT*, comprises “a processor,” and “a memory for storing instructions executable by the processor” (Ex. 1006, ¶¶14-16). The “processor is configured to execute” a “method for collecting ECG data” (Ex. 1006, ¶¶14-16).

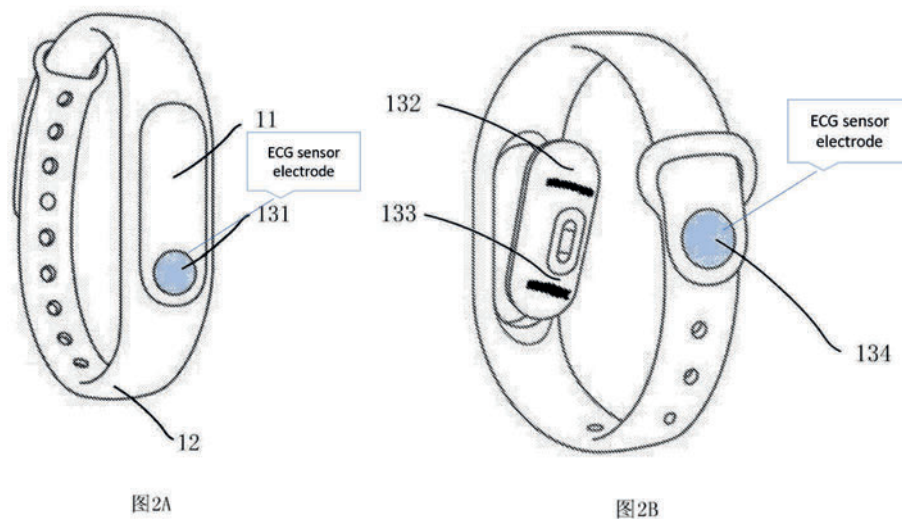
189. *AHIT* further discloses that the wearable device can comprise a display (Ex. 1006, ¶39). For example, *AHIT* discloses “the wearable device comprises a screen” that may “display a preset icon” or “display a progress of collecting the ECG data” (Ex. 1006, ¶39).

190. *AHIT* discloses one or more programs that are configured to be executed by the device. For example, *AHIT* discloses that “wearable ECG monitoring mostly starts ECG monitoring by mobile APPs” (Ex. 1006, ¶5). *AHIT* explains that a “user wears a wearable collecting ECG device, opens a mobile APP, connects the APP with the wearable ECG collecting device, clients the internal online collection mode of the APP, and starts the automatic collection of ECG data” (Ex. 1006, ¶5).

191. *AHIT* discloses, with reference to FIG. 2A and 2B (reproduced below), a wearable device having one or more input devices or biometric sensors in the form of ECG sensor electrodes (Ex. 1006, ¶34). For example, *AHIT* describes “the first ECG sensor electrode 131 may be multiplexed with a button, such as a touch capacitive button,” “[a] second ECG sensor electrode 132 and a third ECG sensor

electrode 133 are provided on the outer side of the front face of the body portion 11,” “a fourth ECG sensor electrode 134 is provided on the outer side of the wristband portion 12,” and “the fourth ECG sensor electrode 134 is connected with the body portion 11 via a wire (not shown) inside the wristband” (Ex. 1006, ¶34).

Ex. 1006, Figs. 2A, 2B (annotated)



192. As such, *AHIT* discloses claim element [20.pre].

Claim 20, Element [20.a]: displaying, on the display, a first user interface indicating that the first electronic device is ready to detect biometric information;

193. *AHIT* and *Hooper* render obvious claim element [20.a].

194. The person of ordinary skill in the art would have understood that one example of an indication that the first electronic device is ready to detect biometric information is a button that allows a user to activate a measurement. For example, the '533 patent discloses that a “user interface 806 displays a notification message

811” “indicating to the user that an action must be performed (by the user) on the device to proceed with an ECG recording” (Ex. 1001, 61:2-7).

195. Similarly, *AHIT* discloses displaying, on the display, a first user interface indicating that the first electronic device is ready to detect biometric information.

196. For example, *AHIT* discloses “identifying a received trigger action” and “collecting ECG data when the trigger is identified,” so that “a user can trigger the collection of ECG data when not feeling well” (Ex. 1006, ¶40). *AHIT* discloses that, “when a user feels symptoms such as palpitation, chest pain, or breathing difficulties, the user may tap the wristband to trigger the collection of ECG data” indicating that the interface of *AHIT* is ready to detect biometric information (Ex. 1006, ¶59).

197. *AHIT* further discloses that “when collecting ECG data, the wearable device may display a preset icon via the screen or control the wearable device to vibrate, so as to prompt the user that collecting the ECG data has been started” (Ex. 1006, ¶39). That is, *AHIT* highlights that, “[b]y means of the above prompt manner, a user is enabled to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39).

198. *AHIT* discloses, with reference to FIG. 7 (reproduced below), that when the “wearable device comprises a screen,” it further comprises “a display and control

module” (Ex. 1006, ¶81). The “display and control module” is “configured to” “display a preset icon via the screen” “so as to prompt the user that collecting the ECG data has been started” (Ex. 1006, ¶82).

Ex. 1006, FIG. 7 (annotated)

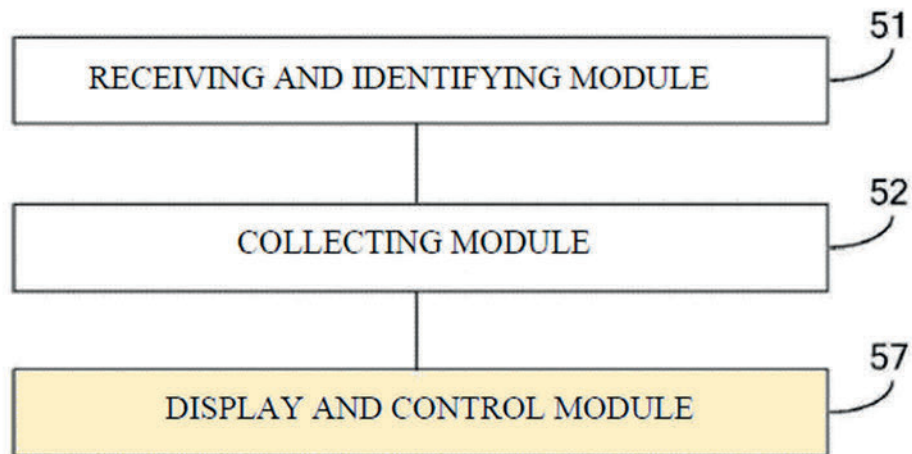


FIG. 7

199. In view of *AHIT*’s disclosure that a trigger action is identified for a user so that the user can trigger the collection of ECG data, and that prompting the user via the screen regarding the collection of the ECG data, a person of ordinary skill in the art would have understood that a screen of *AHIT*’s wearable device would have displayed a first user interface indicating that the wearable device was ready to detect biometric information. The person of ordinary skill in the art would have understood that the first user interface was displayed to inform the user prior to the collection of the ECG data that the device was ready to collect ECG data because the user would

need to be informed that the trigger action could be effectively received by the device.

200. To the extent it is argued that *AHIT*'s disclosure of prompting the user via the screen regarding the collection of ECG data is not a first user interface indicating that the first electronic device is ready to detect biometric information, such a modification would have been obvious to the person of ordinary skill in the art at least in view of *Hooper*. *Hooper* also discloses displaying, on the display, a first user interface indicating that the first electronic device is ready to detect information, or a prompt for the user to perform an action to proceed. For example, *Hooper* discloses a "data processing device" that "prompts for an input command" (Ex. 1007, 2:25-37). *Hooper* further discloses that a "command line or a graphical user interface (GUI)" may be displayed via the external console, where the "command line or graphical user interface (GUI)" "invites a user to enter a command" (Ex. 1007, 5:11-17).

201. A person of ordinary skill in the art would have understood *Hooper*'s prompt for an input command to be a "first user interface" because, similar to the '533 patent, *Hooper* explicitly refers to a "graphical user interface (GUI)" as providing the prompt. A person of ordinary skill in the art would have understood *Hooper*'s prompt for an input command to be an indication that the electronic device is ready to detect information because *Hooper* explains that it may be desirable to

interrupt the initialization process to allow system configuration, maintenance, diagnostics test, or the like (Ex. 1007, 1:36-45). *Hooper* explains that the initialization process may be interrupted and stopped upon receipt of an interrupt signal, but that the user may not be aware that the device is waiting for a valid user command and may, instead, believe that the device is malfunctioning (Ex. 1007, 1:60-63). *Hooper* explains that “if no such valid user command is provided, the initialization process will not resume and the associated device will not complete the initialization process” (Ex. 1007, 1:55-59). Accordingly, a person of ordinary skill in the art would have understood that *Hooper* was providing a prompt for an input command as a signal to the user that the device is ready to receive input.

202. A person of ordinary skill in the art would have been motivated to modify *AHIT* with a first user interface comprising a prompt for a command as in *Hooper* because providing such information to the user is advantageous to inform the user that the device is properly functioning, and to avoid a situation where the user does not provide requisite input because the user is not aware that the device is ready for the input. The reasons why a person of ordinary skill in the art would have implemented the first user interface comprising a prompt for a command in the *AHIT* system are further outlined in the motivation to combine section.

203. Thus, *AHIT* and *Hooper* render obvious claim element [20.a].

Claim 20, Element [20.b]: detecting a first input with the biometric sensor that satisfies first criteria;

204. *AHIT* renders obvious claim element [20.b].

205. The '533 patent broadly describes a “first input.” For example, the '533 patent explains that an input may be “a touch or contact on the input device that is below a threshold amount such that the input does not ‘click’ the input device” (Ex. 1001, 61:8-11). The '533 patent also includes an example of a “user input” that “is a continuous touch or contact on the input device” (Ex. 1001, 61:32-33). In Apple’s Infringement Contentions, Apple does not explicitly indicate what the “first input” is but instead appears to equate contact between a user’s skin and the electrodes with the first input (Ex. 1023, p. 15). That is, it appears that Apple is equating contact with a first input.

206. The '533 patent also broadly describes “first criteria.” For example, the '533 patent explains that “the first input with the biometric sensor” “satisfies the first criteria when a contact (e.g., from a finger of a user) is detected on the biometric sensor” (Ex. 1001, 67:16-20). The '533 patent also provides examples of when “first criteria are met” to include “the device has captured less than a predetermined amount of biometric information” and/or “the first input device has been activated within at least a threshold amount of time, such as 5 seconds” (Ex. 1001, 76:9-13).

207. In Apple’s Infringement Contentions, Apple indicates that “examples of ‘first criteria’ include the KardiaMobile Card being powered on, a stable

connection between a user's skin and the electrodes, a wireless connection between the KardiaMobile Card and the Kardia App, and the lack of electrical interference" (Ex. 1023, p. 15). Apple further states that, "when the user's skin makes sufficient contact with the 'biometric sensor' in the KardiaMobile Card, the 'first criteria' of a stable connection between a user's skin and the electrodes is met" (Ex. 1023, p. 15).

208. *AHIT* discloses detecting a first input with a biometric sensor that satisfies first criteria. For example, *AHIT* discloses "receiving a trigger action performed by a user for the wearable device," "identifying the trigger action," and "if the trigger action is identified to be a preset operation," collecting "ECG data on at least one closed-loop path formed by interconnecting the multiple ECG sensor electrodes" (Ex. 1006, Abstract).

209. *AHIT* discloses detecting a first input that includes contact between a user's skin and a sensor. For example, *AHIT* discloses that the "wearable device may comprise a button," and the "button may multiplex one of the multiple ECG sensor electrodes" (Ex. 1006, ¶32). *AHIT* explains that the "multiplexed ECG sensor electrodes may be located at a position that *can be easily touched* by the user wearing the wearable device" (Ex. 1006, ¶32, emphasis added). *AHIT* further discloses a "trigger action" to be "performed by the user on the button," where the trigger action comprises a click of the button (Ex. 1006, Cls. 3-4).

210. *AHIT* discloses that the first input satisfies first criteria, which includes the formation of “at least one closed-loop path formed by interconnecting the multiple ECG sensor electrodes” based on the electrodes being multiplexed as a result of the button being touched by the user (Ex. 1006, ¶¶36-39). *AHIT* discloses “collecting ECG data when the trigger action is identified to be a preset operation” (Ex. 1006, ¶17). *AHIT* also discloses that, “if the receiving and identifying module identifies the trigger action to be a preset operation, ECG data on at least one closed-loop path formed by interconnecting the multiple ECG sensor electrodes” is collected by “a collecting module” (Ex. 1006, ¶13).

211. *AHIT* discloses detecting states of ECG sensor electrodes to determine whether any one of the ECG sensor electrodes is in a detached state (Ex. 1006, Cl. 6). *AHIT* discloses that, when an ECG sensor is in a detached state, the current ECG data is invalid and collecting of the is stopped (Ex. 1006, ¶¶ 47, 53). *AHIT* also discloses that, “if a user’s finger leaves the ECG sensor electrode during the process of collecting ECG data, no closed-loop path will be formed between the ECG sensor electrodes,” “collection of the ECG data is stopped” (Ex. 1006, ¶62).

212. The person of ordinary skill in the art would have understood that *AHIT*’s disclosure of a closed-loop path formed by inter-connecting the multiple ECG electrodes is a result of the user’s finger being in contact with the ECG sensor electrodes because collecting of data is stopped when an ECG sensor electrode is in

a detached state (e.g., the user's finger is not detected by the sensor). Accordingly, because *AHIT* detects when a user's finger is in contact with the ECG sensor electrodes, *AHIT* discloses detecting the first input with a biometric sensor.

213. A person of ordinary skill in the art would have further understood that the formation of a closed-loop path formed by interconnecting the multiple ECG sensor electrodes is in fact the result of stable contact between a user's skin and the electrodes. A person of ordinary skill in the art would also have understood that the performance of the trigger action, where the user contacts the button, leads to a stable contact between a user's skin and the electrodes because *AHIT* discloses recording biometric information detected by the biometric sensor in response to detecting the first input with the biometric sensor. Accordingly, *AHIT* discloses the "first criteria" according to Apple's own interpretation.

214. Thus, *AHIT* renders obvious claim element [20.b].

Claim 20, Element [20.c.1]: in response to detecting the first input with the biometric sensor: starting to record biometric information detected by the biometric sensor;

215. *AHIT* renders obvious claim element [20.c.1].

216. *AHIT* discloses detecting the first input with a biometric sensor (*see* [20.b]).

217. *AHIT* discloses starting to record biometric information detected by the biometric sensor, and that recording is started in response to detecting the first input

with the biometric sensor. *AHIT* discloses that, “if the receiving and identifying module identifies the trigger action to be a preset operation, ECG data on at least one closed-loop path formed by interconnecting the multiple ECG sensor electrodes” is collected by “a collecting module” (Ex. 1006, ¶13).

218. *AHIT* further discloses that, “if a user’s finger leaves the ECG sensor electrode during the process of collecting ECG data, no closed-loop path will be formed between the ECG sensor electrodes” and “collection of ECG data is stopped” (Ex. 1006, ¶62). A person of ordinary skill in the art would have understood from *AHIT*’s disclosure of collecting ECG data upon identification of the trigger action, which leads to the closed-loop path formed by interconnecting the multiple ECG sensor electrodes, and stopping the collection of ECG data if a user’s finger leaves the ECG sensor electrode, that recording of the ECG data was responsive to detection of input by the ECG sensor electrodes. The person of ordinary skill in the art would have had such an understanding because *AHIT* requires that the user’s finger be in contact with the ECG sensor electrode in order to collect the ECG data.

219. Thus, *AHIT* renders obvious claim element [20.c.1].

Claim 20, Element [20.c.2]: displaying, on the display, a second user interface that is different from the first user interface, wherein the second user interface includes an indication of progress in recording the biometric information;

220. *AHIT* renders obvious claim element [20.c.2].

221. *AHIT* discloses displaying, on the display, a second user interface that includes an indication of progress in recording the biometric information. *AHIT* discloses that “when collecting ECG data, the wearable device may display a preset icon via the screen or control the wearable device to vibrate, so as to prompt the user that collecting the ECG data has been started” (Ex. 1006, ¶39). *AHIT* further discloses that, alternatively, the wearable device may “display a progress of collecting the ECG data via the screen” (Ex. 1006, ¶39). *AHIT* discloses that when the “wearable device comprises a screen,” it further comprises “a display and control module” (Ex. 1006, ¶81). The “display and control module” is “configured to” “display a preset icon via the screen” “so as to prompt the user that collecting the ECG data has been started; and/or display a progress of collecting the ECG data via the screen” (Ex. 1006, ¶82). That is, *AHIT* discloses displaying an indication of progress so as to keep the user informed of the status of the test and to signal what is needed for a valid ECG test.

222. *AHIT*’s disclosure of “display[ing] a preset icon via the screen” as an alternative to “display[ing] a progress of collecting the ECG data via the screen” would have informed a person of ordinary skill in the art that the display of a preset icon via the screen is a different interface (e.g., a first user interface) from the display of progress of collecting the ECG data via the screen (e.g., a second user interface). That is, the person of ordinary skill in the art would have understood that the *AHIT*

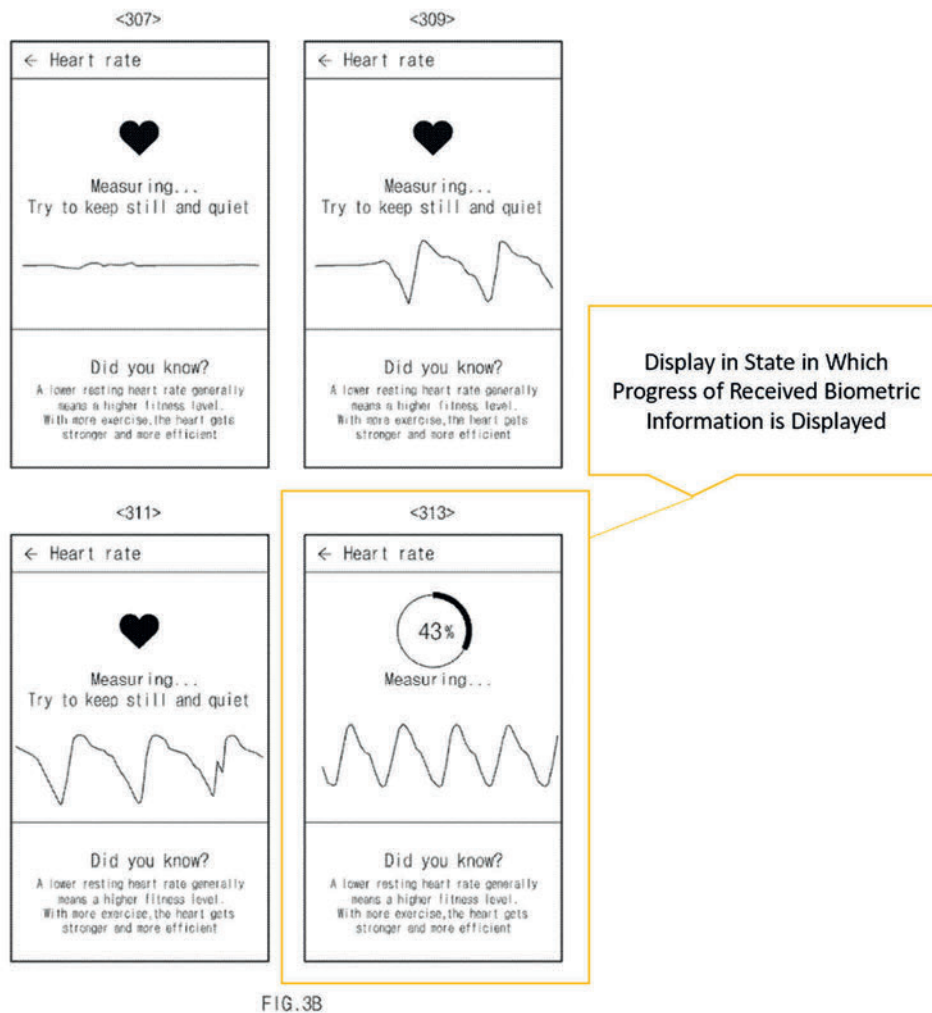
user interface would transition from a preset icon (e.g., a first user interface) to a display of progress (e.g., a second user interface) once recording began.

223. To the extent it is argued that *AHIT* does not explicitly disclose a second user interface, modifying *AHIT* to include a second user interface would have been obvious to a person of ordinary skill in the art. First, *AHIT* explicitly discloses that the user is prompted visually as well as via vibration of the wearable device once recording has begun (Ex. 1006, ¶39). The ability to prompt a user via multiple mechanisms is important in interface design because it maximizes user responsiveness to device requests. Moreover, a person of ordinary skill in the art would have understood the importance of providing feedback to the user so that the user is informed as to whether and when his or her operations are correct so that mistakes can be promptly corrected (Ex. 1006, ¶39). Indeed, *AHIT* specifically discloses the use of an indication of progress and the person of ordinary skill in the art would have understood that the time to provide the indication of progress is when a test is in process and not before. As is discussed above in section VI.C, displaying an indication of progress is a well-known mechanism to provide user feedback that the recording is in process and further indicating the time to completion.

224. Moreover, *Cho* demonstrates the knowledge of the person of ordinary skill in the art because *Cho* discloses a state 313, where the electronic device displays

(yellow below) “a progress rate of processing received biometric signal information”
(Ex. 1008, ¶[0125], FIG. 3B).

Ex. 1008 FIG. 3B (annotated)



225. Thus, *AHIT* renders obvious claim element [20.c.2].

Claim 20, Element [20.d]: after recording at least a portion of the biometric information, detecting, via the one or more input devices, that the first criteria are no longer met;

226. *AHIT* and *Cho* render obvious claim element [20.d].

227. As described above with regard to claim element [20.c.1], *AHIT*

discloses recording the biometric information.

228. *AHIT* further discloses detecting that the first criteria are no longer met, via the one or more input devices. For example, *AHIT* discloses that “states of ECG sensor electrodes” are detected and, “if the state of any one of the ECG sensor electrodes is in a detached state,” then the “current ECG data” is determined to be “invalid ECG data” (Ex. 1006, ¶47). *AHIT* also discloses that, “if the user’s finger leaves the ECG sensor electrode during the process of collecting ECG data, no closed-loop path will be formed between the ECG sensor electrodes” (Ex. 1006, ¶62).

229. *AHIT* further discloses that “if the user’s finger leaves the ECG sensor electrode during the process of collecting ECG data, no closed-loop path will be formed between the ECG sensor electrodes,” and “[a]t this moment, the collection of ECG data is stopped” (Ex. 1006, ¶62). *AHIT* explains that, via the screen, the user is enabled “to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39). In view of this disclosure by *AHIT*, a person of ordinary skill in the art would have understood or found it obvious that the user interface of *AHIT* would be changed to indicate the error associated with the first criteria not being met.

230. The person of ordinary skill in the art would have understood that the device of *AHIT* detected that the criteria were not met, and that a user interface would

change or otherwise update if criteria is no longer met. Similar to *AHIT*, *Cho* also discloses detecting that criteria are not met, via one or more input devices. For example, *Cho* discloses an electronic device that can “determine whether a corresponding condition is a normal measurement condition” (Ex. 1008, ¶[0114]). *Cho*’s electronic device determines that “it is impossible to be measured because a human body (e.g., a finger) of a user is not in normal contact with the biometric sensor” (Ex. 1008, ¶[0114]). The person of ordinary skill in the art would have looked to *Cho* for additional details regarding the detection of the first criteria not being met.

231. *Cho* describes, with reference to FIG. 3A (reproduced below), a “state 301” that is “associated with an initial screen of a biometric information display function,” where a “heartbeat application” is activated “by a user input” (e.g., a touch) or a “certain condition (e.g., a condition in which a finger is in contact with a PPG sensor)” (Ex. 1008, ¶[0113]). *Cho* describes, in state 305, if a finger of a user is not in normal contact with the biometric sensor, “the electronic device may display guide information for guiding the user to bring his or her body with the biometric sensor” (Ex. 1008, ¶[0114]). In other words, after a period of time or abnormal activity, *Cho* teaches changing a screen to provide additional information to the user indicating how to perform the test properly.

Ex. 1008, FIG. 3A (annotated)

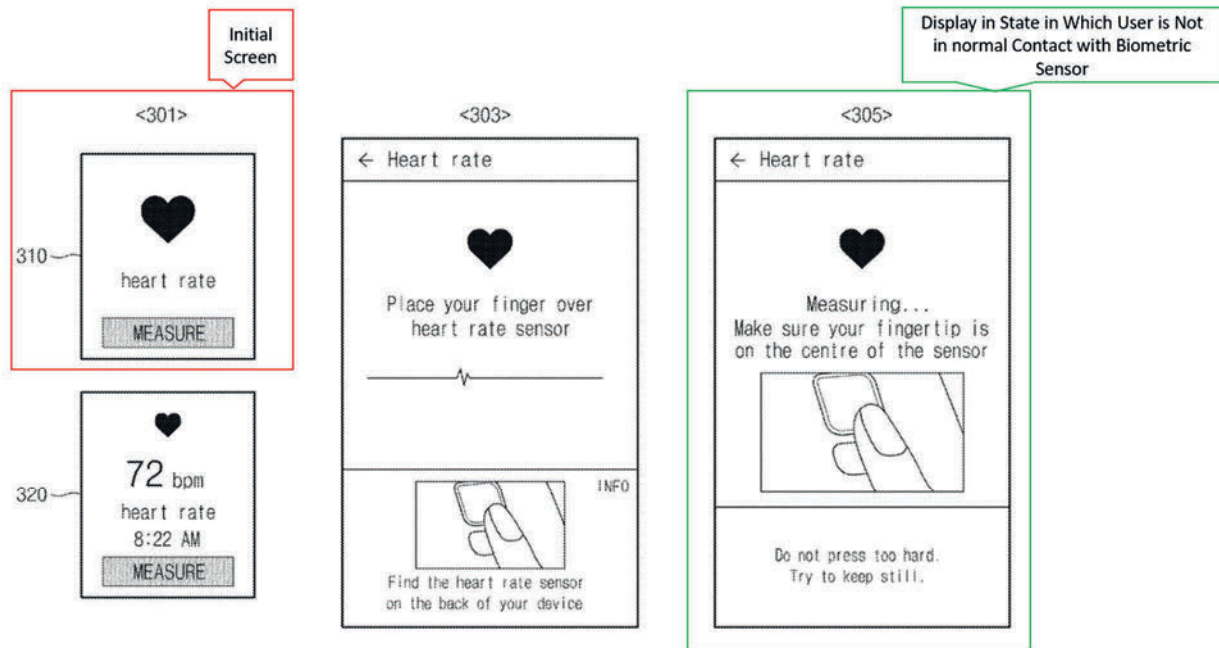


FIG. 3A

232. *Cho* further demonstrates, with reference to FIG. 3B (reproduced below), in a state 313, the display of “a progress rate of processing received biometric signal information” (Ex. 1008, ¶[0125]).

Ex. 1008, FIG. 3B (annotated)

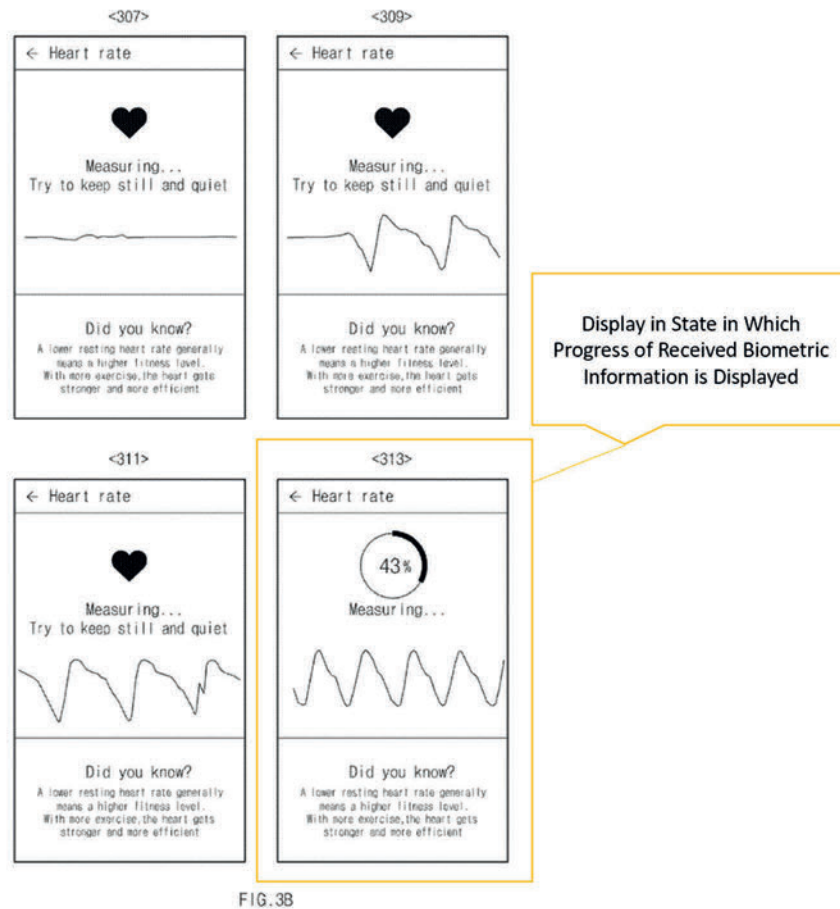


FIG. 3B

233. A person of ordinary skill in the art would have been motivated to combine *Cho's* detection that the first criteria were not met with *AHIT's* screen prompting the user to take corrective action in order to achieve *AHIT's* stated goal of obtaining a desired amount of ECG data without wasting wearable device resources and without frustrating the user. The person of ordinary skill in the art would take such an action because a user needs to engage an electrode for the full collection period and, thus, if there is an interruption with the collection, the person

of ordinary skill in the art would have known to prompt the user to reengage the electrode for the full time and, thus, the full collection period. *Cho* would further have provided the person of ordinary skill in the art with the details necessary to implement a user interface within *AHIT* whereby, after a period of time or abnormal activity, a screen changes to provide additional information to the user indicating how to perform the test properly. The reasons why a person of ordinary skill in the art would have implemented the *Cho*'s detection that the first criteria were not met with the *AHIT* system are further outlined in the motivation to combine section.

234. Thus, *AHIT* and *Cho* render obvious claim element [20.d].

Claim 20, Element [20.e]: in response to detecting that the first criteria are no longer met for a first period of time, resetting the indication of progress in recording the biometric information and maintaining display of the second user interface;

235. *AHIT* and *Hooper* render obvious claim element [20.e].

236. The '533 patent broadly describes "first period of time." For example, the '533 patent provides an example of the "first period of time" to be "5 seconds" (Ex. 1001, 67:58-59). The '533 patent explains that "[r]esetting the indication of progress" "while maintaining display of the second user interface" "in response to detecting that the first criteria are no longer met for a first period of time provides the user with more control of the device" (Ex. 1001, 67:63-68:4).

237. In Apple's Infringement Contentions, Apple indicates that "if the AliveCor Products detect a loss of connection within ten seconds, they determine that 'the first criteria are no longer met.'" (Ex. 1023, p. 27).

238. *AHIT* discloses detecting that the first criteria are no longer met for a first period of time and resetting the indication of progress in recording the biometric information and maintaining display of the second user interface.

239. *AHIT* discloses resetting an indication of progress of collected the ECG data. For example, *AHIT* discloses the wearable device may "display a progress of collecting the ECG data via the screen" (Ex. 1006, ¶39). *AHIT* discloses "counting a collecting duration," "continuing to collect ECG data when the collecting duration does not reach [a] preset threshold," and "stopping collecting ECG data when the collecting duration reaches the preset threshold" (Ex. 1006, ¶56). *AHIT* explains that the use of the preset threshold achieves "the objective of obtaining a desired amount of ECG data without wasting wearable device resources" (Ex. 1006, ¶56).

240. *AHIT* further discloses that "if the user's finger leaves the ECG sensor electrode during the process of collecting ECG data, no closed-loop path will be formed between the ECG sensor electrodes," and "[a]t this moment, the collection of ECG data is stopped" (Ex. 1006, ¶62). *AHIT* explains that, via the screen, the user is enabled "to learn whether his/her operations are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode"

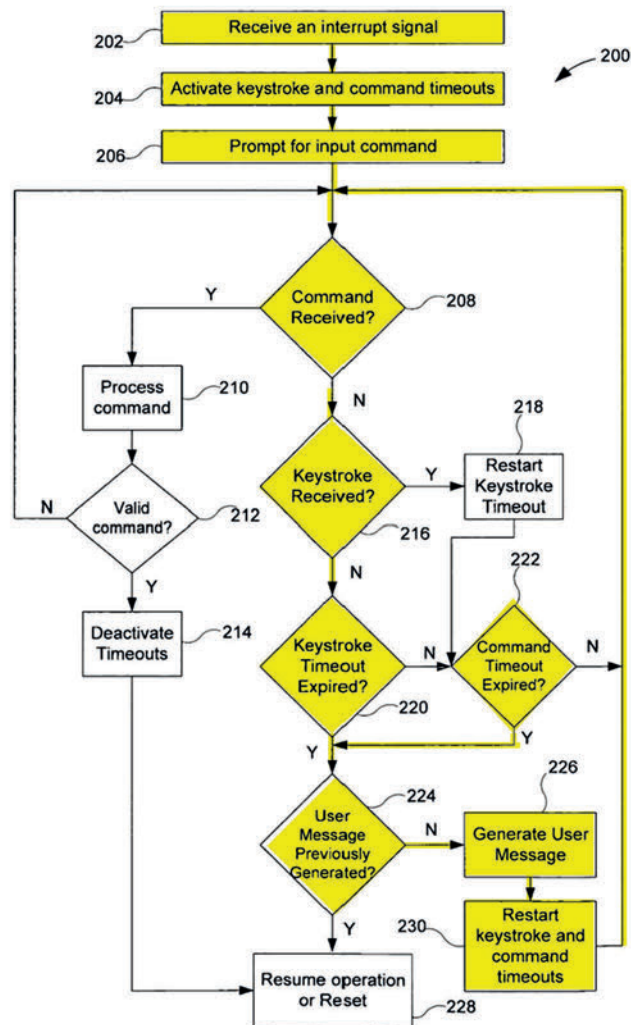
(Ex. 1006, ¶39). A person of ordinary skill in the art would have understood that the indication of progress would have been reset given that *AHIT* explicitly teaches detecting an incorrect operation and prompting a user to make a correction. Such a correction would include reengaging the electrode for the full time and, thus, the full collection period.

241. A person of ordinary skill in the art would have understood that *AHIT*'s disclosure of enabling a user to “*promptly* correct his/her mistakes during incorrect operations” is a teaching of a first period of time because the person of ordinary skill in the art would have understood that “prompt correction” of a mistake would provide for correcting the mistake – re-touching the electrode - within such a period of time that the operation can continue without resetting the entire device. Indeed, prompt correction ensures that the user is in fact interested in continuing the test, whereas a non-responsive user indicates that the user is no longer interested in performing the test.

242. To the extent that is argued that the *AHIT* does not teach or suggest a first period of time, the person of ordinary skill in the art would have known that interfaces are designed to include timeouts, especially when an input from a user is requested. In this way, *Hooper* also discloses a first period of time, during which criteria may be detected. For example, *Hooper* discloses that the device “presents a user message after expiration of a first time period if the data processing device does

not receive a valid input command during the first time period and a user message has not been previously presented.” (Ex. 1007, 2:62-66). That is, depicted in FIG. 2 (annotated in yellow), *Hooper* discloses a “first time period” during which the device is waiting for a valid input command and the display of the user interface has not changed. The reasons why a person of ordinary skill in the art would have implemented the first time period of *Hooper* in the *AHIT* system are further outlined in the motivation to combine section.

Ex. 1007, Fig. 2 (annotated)



243. In view of the disclosures of at least both *AHIT* and *Hooper*, it would have been obvious to the person of ordinary skill in the art that once there is an error (e.g., a lack of input), in user interface design, the system will generally transition to an error state and provide the user with time (and/or notification) to fix the error without completely resetting.

244. Thus, *AHIT* and *Hooper* render obvious claim element [20.e].

Claim 20, Element [20.f]: in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time, replacing display of the second user interface with the first user interface.

245. *AHIT* and *Hooper* render obvious claim element [20.f].

246. The '533 patent broadly describes “second period of time.” For example, the '533 patent provides an example of the “second period of time” to be “longer than the first period of time (e.g., longer than 5 seconds)” (Ex. 1001, 68:14-16). The '533 patent explains that “[r]eplacing display of the second user interface” “with the first user interface” “in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time improves visual feedback by visually indicating to the user that the recording has been stopped and that the new recording can be re-initiated by the user” (Ex. 1001, 68:19-26).

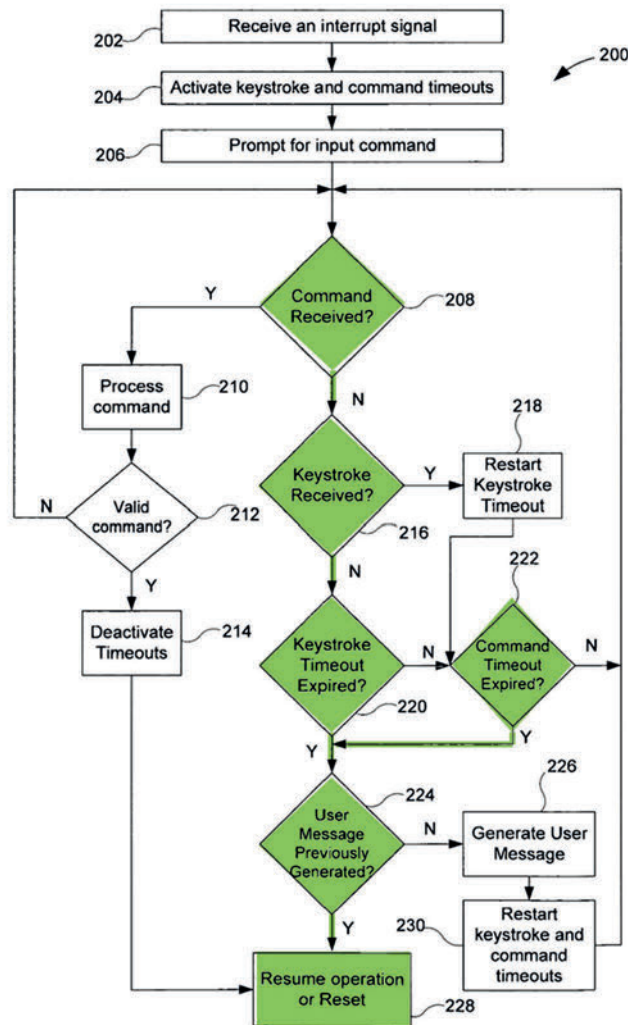
247. In Apple’s Infringement Contentions, Apple indicates that “the KardiaMobile Card automatically shuts off after ten seconds if no contact from the user’s skin is sensed by the KardiaMobile Card.” (Ex. 1023, p. 31). That is, it appears Apple is equating the “second period of time” to be any duration of time that extends beyond the completion of the “first period of time”.

248. *AHIT* discloses an “objective of obtaining a desired amount of ECG data without wasting wearable device resources” (Ex. 1006, ¶56). *AHIT* also discloses, via the screen, that the user is enabled “to learn whether his/her operations

are correct, and promptly correct his/her mistakes during incorrect operations, for example, re-touching the electrode” (Ex. 1006, ¶39). *AHIT* does not explicitly teach replacing a display in response to detecting that the first criteria are no longer met for a second period of time. Such a change in the display would have been obvious to a person of ordinary skill in the art in view of *AHIT*’s explicit goal of saving wearable device resources.

249. A person of ordinary skill in the art would have turned to *Hooper*, which explicitly discloses a second period of time, during which criteria may be detected. For example, *Hooper* discloses that, upon a second expiration of either the keystroke or command timeouts, which were restarted after the user message was generated, the device “restarts” the program (Ex. 1007, 6:15-25; FIG. 2). That is, *Hooper* discloses that the system “resumes initialization of the hardware device after expiration of a second time period if the data processing device does not receive a keystroke within the second time period” (Ex. 1007, 2:22-3:3). A person of ordinary skill in the art would have understood that resuming initialization or resetting the data processing device would replace the display.

Ex. 1007, Fig. 2 (annotated)



250. In view of *AHIT*'s disclosure of saving wearable device resources and the well-known desire to save on battery power by operating in (and optimizing transitions between) multiple modes, including a low-power mode, it would have been obvious to a person of ordinary skill in the art to revert to the first user interface after the first input was no longer detected for a second period of time. The reasons why a person of ordinary skill in the art would have implemented the second time

period of *Hooper* in the *AHIT* system are further outlined in the motivation to combine section.

251. Thus, *AHIT* and *Hooper* render obvious claim element [20.f].

Claim 21, Element [21]: The non-transitory computer-readable storage medium of claim 20, wherein the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor.

252. *AHIT*, *Hooper*, and *Cho* render obvious claim element [21] (both [21.pre] and [21.a]).

253. As set forth above, *AHIT*, *Hooper*, and *Cho* render obvious all of the elements of claim 20. Thus, *AHIT*, *Hooper*, and *Cho* render obvious [21.pre].

254. *AHIT* renders obvious [21.a]. *AHIT* discloses that the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor. For example, *AHIT* discloses “a method, an apparatus, and a wearable device for collecting electrocardiogram data,” where “the wearable device comprises multiple ECG sensor electrodes” (Ex. 1006, Abstract). The wearable device comprises “a processor,” and “a memory for storing instructions executable by the processor” (Ex. 1006, ¶¶14-16). The “processor is configured to execute” a “method for collecting ECG data” (Ex. 1006, ¶¶14-16).

255. Thus, *AHIT*, *Hooper*, and *Cho* render obvious claim element [21] (both [21.pre] and [21.a]).

Claim 24, Element [24]: The non-transitory computer-readable storage medium of claim 20, wherein the biometric sensor is a contact-based sensor, and wherein the first input with the biometric sensor satisfies the first criteria when a contact is detected on the biometric sensor.

256. *AHIT*, *Hooper*, and *Cho* render obvious claim element [24] (both [24.pre] and [24.a]).

257. As set forth above, *AHIT*, *Hooper*, and *Cho* render obvious all of the elements of claim 20. Thus, *AHIT*, *Hooper*, and *Cho* render obvious [24.pre].

258. *AHIT* renders obvious [24.a]. For example, *AHIT* discloses that the “wearable device may comprise a button,” and the “button may multiplex one of the multiple ECG sensor electrodes” (Ex. 1006, ¶32). *AHIT* explains that the “multiplexed ECG sensor electrodes may be located at a position that can ***be easily touched*** by the user wearing the wearable device” (Ex. 1006, ¶32, emphasis added). The “trigger action performed by a user” may be received “on the button,” where the trigger action “may be identified via [a] MEMS sensor.” (Ex. 1006, ¶¶36-37).

259. Thus, *AHIT*, *Hooper*, and *Cho* render obvious claim element [24] (both [24.pre] and [24.a]).

Claim 29, Element [29]: The non-transitory computer-readable storage medium of claim 20, wherein the second user interface includes a graphical representation that corresponds to a visualization of the biometric information from the recorded biometric information and a timer indicating an amount of time remaining to complete the recording of the biometric information.

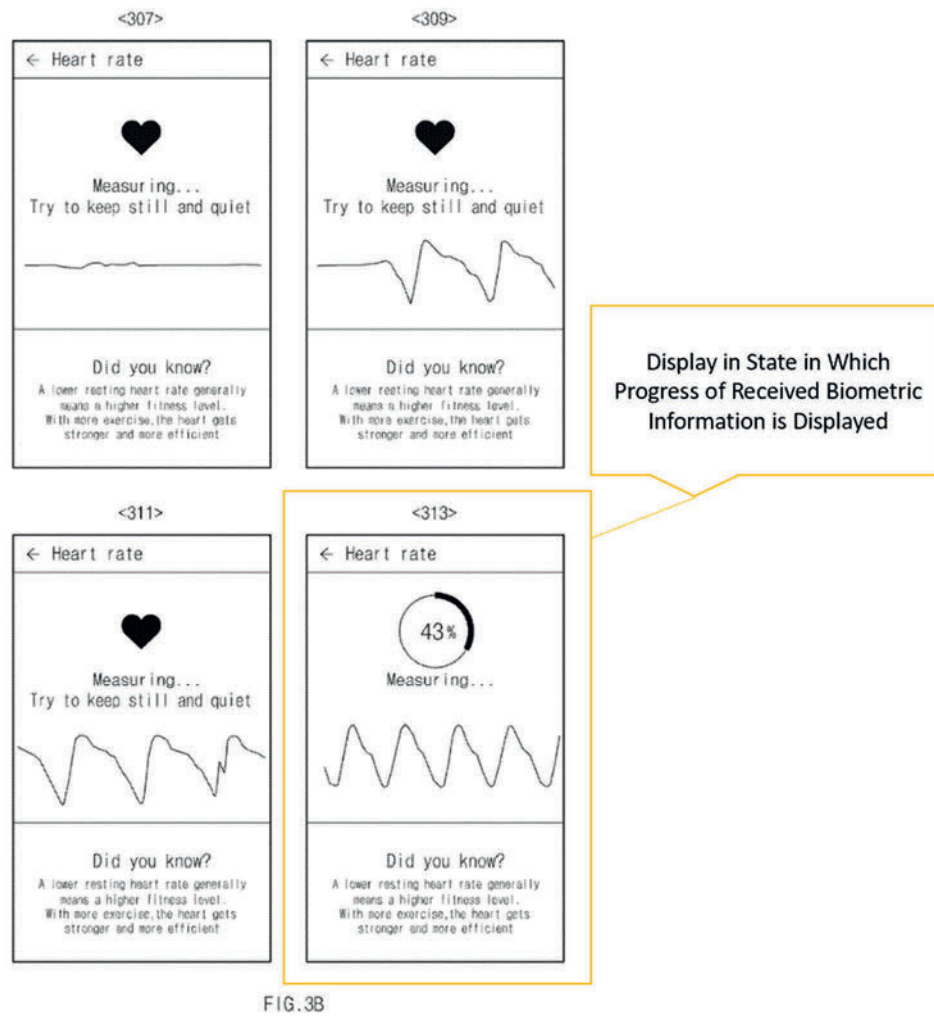
260. *AHIT*, *Hooper*, and *Cho* render obvious claim element [29] (both [29.pre] and [29.a]).

261. As set forth above, *AHIT*, *Hooper*, and *Cho* render obvious all of the elements of claim 20. Thus, *AHIT*, *Hooper*, and *Cho* render obvious [29.pre].

262. *AHIT* and *Cho* render obvious [29.a]. *AHIT* discloses a second user interface that includes an indication of progress in recording the biometric information (see Claim 20.c.2). To the extent it is argued that *AHIT* does not explicitly disclose a graphical representation that corresponds to a visualization of the biometric information from the recorded biometric information, such a modification would have been obvious to the person of ordinary skill in the art at least in view of *Cho*, which explicitly discloses such a feature.

263. *Cho* discloses a state 313, where the electronic device displays “a progress rate of processing received biometric signal information” (Ex. 1008, ¶[0125], FIG. 3B).

Ex. 1008 Fig. 3B (annotated)



264. *Cho* would further have provided the person of ordinary skill in the art with the details necessary to implement the visual representation in *AHIT*'s second user interface to provide additional information to the user indicating how the test was progressing.

265. The use of a progress indicator in user interface design was well known at the time (*see*, VI). As evidenced at least by the disclosures of *AHIT*, *Hooper*, and

Cho, it would have been known and/or obvious to a person of ordinary skill in the art that an indication of progress would have been used to keep a user informed as to the status of a device. Further, a countdown timer was known to be a useful type of progress indicator to provide a user with information related to how much time remains for a particular task or action.

266. Thus, *AHIT*, *Hooper*, and *Cho* render obvious claim element [29] (both [29.pre] and [29.a]).

Claim 37, Element [37]: The non-transitory computer-readable storage medium of claim 20, wherein the indication of progress is a countdown timer.

267. *AHIT*, *Hooper*, and *Cho* render obvious claim element [37] (both [37.pre] and [37.a]).

268. As set forth above, *AHIT*, *Hooper*, and *Cho* render obvious all of the elements of claim 20. Thus, *AHIT*, *Hooper*, and *Cho* render obvious [37.pre].

269. *AHIT* and *Hooper* render obvious [37.a]. *AHIT* discloses that when the “wearable device comprises a screen,” it further comprises “a display and control module” (Ex.1006, ¶81). The “display and control module” is “configured to” “display a preset icon via the screen” “so as to prompt the user that collecting the ECG data has been started; and/or display a progress of collecting the ECG data via the screen” (Ex. 1006, ¶82).

270. *Hooper* discloses that the device may generate a user message for viewing by a user, where the “user message may comprise a message warning the user that if the user does not enter a valid command, such as within a certain time period, that device will resume operation or reset” (Ex. 1007, 6:15-25).

271. The use of a progress indicator in user interface design was well known at the time of the earliest priority date of the ’533 patent (*see, e.g.*, Section VI). As evidenced at least by the disclosures of *AHIT* and *Hooper*, it would have been known and/or obvious to a person of ordinary skill in the art that an indication of progress would have been used to keep a user informed as to the status of a device. A countdown timer was known to be useful to provide a user with information related to how much time remains for a particular task or action (*see* VI).

272. Thus, *AHIT*, *Hooper*, and *Cho* render obvious claim element [37] (both [37.pre] and [37.a]).

B. Ground 2: *AHIT*, *Hooper*, *Cho*, and *Mayor* Render Obvious Claim 22 of the ’533 patent.

273. *AHIT*, *Hooper*, *Cho*, and *Mayor* render obvious claim 22 of the ’533 patent.

Motivation to Combine AHIT, Hooper, Cho, and Mayor

274. In addition to the reasons described above with respect to *Motivation to Combine AHIT, Hooper, and Cho*, a person of ordinary skill in the art would have been motivated to combine *Mayor* with the combination of *AHIT*, *Hooper*, and *Cho*

because the person of ordinary skill in the art would have understood that the devices of *AHIT*, *Hooper*, and *Cho* could have several applications installed thereon and the person of ordinary skill in the art would have sought out mechanisms for convenient access via a user interface to any of the applications of the device (*see e.g.*, Section VI). *Mayor* provides such express disclosure, including enabling a user to “select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut” (Ex. 1012, ¶[0003]). *Mayor* explicitly provides for a “graphical user interface 100 for invoking applications on a mobile device,” where “GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶[0021]). *Mayor* explicitly teaches that there are shortcomings with having to “navigate through menus and make multiple inputs to view a desired application user interface” and “requiring a user to make multiple menu selections to access a desired user interface can waste time and cause frustration for the user” (Ex. 1012, ¶[0002]). As a solution, *Mayor* discloses advantageously creating icons so as to be able to more quickly access the application (Ex. 1012, ¶[0029]).

275. A person of ordinary skill in the art would have had a reasonable expectation of success in combining the graphical objects for invoking respective applications with *AHIT*, *Hooper*, and *Cho* given the ubiquitous nature of applications

(see, e.g., VI.B) as well as the explicit teachings of *AHIT*, *Hooper*, *Cho*, and *Mayor* of the use of applications on their respective devices (see, e.g., Ground 1).

276. For at least the reasons outlined above in the section entitled *Motivation to Combine AHIT, Hooper, Cho, and Mayor*, and those discussed further below, it is my opinion that a person of ordinary skill in the art would have been motivated to combine the teachings of *AHIT*, *Hooper*, *Cho*, and *Mayor*.

Claim 22, Element [22.pre]: The non-transitory computer-readable storage medium of claim 20, wherein the one or more programs further include instructions for:

277. *AHIT*, *Hooper*, and *Cho* render obvious claim element [22.pre].

278. As set forth above, *AHIT*, *Hooper*, and *Cho* render obvious all of the elements of claim 20.

279. Thus, *AHIT*, *Hooper*, and *Cho* render obvious claim element [22.pre].

Claim 22, Element [22.a]: prior to displaying the first user interface, displaying a homescreen that includes an application affordance corresponding to a health monitoring application;

280. *AHIT* and *Mayor* render obvious claim element [22.a].

281. *AHIT* discloses that “wearable ECG monitoring mostly starts ECG monitoring by mobile APPs” (Ex. 1006, ¶5). *AHIT* explains that a “user wears a wearable collecting ECG device, opens a mobile APP, connects the APP with the wearable ECG collecting device, clicks the internal online collection mode of the APP, and starts the automatic collection of ECG data” (Ex. 1006, ¶5).

282. *AHIT*'s disclosure of “open[ing] a mobile APP” would have been understood by a person of ordinary skill in the art to include an application invokable via an application affordance.

283. To the extent it is argued that *AHIT* does not explicitly disclose or suggest element [22.a], a person of ordinary skill in the art would have been very familiar, at least as evidenced by *Mayor*, with displaying a homescreen that includes an application affordance corresponding to a health monitoring application.

284. *Mayor* discloses enabling a user to “select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut” (Ex. 1012, ¶ [0003]). *Mayor* explains that advantages provided for by the implementations disclosed include creation of an “application user interface shortcut for directly invoking or accessing an application user interface” (Ex. 1012, ¶ [0004]).

285. With reference to FIG. 1 (reproduced below), *Mayor* describes a “graphical user interface 100 for invoking applications on a mobile device,” where “GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶ [0021]).

Ex. 1012, FIG. 1 (annotated)

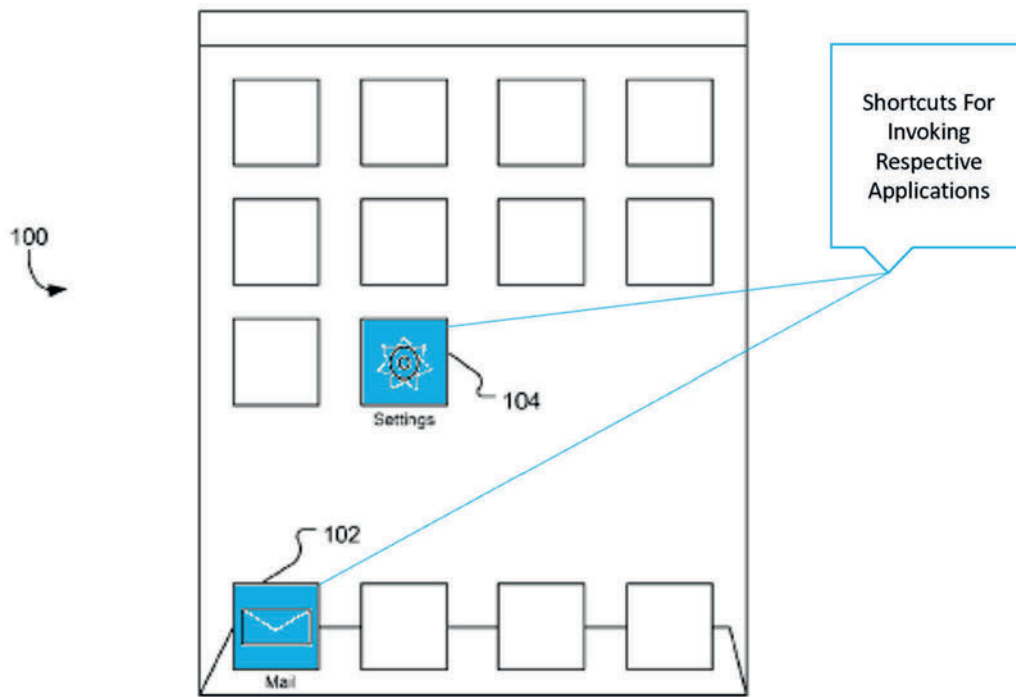


FIG. 1

286. *Mayor* discloses that “graphical objects 102 and 104 can be icons or images that, when selected by a user, cause invocation of a corresponding application that is installed on the mobile device” (Ex. 1012, ¶ [0021]). For example, “[g]raphical object 102” “can be selected to invoke an email application on the mobile device,” and “[g]raphical object 104 can be selected to invoke a settings application or function of the mobile device” (Ex. 1012, ¶ [0021]).

287. With reference to FIG. 9 (reproduced below), *Mayor* depicts an example graphical user interface “for invoking applications and GUI shortcuts on a

mobile device,” where the “graphical user interface 900” includes “GUI shortcut 902 and/or GUI shortcut 904” (Ex. 1012, ¶ [0036]). *Mayor* explains that “GUI shortcut 902 can be selected to invoke” a “‘Friends’ email folder” (Ex. 1012, ¶ [0036]). When “GUI shortcut 902 is invoked (e.g., selected by a user),” an application identifier associated therewith “can be used by the mobile device to invoke the application” (Ex. 1012, ¶ [0037]).

Ex. 1012, FIG. 9 (annotated)

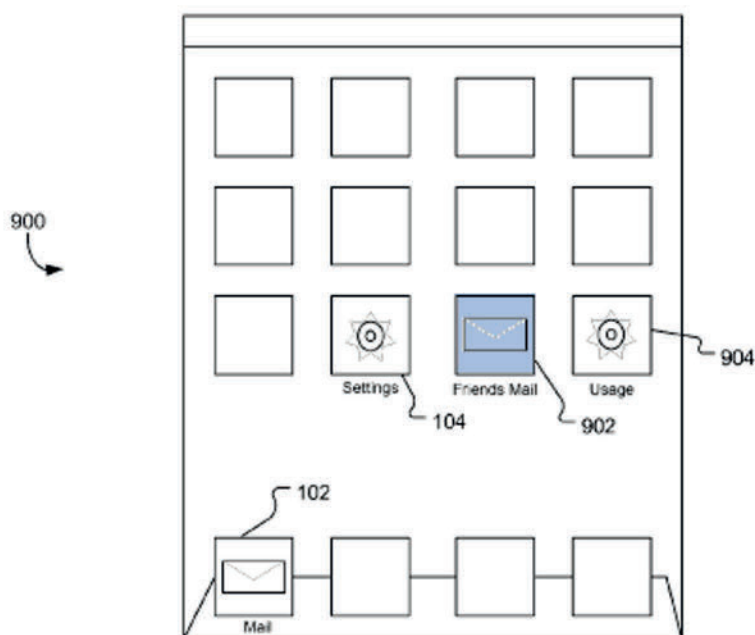


FIG. 9

288. With reference to FIG. 10B (reproduced below), *Mayor* discloses an example process “for invoking an application using a graphical user interface shortcut” (Ex. 1012, ¶ [0046]).

Ex. 1012, FIG. 10B (annotated)

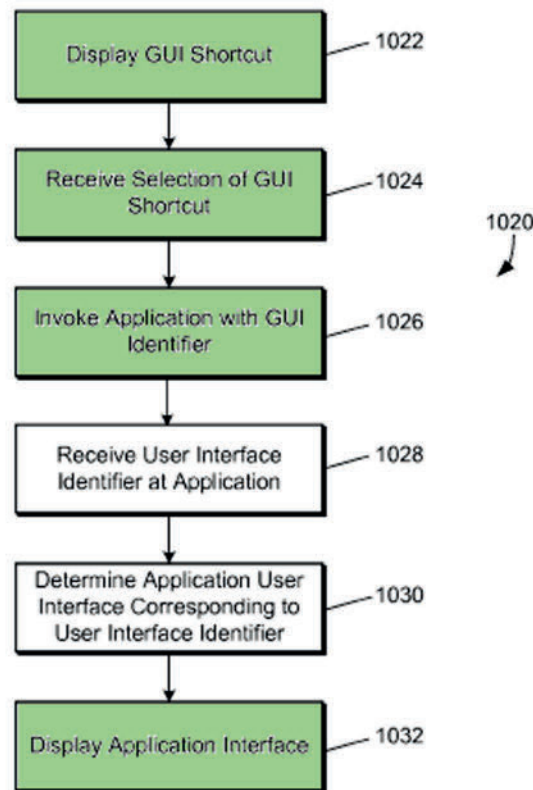


FIG. 10B

289. Thus, *AHIT* and *Mayor* render obvious claim element [22.a].

Claim 22, Element [22.b]: detecting, via the one or more input devices, a user activation of the application affordance; and in response to detecting the user activation of the application affordance, displaying, on the display, the first user interface.

290. *AHIT* and *Mayor* render obvious claim element [22.b].

291. *AHIT* discloses that “wearable ECG monitoring mostly starts ECG monitoring by mobile APPs” (Ex. 1006, ¶5). *AHIT* explains that a “user wears a

wearable collecting ECG device, opens a mobile APP, connects the APP with the wearable ECG collecting device, clicks the internal online collection mode of the APP, and starts the automatic collection of ECG data” (Ex. 1006, ¶5).

292. *AHIT*’s disclosure of “open[ing] a mobile APP” would have been understood by a person of ordinary skill in the art to include an activation of an application affordance.

293. To the extent it is argued that *AHIT* does not explicitly disclose or suggest element [22.b], a person of ordinary skill in the art would have been very familiar, at least as evidenced by *Mayor*, with “detecting, via the one or more input devices, a user activation of the application affordance,” and “in response to detecting the user activation of the application affordance, displaying, on the display, the first user interface.”

294. *Mayor* discloses enabling a user to “select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut” (Ex. 1012, ¶ [0003]). *Mayor* explains that advantages provided for by the implementations disclosed include creation of an “application user interface shortcut for directly invoking or accessing an application user interface” (Ex. 1012, ¶ [0004]).

295. With reference to FIG. 1 (reproduced below), *Mayor* describes a “graphical user interface 100 for invoking applications on a mobile device,” where

“GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶ [0021]).

Ex. 1012, FIG. 1 (annotated)

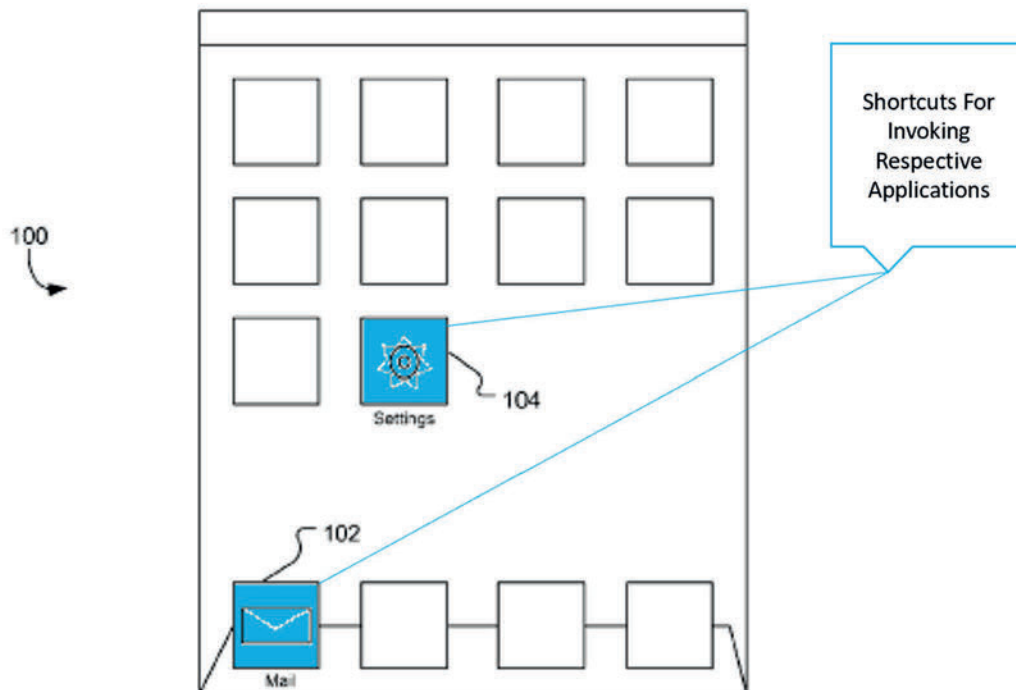
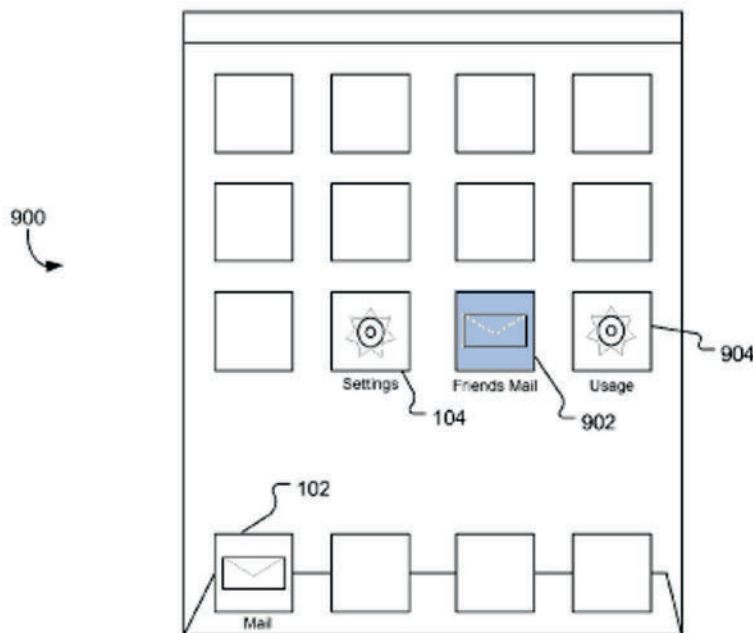


FIG. 1

296. *Mayor* discloses that “graphical objects 102 and 104 can be icons or images that, when selected by a user, cause invocation of a corresponding application that is installed on the mobile device” (Ex. 1012, ¶ [0021]). For example, “[g]raphical object 102” “can be selected to invoke an email application on the mobile device,” and “[g]raphical object 104 can be selected to invoke a settings application or function of the mobile device” (Ex. 1012, ¶ [0021]).

297. With reference to FIG. 9 (reproduced below), *Mayor* depicts an example graphical user interface “for invoking applications and GUI shortcuts on a mobile device,” where the “graphical user interface 900” includes “GUI shortcut 902 and/or GUI shortcut 904” (Ex. 1012, ¶ [0036]). *Mayor* explains that “GUI shortcut 902 can be selected to invoke” a “‘Friends’ email folder” (Ex. 1012, ¶ [0036]). When “GUI shortcut 902 is invoked (e.g., selected by a user),” an application identifier associated therewith “can be used by the mobile device to invoke the application” (Ex. 1012, ¶ [0037]).

Ex. 1012, FIG. 9 (annotated)



298. With reference to FIG. 10B (reproduced below), *Mayor* discloses an example process “for invoking an application using a graphical user interface shortcut” (Ex. 1012, ¶ [0046]).

Ex. 1012, FIG. 10B

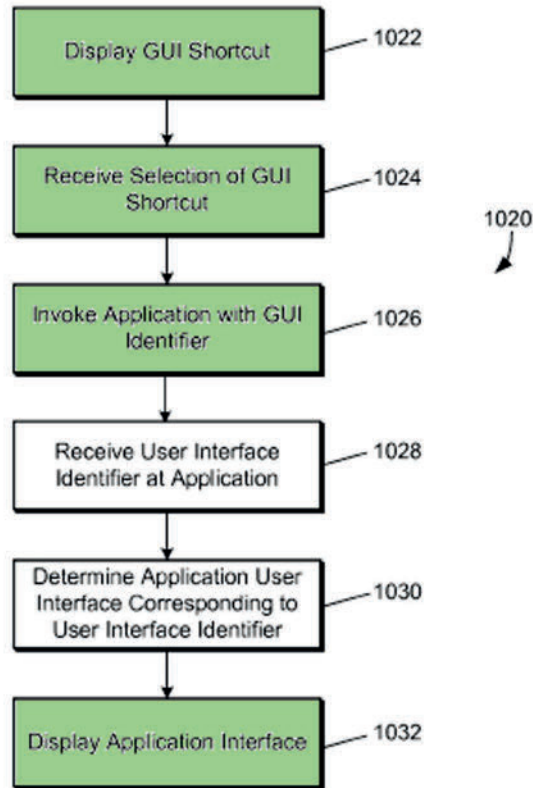


FIG. 10B

299. Thus, *AHIT* and *Mayor* render obvious claim element [22.b].

C. Ground 3: *Petterson, Albert, and Nakada* Render Obvious Claims 20-21, 24, 29, and 37 of the '533 patent.

300. *Petterson, Albert, and Nakada* render obvious claims 20-21, 24, 29, and 37 of the '533 patent.

Motivation to Combine Petterson, Albert, and Nakada

301. There are numerous reasons why a person of ordinary skill in the art would have been specifically motivated to combine *Petterson, Albert, and Nakada*.

302. First, *Petterson, Albert, and Nakada* are generally all directed to the field of monitoring health related metrics with sensors and devices. *Petterson* relates generally to “applications, devices, systems, and methods” “for monitoring, recording, and tracking cardiac health related metrics using an associated computing device” (Ex. 1009, Abstract). *Petterson* describes “software applications [that] may monitor record, and track physiological data such as cardiac electrical activity, heart rate, and blood pressure” (Ex. 1009, Abstract). *Albert* generally relates to “ECG sensing devices for use with mobile telecommunications devices,” “so that the mobile telecommunication device may receive biological signals measured directly from a patient” (Ex. 1010, ¶[0006]). *Albert* discloses “[a]pparatuses and methods for sensing an electrocardiogram (ECG) of a subject using an ECG module that may removably connect to a mobile telecommunications device” and “wirelessly communicate with the mobile telecommunications device” (Ex. 1010, Abstract). *Albert* describes “ECG sensing devices for use with mobile telecommunications

devices such as smartphones, tablet computers, smart watches, wearable computing devices, and the like so that the mobile telecommunications device may receive biological signals measured directly from a patient” (Ex. 1010, ¶ [0006]). *Nakada* generally relates to “an apparatus capable of carrying out an accurate bioelectrical impedance measurement” (Ex. 1011, Abstract). *Nakada* discloses a “body fat meter compris[ing] measuring means 1 a storage section 2, a microcomputer 3, and a display section 4” (Ex. 1011, 6:18-20). The “measurement means 1” includes “electrodes A10” and “electrodes B11” (Ex. 1011, 6:21-28). These references, like the ’533 patent, are directed to user interface design and processing to reduce wasted time and wasted energy (Ex. 1001, 1:36-52 (“some existing techniques use a complex and time-consuming user interface, which may include multiple key presses or keystrokes;” “[e]xisting techniques require more time than necessary, wasting user time and device energy.”) *see also* 11:41-42 (“There is a need for electronic devices that provide efficient methods and interfaces for managing health monitoring.”)).

303. Second, *Petterson* discloses the importance of providing a user with a test duration and celebrating a user when they complete the test. For example, *Petterson* expressly discloses an interest in providing a patient with the ability to perform a test for a set period of time, as prescribed by a healthcare provider, and to provide the user with a congratulatory message upon completion of the test (Ex.

1009, 12:38-13:13). In order to ensure the user completes the test and the ability to send the congratulatory message, a person of ordinary skill in the art would have looked to the various displays of *Nakada* to ensure the user was informed as to successful progress of the test.

304. Lastly, *Petterson*, *Albert*, and *Nakada* share similar goals. *Petterson* seeks to provide “effective healthcare to a patient while increasing the efficiency of the healthcare provider” by “monitoring of the physical parameters and therapeutic objectives of the patient” and “provide a communication link between a patient and a healthcare provider” (Ex. 1009, 4:10-23). *Albert* also seeks to provide apparatuses for use with mobile telecommunications devices for use of data “by the subject as well as healthcare professionals to guide preventative and therapeutic treatment decision making” (Ex. 1010, ¶¶[0004-0005]). *Nakada* also seeks to ensure the measurements obtained from a living body are accurate (Ex. 1011, 3:29-37), which in turn leads to better monitoring of physical parameters and informed treatment decisions. Altogether, the person of ordinary skill in the art would have understood that each of the references are focused on efficient testing so as to ensure that users take the tests so that they can take care of themselves. Given the overlap of the disclosures of *Petterson*, *Albert*, and *Nakada*, as well as the discussions of the references herein, the person of ordinary skill in the art would have had a reasonable expectation of success in implementing the combination (see, e.g., VI).

305. A person of ordinary skill in the art would have been motivated to combine the explicit disclosure in *Albert* of detection of the first input by the biometric sensor with the *Petterson* ECG sensing device because the person of ordinary skill in the art would have known that contact with the biometric sensor was required for a successful ECG testing session. *Albert* provides the implementation details necessary for the person of ordinary skill in the art to implement detection of the first input. For example, *Albert* discloses “an ECG electrode module” including “two or more electrodes, or connectors for two or more electrodes, configured to be contacted by or to a patient/subject to sense an ECG signal from the patient/subject” (Ex. 1010, ¶[0098]).

306. A person of ordinary skill in the art would have been motivated to modify *Petterson* with disclosure related to recording of biometric information in *Albert* to enable a user to compare recordings over time as well as sharing with health care professionals. *Petterson* specifically seeks to “monitor” “physical parameters and therapeutic objectives of the patient” and “provide a communication link between a patient and a healthcare provider” (Ex. 1009, 4:10-23). *Albert* also seeks to provide apparatuses for use with mobile telecommunications devices for use of data “by the subject as well as healthcare professionals to guide preventative and therapeutic treatment decision making” (Ex. 1010, ¶¶[0004-0005]). The person of ordinary skill in the art would have understood that the ability to compare biometric

information over time is essential to health monitoring and diagnosis, and *Albert* would have further confirmed details with respect to recording biometric information to the person of ordinary skill in the art.

307. A person of ordinary skill in the art would have been motivated to combine *Nakada*'s maintaining of a second user interface and resetting an indication of progress with *Pettersen*'s user interface in order to achieve a stated goal of *Pettersen*'s – to provide a patient with the ability to perform a test for a set period of time, as prescribed by a healthcare provider, and to provide the user with a congratulatory message upon completion of the test (Ex. 1009, 12:38-13:13). In order to ensure the user completes the test and the ability to send the congratulatory message, in *Pettersen*, a person of ordinary skill in the art would have looked to ensure the user was informed as to successful progress of the test. The person of ordinary skill in the art would have known that the use of the time periods would ensure a user could achieve a full data collection process if so desired, and that waiting indefinitely to send a congratulatory message to a user may not lead to a user taking better care of themselves. Moreover, without a time period, such as the 30 seconds disclosed in *Nakada*, the *Pettersen* device would remain in testing mode indefinitely, leading to a drain in resources, such as processing power. As explained in section VI, a person of ordinary skill in the art would have understood the importance of a standby or inactive state to save battery.

308. A person of ordinary skill in the art would have been motivated to combine *Nakada*'s reset after the timeout, and display of an error message, with *Petterson*'s user interface in order to keep a user informed of progress of a recording and/or maintain battery life of the device. That is, *Nakada* discloses a second condition, where, if "the contact condition is not normal" and "30 seconds have already elapsed," the device "determines that an accurate measurement could not be made" and "displays an error on the display section" (Ex. 1011, 9:45-57). The person of ordinary skill in the art would have understood that *Petterson* could have been modified to include the change of the display as in *Nakada*, as a result of the error condition, so as to maintain battery life of the device as well as keep the user informed as to device and/or recording status.

309. For at least the reasons outlined above in the section entitled *Motivation to Combine Petterson, Albert, and Nakada*, and those discussed further below, it is my opinion that a person of ordinary skill in the art would have been motivated to combine the teachings of *Petterson*, *Albert*, and *Nakada*.

Claim 20, Element [20.pre]: A non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, the one or more programs including instructions for:

310. To the extent that element [20.pre] is found to be limiting, *Petterson* and *Albert* disclose this claim element.

311. Specifically, *Petterson* discloses a non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, where the one or more programs cause the device to perform the elements of claim 20.

312. *Petterson* relates generally to “applications, devices, systems, and methods” “for monitoring, recording, and tracking cardiac health related metrics using an associated computing device” (Ex. 1009, Abstract). *Petterson* describes “software applications [that] may monitor record, and track physiological data such as cardiac electrical activity, heart rate, and blood pressure” (Ex. 1009, Abstract).

313. *Petterson* explains that the “use of smartphones, tablet computers, wearable computers, and ‘smart’ accessories is becoming increasing prevalent,” and that the “increased prevalence of computing power and devices offers many opportunities for improved ways of monitoring health and placing health management more in the control of the patient” (Ex. 1009, 1:12-21). *Petterson* further explains that “[h]eart rate measurement, blood pressure measurement, and electrocardiography are widely used techniques for diagnosing the cardiovascular health of a patient” (Ex. 1009, 1:22-27).

314. *Petterson* describes “a platform” having a “patient application” with “a software module for receiving sensed data from a sensor configured to sense a

physiologic parameter of a patient” (Ex. 1009, 1:38-41). The “platform comprises the sensor” and “the sensor is configured to operably couple with a mobile computing device” (Ex. 1009, 1:67-2:2). The sensor may be “integrated with the mobile computing device,” and may comprise “two ECG electrodes” (Ex. 1009, 2:2-5).

315. *Petterson* explains that “one or more sensors (or ‘sensing devices’) are configured to monitor one or more physiologic parameters of an individual” (Ex. 1009, 6:6-16). The “sensing device, located with a patient, is configured to communicate with one or more remote computing devices” (Ex. 1009, 6:9-16). The “sensing device” may be, in some embodiments, “integrated with a patient computing device,” where “one or more ECG electrodes [are] integrated into a housing and/or processor of a computing device such as a smartphone or smartwatch” (Ex. 1009, 6:17-23).

316. *Petterson* describes a “patient application” “configured to receive, organize, and/or track patient data including sensed physiologic parameters,” including “a sensed ECG of a patient” (Ex. 1009, 6:64-7:3). In *Petterson*, the “patient application comprises one or more interfaces (e.g., a graphical interface, an audio interface, a video interface)” that “enable the patient to: for example, obtain physiological information from a sensing device or from other health-based software

applications (e.g. Apple Health), store sensed data from a sensing device” (Ex. 1009, 7:55-61).

317. *Albert* also discloses a non-transitory computer-readable storage medium storing one or more programs configured to be executed by one or more processors of a first electronic device with a display and one or more input devices including a biometric sensor, where the one or more programs cause the device to perform the elements of claim 20.

318. For example, *Albert* generally relates to “ECG sensing devices for use with mobile telecommunications devices,” “so that the mobile telecommunication device may receive biological signals measured directly from a patient” (Ex. 1010, ¶[0006]).

319. *Albert* discloses “[a]pparatuses and methods for sensing an electrocardiogram (ECG) of a subject using an ECG module that may removably connect to a mobile telecommunications device” and “wirelessly communicate with the mobile telecommunications device” (Ex. 1010, Abstract). *Albert* describes “ECG sensing devices for use with mobile telecommunications devices such as smartphones, tablet computers, smart watches, wearable computing devices, and the like so that the mobile telecommunications device may receive biological signals measured directly from a patient” (Ex. 1010, ¶ [0006]).

320. *Albert* explains that “[e]lectrocardiogram (ECG) monitoring is often highly useful in maintaining optimal cardiac function in both healthy and non-healthy subjects,” and that “[s]uch monitoring can generate data that can be used by the subject as well as healthcare professionals to guide preventative and therapeutic treatment decision making” (Ex. 1010, ¶ [0004]).

321. *Albert* describes “connecting a universal ECG electrode module to a mobile telecommunications device using a base unit,” and “using the universal ECG electrode module to detect and transmit ECG data” (Ex. 1010, ¶ [0089]). The “mobile telecommunications device may include any appropriate wireless telecommunications device” (Ex. 1010, ¶ [0091]). The “ECG electrode module” may include “two or more electrodes, or connectors for two or more electrodes, configured to be contacted by or to a patient/subject to sense an ECG signal from the patient/subject” (Ex. 1010, ¶ [0098]).

322. *Albert* describes an ECG sensing system 2000 in which a “mobile device 2001 has a display 2004,” and the display “displays an ECG wave” (Ex. 1010, ¶ [0142]). An “ECG module 2003 can removably attach to a base unit 2002” (Ex. 1010, ¶ [0142]).

323. As such, *Petterson* and *Albert* render obvious claim element [20.pre].

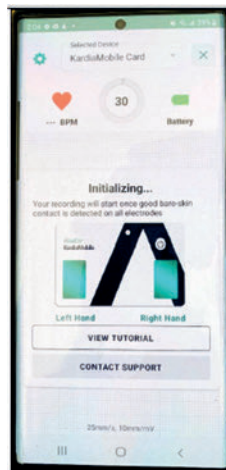
Claim 20, Element [20.a]: displaying, on the display, a first user interface indicating that the first electronic device is ready to detect biometric information;

324. *Petterson* renders obvious claim element [20.a].

325. The person of skill in the art would have understood that that an indication that the first electronic device is ready to detect biometric information is a button or other selectable element that allows a user to activate a measurement. For example, the '533 patent discloses that a “user interface 806 displays a notification message 811” “indicating to the user that an action must be performed (by the user) on the device to proceed with an ECG recording” (Ex. 1001, 61:2-7).

326. In *Apple’s Infringement Contentions*, Apple cites to a screenshot (reproduced below) as providing an alleged “display” of “a first user interface indicating that the first electronic device is ready to detect biometric information” (Ex. 1023, p. 14).

Ex. 1023 p. 14



327. *Petterson* discloses displaying, on a display, a first user interface indicating that the first electronic device is ready to detect biometric information.

328. For example, *Petterson* describes a “patient application” “configured to receive, organize, and/or track patient data including sensed physiologic parameters,” including “a sensed ECG of a patient” (Ex. 1009, 6:64-7:3). The “patient application comprises one or more interfaces (e.g., a graphical interface, an audio interface, a video interface)” that “enable the patient to: for example, obtain physiological information from a sensing device or from other health-based software applications (e.g. Apple Health), store sensed data from a sensing device” (Ex. 1009, 7:55-61).

329. FIG. 2A of *Petterson* (reproduced below) shows an “initial home screen interface encountered by a patient when he or she has not yet signed into a patient application that is operating on a computing device” (Ex. 1009, 8:20-23). Once logged in, FIG. 2B (reproduced below) shows “a patient interface component” “that provides the patient with the ability to select to record an ECG” using “an ECG sensing device” “configured to interact with the software application” (Ex. 1009, 9:7-15). *Petterson* discloses that the “patient engages with” interface 204” “in order to carry out a task such as sense” “one or more physiologic parameters” (Ex. 1009, 9:15-27). *Petterson* states that the “patient application may instruct the patient to place a cardiac health monitoring device in contact with his or her skin” to “take a

baseline ECG measurement” (Ex. 1009, 12:44-46). That is, *Petterson* explains that, when “engaged by the patient, the interface 204 causes the sensing of a physiologic parameter of a patient” (Ex. 1009, 9:22-27).

Ex. 1009, Fig. 2A (annotated)



FIG. 2A

330. FIG. 2B includes a “record now” button or interface element 204, which the person of ordinary skill in the art would understand to be an indication that the device is ready to detect biometric information because the person of ordinary skill in the art would have known that the interface element 204 would not have been made available to the user or patient if the device were not ready to detect the biometric information (Ex. 1009, 9:7-27).

Ex. 1009, Fig. 2B (annotated)

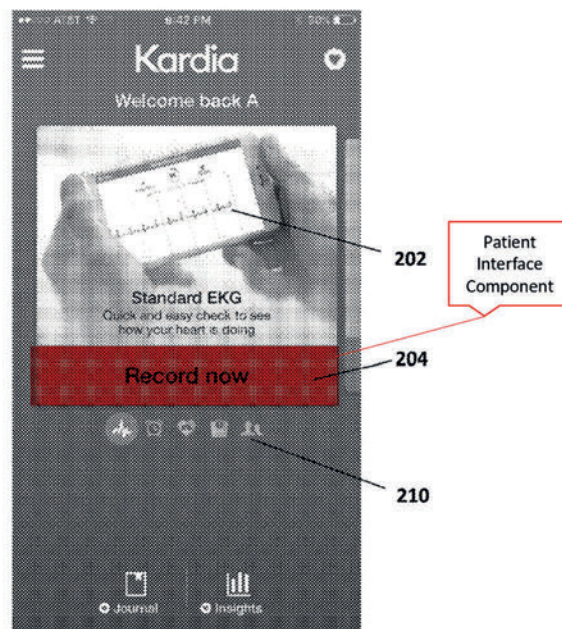


FIG. 2B

331. Next, *Petterson* in FIG. 3, shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41). The person of ordinary skill in the art would have understood that upon selection of “Record now,” *Petterson* transitions to FIG. 3, which shows the connection signal, an indication of progress, a countdown timer, and an ECG indicator, all of which suggest that that the *Petterson* device was ready to detect biometric information and is, in fact, recording biometric information.

Ex. 1009, Fig. 3 (annotated)

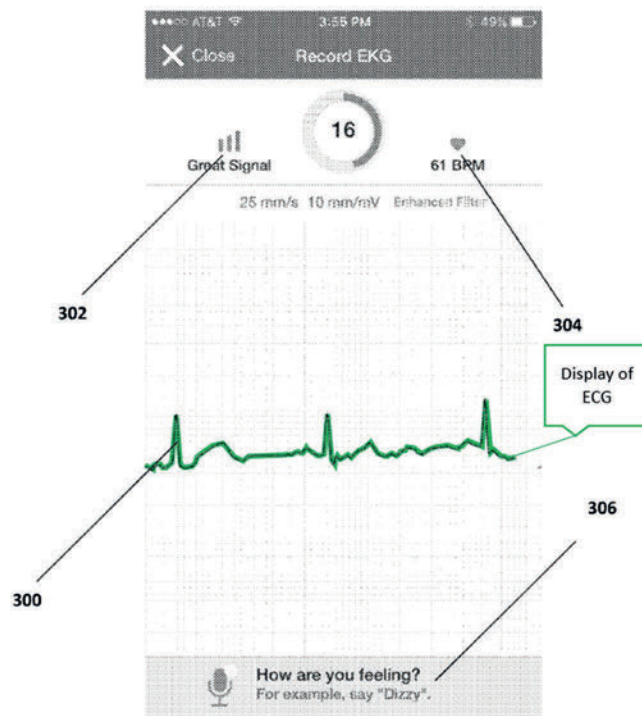


FIG. 3

332. In view of *Petterson*’s depiction of the “Record now” button 204, which a person of ordinary skill in the art would understand to be an indication that the device is ready to detect biometric information, and the subsequent screen shown to the user during the sensing of the ECG (in FIG. 3), a person of ordinary skill in the art would have understood that the device was, in fact, ready to detect the biometric information. The device is shown to sense the ECG data after the “Record now” button is selected.

333. Moreover, it was well known at the time of the earliest priority date of the ’533 patent, that it was advantageous in user interface design to provide a user

with a screen that indicates a device is ready and, upon activation, has begun recording (*see* IV).

334. Thus, *Petterson* renders obvious claim element [20.a].

Claim 20, Element [20.b]: detecting a first input with the biometric sensor that satisfies first criteria;

335. *Petterson* and *Albert* render obvious claim element [20.b].

336. The '533 patent broadly describes a “first input.” For example, the '533 patent explains that an input may be “a touch or contact on the input device that is below a threshold amount such that the input does not ‘click’ the input device” (Ex. 1001, 61:8-11). The '533 patent also includes an example of a “user input” that “is a continuous touch or contact on the input device” (Ex. 1001, 61:32-33).

337. In Apple's Infringement Contentions, Apple does not explicitly indicate what the “first input” is but instead appears to equate contact between a user's skin and the electrodes with the first input (Ex. 1023, p. 15). That is, it appears that Apple is equating contact with a first input.

338. The '533 patent also broadly describes “first criteria.” For example, the '533 patent explains that “the first input with the biometric sensor” “satisfies the first criteria when a contact (e.g., from a finger of a user) is detected on the biometric sensor” (Ex. 1001, 67:16-20). The '533 patent also provides examples of when “first criteria are met” to include “the device has captured less than a predetermined

amount of biometric information” and/or “the first input device has been activated within at least a threshold amount of time, such as 5 seconds” (Ex. 1001, 76:9-13).

339. In Apple’s Infringement Contentions, Apple indicates that “examples of ‘first criteria’ include the KardiaMobile Card being powered on, a stable connection between a user’s skin and the electrodes, a wireless connection between the KardiaMobile Card and the Kardia App, and the lack of electrical interference” (Ex. 1023, p. 15). Apple further states that, “when the user’s skin makes sufficient contact with the ‘biometric sensor’ in the KardiaMobile Card, the ‘first criteria’ of a stable connection between a user’s skin and the electrodes is met” (Ex. 1023, p. 15).

340. *Petterson* discloses detecting a first input with a biometric sensor that satisfies first criteria. *Petterson* discloses the first input because *Petterson* explicitly states that a “patient application may instruct the patient to place a cardiac health monitoring device in contact with his or her skin” to “take a baseline ECG measurement” (Ex. 1009, 12:44-46).

341. Further, *Petterson* discloses a “patient application” “configured to receive, organize, and/or track patient data including sensed physiologic parameters,” including “a sensed ECG of a patient” (Ex. 1009, 6:64-7:3). *Petterson* discloses that a “patient interface component 204” “provides the patient with the ability to select to record an ECG” using “an ECG sensing device 200 that is configured to interact with the software application” (Ex. 1009, 9:9-15). The “patient

interface component 204” may comprise “a touchscreen button” (Ex. 1009, 9:9-15). *Petterson* further discloses that “interface 204,” “*when engaged by the patient*” “causes the sensing of a physiologic parameter of a patient by a sensing device 200, 206, or 208” (Ex. 1009, 9:22-29, emphasis added). *Petterson* discloses that the “sensing device 200 comprises a smartphone coupled to one or more ECG electrodes” (Ex. 1009, 9:27-29). Specifically, once interface 204 is engaged, sensing begins as is shown in, for example, FIG. 3 (Ex. 1009, FIG. 3).

342. Next, *Petterson* in FIG. 3 (reproduced below), shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41).

Ex. 1009, Fig. 3 (annotated)

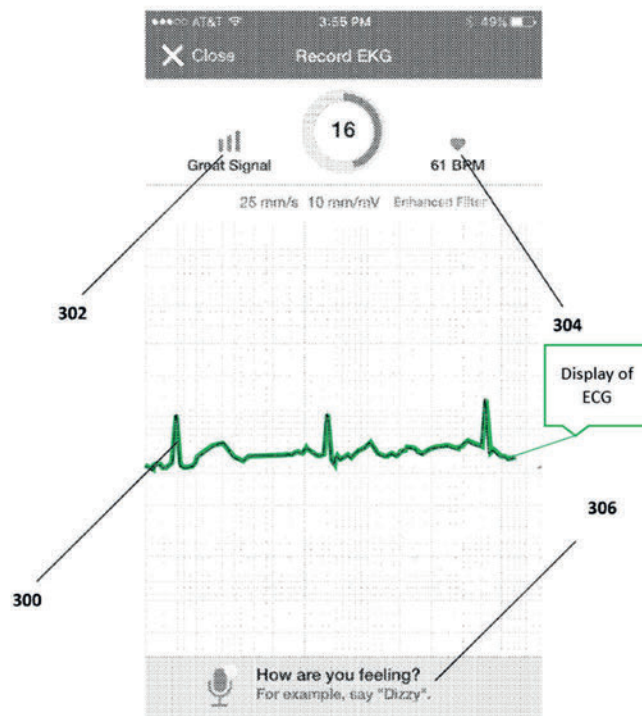


FIG. 3

343. In view of *Petterson*'s depiction of the "Record now" button 204, and the subsequent screen shown to the user during the sensing of the ECG (in FIG. 3), a person of ordinary skill in the art would have understood that the device had received input and was sensing the ECG data after the "record now" button is selected. Such feedback to the user is important in interface design, and a person having ordinary skill in the art would have understood that feedback representative of a recording in progress would only have been provided if the first input were actually detected.

344. To the extent it is argued that *Petterson* does not explicitly disclose

detecting a first input with the biometric sensor that satisfies first criteria, the person of ordinary skill in the art would have known *Petterson* was, in fact, detecting the first input with the biometric sensor at least in view of the disclosure described above as well as the related teachings of *Albert* which also discloses detecting a first input with the biometric sensor that satisfies first criteria. *Albert* discloses “an ECG electrode module” including “two or more electrodes, or connectors for two or more electrodes, configured to be contacted by or to a patient/subject to sense an ECG signal from the patient/subject” (Ex. 1010, ¶[0098]). The “electrodes on the outer surface of the housing may be configured to be touched by a subject holding the device in their hand or hands; one electrode may be touched by a hand holding the device (e.g., a finger or fingers, thumb, etc.) and the second electrode may be touched by another portion of the body, including another hand, leg, chest, etc.” (Ex. 1010, ¶[0098]). The person of ordinary skill in the art would have known to include *Albert*’s explicit detection in the system *Petterson* because proper sensing of an ECG for a user requires detection of contact with sensors.

345. Thus, *Petterson* and *Albert* render obvious claim element [20.b].

Claim 20, Element [20.c.1]: in response to detecting the first input with the biometric sensor: starting to record biometric information detected by the biometric sensor;

346. *Petterson* and *Albert* render obvious claim element [20.c.1].

347. *Petterson* discloses detecting the first input with a biometric sensor. For

example, *Petterson* discloses “a first computing device” comprising “one or more sensors (either physically integrated with the computing device or not physically integrated with the computing device) configured to sense a physiologic parameter of a patient” (Ex. 1009, 7:33-47).

348. *Petterson* discloses starting to record biometric information detected by the biometric sensor. For example, *Petterson* discloses that “a patient may utilize an ECG monitor, a blood pressure monitor or a pulse oximeter, and the patient application to record and save or store his or her cardiac electric activity and blood pressure” (Ex. 1009, 7:33-47). That is, “the patient application” “is configured to” “monitor and/or record multiple physiologic parameters” (Ex. 1009, 7:33-47). *Petterson* discloses a “patient application” “configured to receive, organize, and/or track patient data including sensed physiologic parameters,” including “a sensed ECG of a patient” (Ex. 1009, 6:64-7:3).

349. Further, with reference to FIG. 2B (reproduced below) *Petterson* discloses that a “patient interface component 204” “provides the patient with the ability to select to record an ECG” using “an ECG sensing device 200 that is configured to interact with the software application” (Ex. 1009, 9:9-15). *Petterson* further discloses that “interface 204,” “***when engaged by the patient***” “causes the sensing of a physiologic parameter of a patient by a sensing device 200, 206, or 208” (Ex. 1009, 9:22-29, emphasis added).

Ex. 1009, Fig. 2B (annotated)

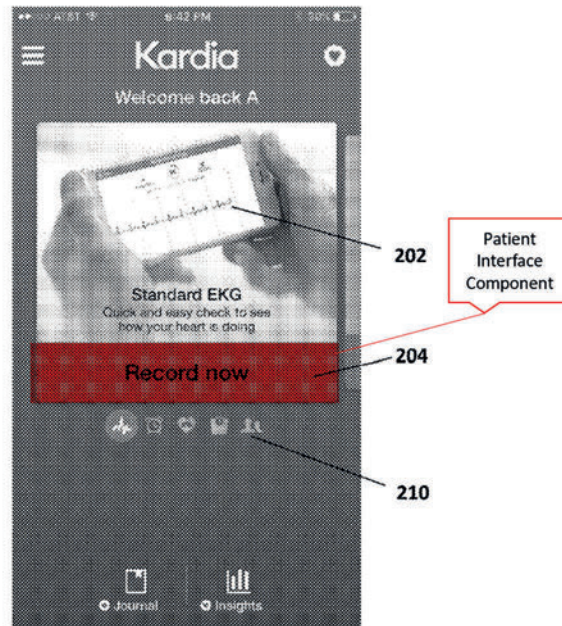


FIG. 2B

350. Next, *Petterson* in FIG. 3 (reproduced below), shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41).

Ex. 1009, Fig. 3 (annotated)

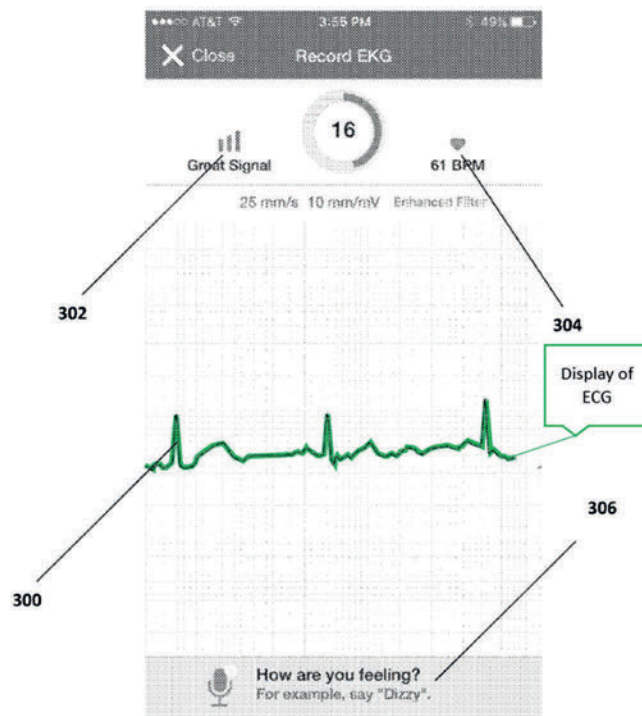


FIG. 3

351. *Petterson* also discloses that a patient care plan can be transmitted to a patient application, where the patient care plan “is configured to monitor, record, and/or track multiple health metrics in a patient such as ECG” (Ex. 1009, 11:65-12:1). *Petterson* also discloses that the interface of a patient application “may comprise a component to provide the patient with the option to record, save, and/or send all data collected” (Ex. 1009, 12:63-67).

352. In view of *Petterson*’s depiction of the “Record now” button 204 in FIG. 2B (reproduced above), and the subsequent screen shown to the user during the sensing of the ECG (in FIG. 3), a person of ordinary skill in the art would have

understood that the device had received input and began recording the sensed ECG data after the “Record now” button is selected (Ex. 1009, 12:63-67).

353. To the extent it is argued that *Petterson* does not explicitly disclose starting to record the biometric information, the person of ordinary skill in the art would have turned to *Albert*, which expressly discloses recording the sensed ECG data.

354. *Albert* discloses, with reference to FIG. 19 (reproduced below), a method for sensing an ECG of a subject (Ex. 1010, ¶ [0085]). *Albert* discloses an “ECG module” which “may comprise first and second sensor electrodes that the subject may contact with her or her skin” (Ex. 1010, ¶ [0131]). *Albert* further discloses a “sensed ECG signal may be converted to a wired or wireless signal by the ECG module,” transmitted to the mobile computing device,” and the “computing device may store the ECG” (Ex. 1010, ¶¶ [0131-0134]). A person of ordinary skill in the art would have understood that storing ECG data was recording the ECG data.

Ex. 1010, FIG. 19 (annotated)

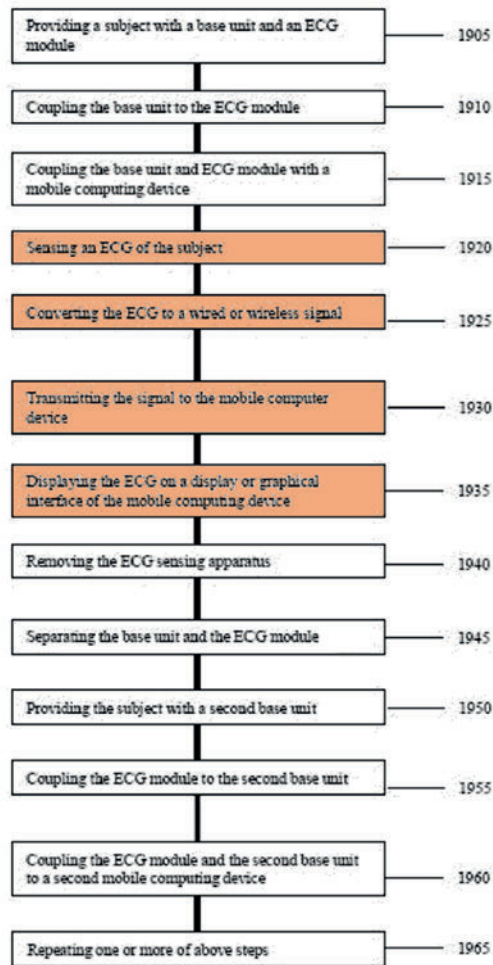


FIG. 19

355. A person of ordinary skill in the art would have been motivated to modify *Petterson* with the recording of biometric information from *Albert* in order to enable comparisons of recordings over time as well as sharing with health care professionals.

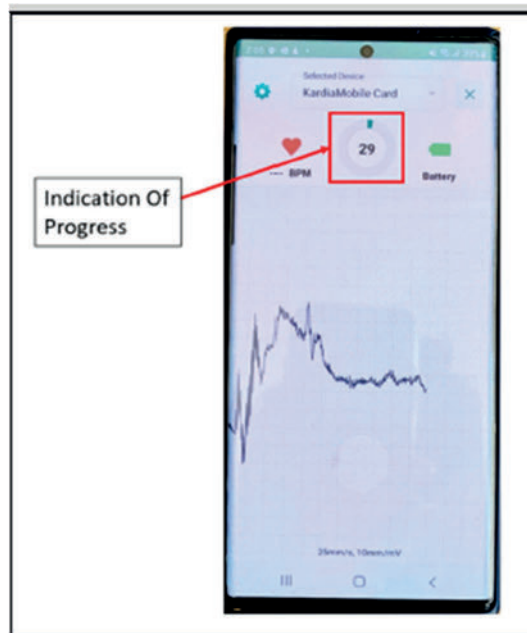
356. Thus, *Petterson* and *Albert* render obvious claim element [20.c.1].

Claim 20, Element [20.c.2]: displaying, on the display, a second user interface that is different from the first user interface, wherein the second user interface includes an indication of progress in recording the biometric information;

357. *Petterson* renders obvious claim element [20.c.2].

358. In Apple’s Infringement Contentions, Apple includes a “Screenshot of the Kardia App,” annotated to indicate an alleged “indication of progress” (Ex. 1023, p. 28).

Ex. 1023, p. 28 (annotations in original)



359. *Petterson* discloses displaying a second user interface that is different from the first user interface, where the second user interface includes an indication of progress in recording the biometric information. For example, FIG. 3 of *Petterson* (reproduced below) shows “an exemplary patient interface a patient encounters

during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41).

Ex. 1009, Fig. 3 (annotated)

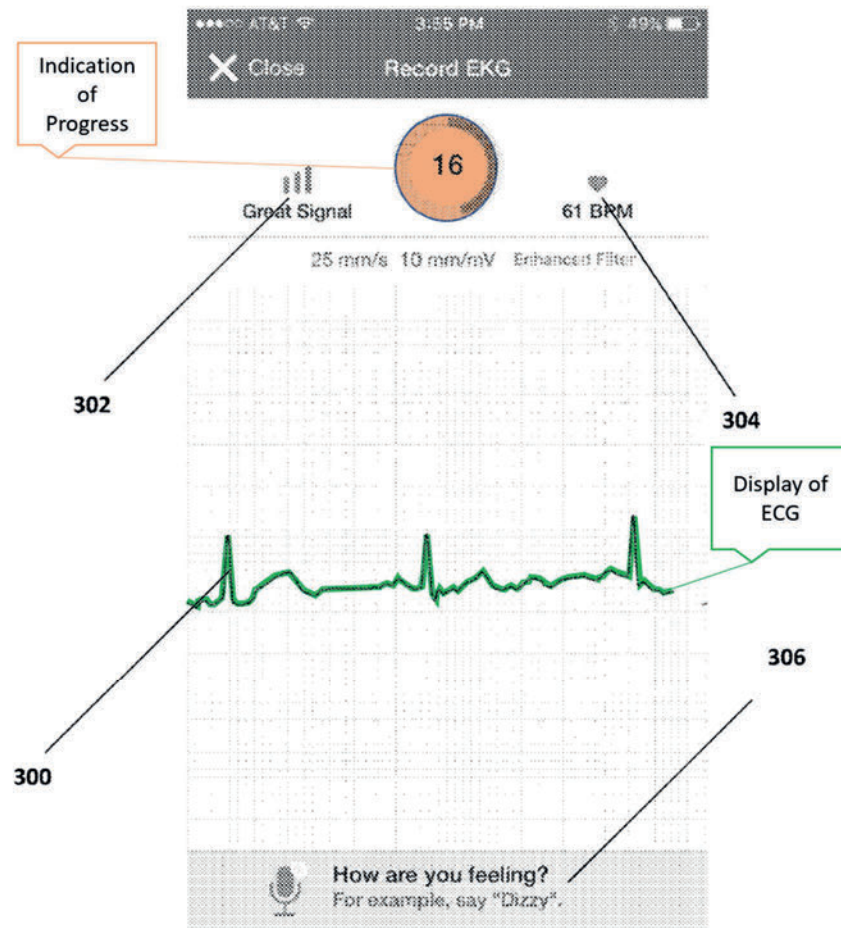


FIG. 3

360. *Petterson* further discloses that “[t]he patient interface may also display an ECG at 300” “over a period of time,” where the ECG and time “may be displayed graphically or textually” (Ex. 1009, 10:13-16).

361. Thus, *Petterson* renders obvious claim element [20.c.2].

Claim 20, Element [20.d]: after recording at least a portion of the biometric information, detecting, via the one or more input devices, that the first criteria are no longer met;

362. *Petterson, Albert, and Nakada* render obvious claim element [20.d].

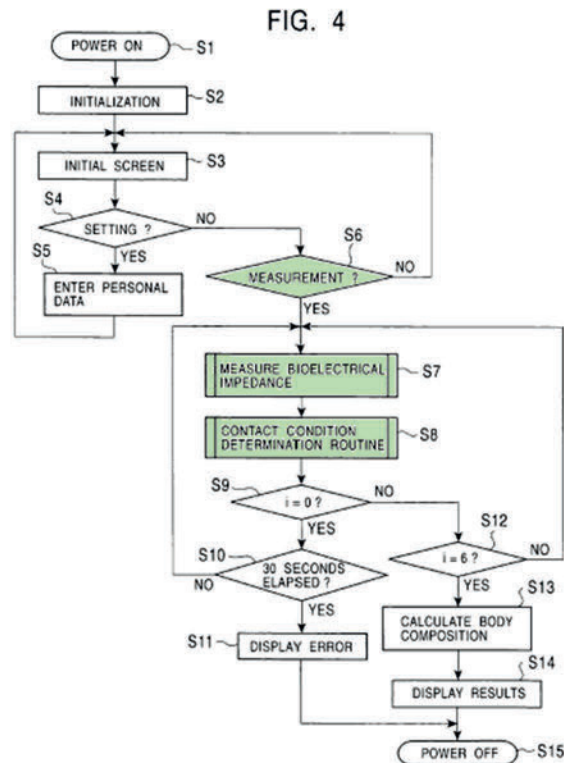
363. *Petterson* and *Albert* both disclose recording the biometric information and displaying the progress of the recording while the first criteria are met, as discussed above.

364. It would have been obvious to a person of ordinary skill in the art that the first criteria were evaluated for the entire intended duration of the ECG recording because the person of ordinary skill in the art would have known that ECG data needs to be acquired over time for a minimum duration. The '533 patent confirms that such a required duration is 30 seconds (Ex. 1001, 64:67-65:3; *see also* Ex. 1011, 9:45-57, FIG. 4). Moreover, the person of ordinary skill in the art would have known that displaying the progress of the recording to the user was intended to inform the user that the first criteria needed to be satisfied for a given duration.

365. To the extent it is argued that *Petterson* and *Albert* do not explicitly disclose detecting that the first criteria were no longer met, the person of ordinary skill in the art would have looked to *Nakada*, which also discloses detecting that criteria are not met, via one or more input devices. With reference to FIG. 4, reproduced below, *Nakada* discloses a “contact condition determination routine” which checks “whether the contact condition is normal,” and, if “the contact

condition is not normal” and “30 seconds have not yet elapsed,” the measurement continues” (Ex. 1011, 9:45-57).

Ex. 1011, Fig. 4 (annotated)



366. The person having ordinary skill in the art would have known that, at least in view of *Nakada*, *Petterson* could be modified to include explicit detection that the first criteria were not met because the person having ordinary skill in the art would have known that a successful ECG recording needed to be acquired over a minimum duration of time.

367. Thus, *Petterson* and *Albert* render obvious claim element [20.d].

Claim 20, Element [20.e]: in response to detecting that the first criteria are no longer met for a first period of time, resetting the indication of progress in recording the biometric information and maintaining display of the second user interface;

368. *Petterson, Albert, and Nakada* render obvious claim element [20.e].

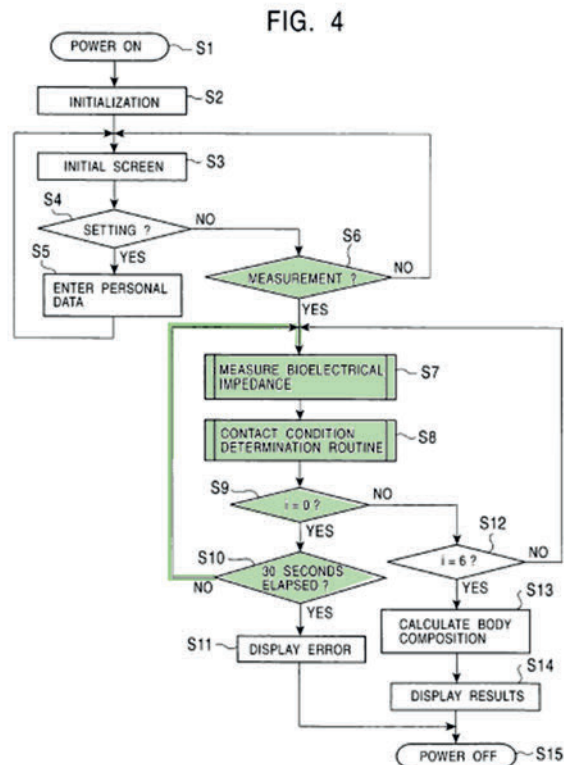
369. The '533 patent broadly describes “first period of time.” For example, the '533 patent provides an example of the “first period of time” to be “5 seconds” (Ex. 1001, 67:58-59). The '533 patent explains that “[r]esetting the indication of progress” “while maintaining display of the second user interface” “in response to detecting that the first criteria are no longer met for a first period of time provides the user with more control of the device” (Ex. 1001, 67:63-68:4).

370. In Apple’s Infringement Contentions, Apple indicates that “if the AliveCor Products detect a loss of connection within ten seconds, they determine that ‘the first criteria are no longer met.’” (Ex. 1023, p. 27).

371. *Petterson* discloses the display of the second user interface as discussed above with respect to claim element [20.c.2]. It would have been obvious to a person of ordinary skill in the art to reset *Petterson*’s indication of progress and maintain the display of the second user interface, as taught in *Nakada*, because *Petterson* expressly discloses an interest in providing a patient with the ability to perform a test for a set period of time, as prescribed by a healthcare provider, and to provide the user with a congratulatory message upon completion of the test (Ex. 1009, 12:38-13:13). Given that ECG test itself requires both proper contact and a particular

duration of data, according to the '533 patent, the person of ordinary skill in the art would have known that any loss of data connection would require another 30 second test (Ex. 1001, 64:67-65:3). In order to ensure the user completes the test and the ability to send the congratulatory message in *Petterson*, a person of ordinary skill in the art would have looked to ensure the user was informed as to successful progress of the test, and thus would have looked to *Nakada*.

372. With reference to FIG. 4, reproduced below, *Nakada* discloses a “contact condition determination routine” which checks “whether the contact condition is normal” (Ex. 1011, 9:45-57). In the “contact condition determination routine,” a “value of the number i of normal contacts is checked to check whether the contact condition is normal” (Ex. 1011, 9:45-47). If “the contact condition is not normal” and “30 seconds have not yet elapsed,” the measurement continues (Ex. 1011, 9:45-57).



373. If “the contact condition is not normal” and “30 seconds have already elapsed,” the device “determines that an accurate measurement could not be made” and “displays an error on the display section” (Ex. 1011, 9:45-57).

374. That is, *Nakada* discloses a first condition where a “contact condition is not normal” and “30 seconds have not yet elapsed,” where the measurement may continue (Ex. 1011, 9:45-57). *Nakada* therefore discloses a first period of time (i.e., 30 seconds have not yet elapsed) during which the device detects that the first input does not satisfy the first criteria (i.e., a contact condition is not normal). If “30 seconds have not yet elapsed, the microcom

impedance measuring routine in STEP S7 and continues the measurement” (Ex. 1011, 9:51-47). A person of ordinary skill in the art would have understood that *Nakada*’s return to the bioelectrical impedance measuring routine was a resetting of the progress indication because *Nakada* was starting the routine over.

375. Thus, *Petterson*, *Albert*, and *Nakada* render obvious claim element [20.e].

Claim 20, Element [20.f]: in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time, replacing display of the second user interface with the first user interface.

376. *Petterson*, *Albert*, and *Nakada* render obvious claim element [20.f].

377. The ’533 patent broadly describes “second period of time.” For example, the ’533 patent provides an example of the “second period of time” to be “longer than the first period of time (e.g., longer than 5 seconds)” (Ex. 1001, 68:14-16). The ’533 patent explains that “[r]eplacing display of the second user interface” “with the first user interface” “in response to detecting that the first criteria are no longer met for a second period of time that is longer than the first period of time improves visual feedback by visually indicating to the user that the recording has been stopped and that the new recording can be re-initiated by the user” (Ex. 1001, 68:19-26).

378. In Apple’s Infringement Contentions, Apple indicates that “the KardiaMobile Card automatically shuts off after ten seconds if no contact from the

user's skin is sensed by the KardiaMobile Card.” (Ex. 1023, p. 31). That is, it appears Apple is equating the “second period of time” to be any duration of time that extends beyond the completion of the “first period of time”.

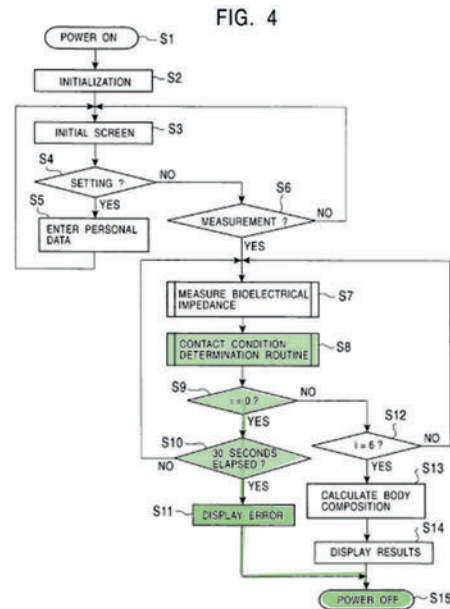
379. In view of *Pettersen*, the person of ordinary skill in the art would have understood that a device would not remain in a recording mode (e.g., depicted in FIG. 3 of *Pettersen*) if the first criteria were no longer met for a second period of time after which it would not make sense to continue attempting to record. The person of ordinary skill in the art would have understood that, in user interface design, it would have been preferred to return back to FIG. 2B of *Pettersen* in the absence of the first criteria being met because the person of ordinary skill in the art would have understood that resetting the user interface at least because of lack of interaction is suggestive that the user wants to start over.

380. To the extent it is argued that *Pettersen* and *Albert* do not explicitly disclose claim element [20.f], it would have been obvious to a person of ordinary skill in the art to replace display of a user interface in response to detecting that the first criteria are no longer met for a second period of time, at least in view of *Nakada*.

381. With reference to FIG. 4, reproduced below, *Nakada* discloses a “contact condition determination routine” which checks “whether the contact condition is normal.” If “the contact condition is not normal” and “30 seconds have

already elapsed,” the device “determines that an accurate measurement could not be made” and “displays an error on the display section” (Ex. 1011, 9:45-57).

Ex. 1011, Fig. 4 (annotated)



382. That is, *Nakada* discloses a second condition, where, if “the contact condition is not normal” and “30 seconds have already elapsed,” the device “determines that an accurate measurement could not be made” and “displays an error on the display section” (Ex. 1011, 9:45-57). A person of ordinary skill in the art would have understood the lapsing of the 30 seconds to be a second period of time because the second condition is satisfied only after completion of the first period of time (e.g., the 30 seconds of *Nakada*’s first condition). The person of ordinary skill in the art would have understood that, in user interface design, it would have been

preferred to use the lapsing of a specific period of time to return back to FIG. 2B of *Petterson* in the absence of the first criteria being met because the person of ordinary skill in the art would have understood that resetting the user interface at least because of lack of interaction is suggestive that the user wants to start over. *Nakada* confirms that after 30 seconds have elapsed an error is displayed and then the system is returned to the beginning state of the routine, which in the case of *Petterson* would be FIG. 2B.

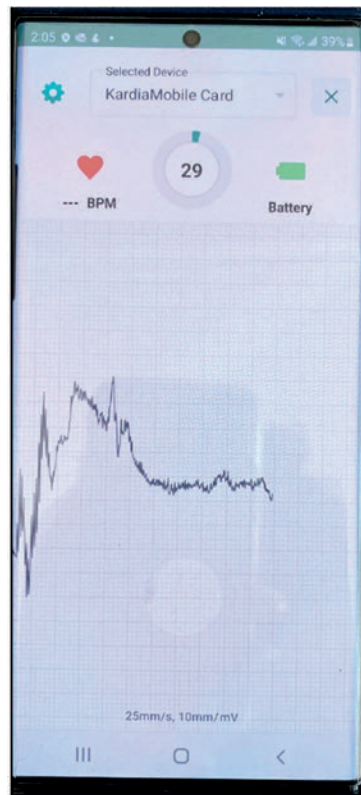
383. Thus, *Petterson*, *Albert*, and *Nakada* render obvious claim element [20.f].

Claim 21, Element [21]: The non-transitory computer-readable storage medium of claim 20, wherein the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor.

384. *Petterson*, *Albert*, and *Nakada* render obvious claim element [21] (both [21.pre] and [21.a]).

385. As set forth above, *Petterson*, *Albert*, and *Nakada* render obvious all of the elements of claim 20. Thus, *Petterson*, *Albert*, and *Nakada* render obvious [21.pre]. *Petterson* and *Albert* render obvious [21.a].

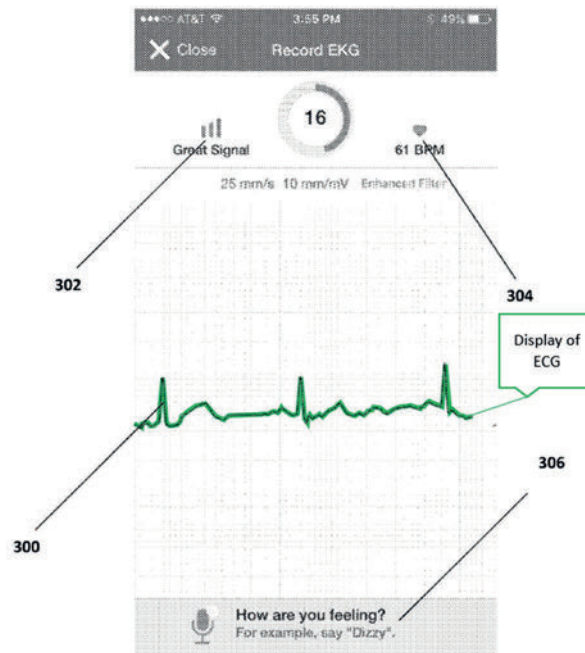
386. In Apple's Infringement Contentions, Apple includes a "Screenshot of the Kardia App" for claim 21 (Ex. 1023, p. 38).



387. *Petterson* discloses the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor. For example, *Petterson* discloses a “sensing device” “integrated with a patient computing device,” where the “sensing device” comprises “one or more ECG electrodes” and is “integrated into a housing and/or processor of a computing device such as a smartphone or smartwatch” (Ex. 1009, 6:16-29). Moreover, FIG. 3 of *Petterson* shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41). *Petterson* also discloses that a patient

care plan can be transmitted to a patient application, where the patient care plan “is configured to monitor, record, and/or track multiple health metrics in a patient such as ECG” (Ex. 1009, 11:65-12:1). *Petterson* also discloses that the interface of a patient application “may comprise a component to provide the patient with the option to record, save, and/or send all data collected” (Ex. 1009, 12:63-67).

Ex. 1009, Fig. 3 (annotated)



388. *Albert* also discloses the recorded biometric information includes an electrocardiogram recording derived from the biometric information detected by the biometric sensor. For example, *Albert* discloses “ECG sensing devices for use with mobile telecommunications devices,” “so that the mobile telecommunication device

may receive biological signals measured directly from a patient” (Ex. 1010, ¶[0006]).

389. Thus, *Petterson, Albert, and Nakada* render obvious claim element [21] (both [21.pre] and [21.a]).

Claim 24, Element [24]: The non-transitory computer-readable storage medium of claim 20, wherein the biometric sensor is a contact-based sensor, and wherein the first input with the biometric sensor satisfies the first criteria when a contact is detected on the biometric sensor.

390. *Petterson, Albert, and Nakada* render obvious claim element [24] (both [24.pre] and [24.a]).

391. As set forth above, *Petterson, Albert, and Nakada* render obvious all of the elements of claim 20. Thus, *Petterson, Albert, and Nakada* render obvious [24.pre]. *Petterson* and *Albert* render obvious [24.a].

392. *Petterson* discloses that the biometric sensor is a contact-based sensor. For example, *Petterson* discloses that “the sensor comprises two ECG electrodes” (Ex. 1009, 19:7-8). *Petterson* further discloses that a “patient application may instruct [a] patient to place a cardiac health monitoring device in contact with his or her skin” to “take a baseline ECG measurement” (Ex. 1009, 12:44-46).

393. *Albert* also discloses that the biometric sensor is a contact-based sensor. For example, *Albert* discloses “an ECG electrode module” which “includes two or more electrodes, or connectors for two or more electrodes, configured to be contacted by or to a patient/subject to sense an ECG signal from the patient/subject”

(Ex. 1010, ¶[0098]). The “electrodes on the outer surface of the housing may be configured to be touched by a subject holding the device in their hand or hands; one electrode may be touched by a hand holding the device (e.g., a finger or fingers, thumb, etc.) and the second electrode may be touched by another portion of the body, including another hand, leg, chest, etc.” (Ex. 1010, ¶[0098]).

394. Thus, *Petterson, Albert, and Nakada* render obvious claim element [24] (both [24.pre] and [24.a]).

Claim 29, Element [29]: The non-transitory computer-readable storage medium of claim 20, wherein the second user interface includes a graphical representation that corresponds to a visualization of the biometric information from the recorded biometric information and a timer indicating an amount of time remaining to complete the recording of the biometric information.

395. *Petterson, Albert, and Nakada* render obvious claim element [29] (both [29.pre] and [29.a]).

396. As set forth above, *Petterson, Albert, and Nakada* render obvious all of the elements of claim 20. Thus *Petterson, Albert, and Nakada* render obvious [29.pre]. *Petterson* renders obvious [29.a].

397. *Petterson* discloses a graphical representation that corresponds to a visualization of the biometric information from the recorded biometric information and a timer indicating the amount of time remaining to complete the recording of the biometric information. FIG. 3 of *Petterson* shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300

– using an ECG sensing device” (Ex. 1009, 9:38-41). *Petterson* discloses that the “patient interface may display an ECG at 300 and heart rate recordings at 304 over a period of time” (Ex. 1009, 10:13-16).

Ex. 1009, FIG. 3 (annotated)

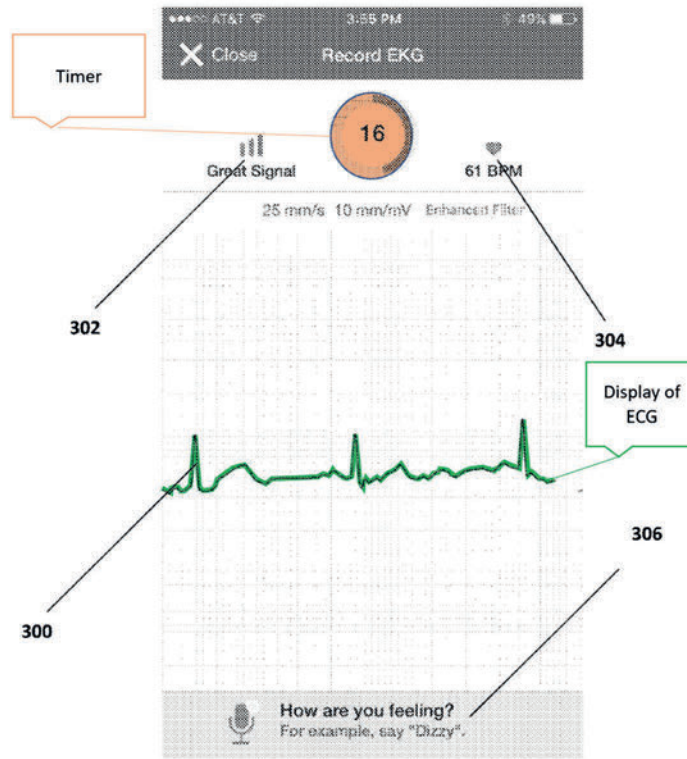


FIG. 3

398. Thus, *Petterson*, *Albert*, and *Nakada* render obvious claim element [29].

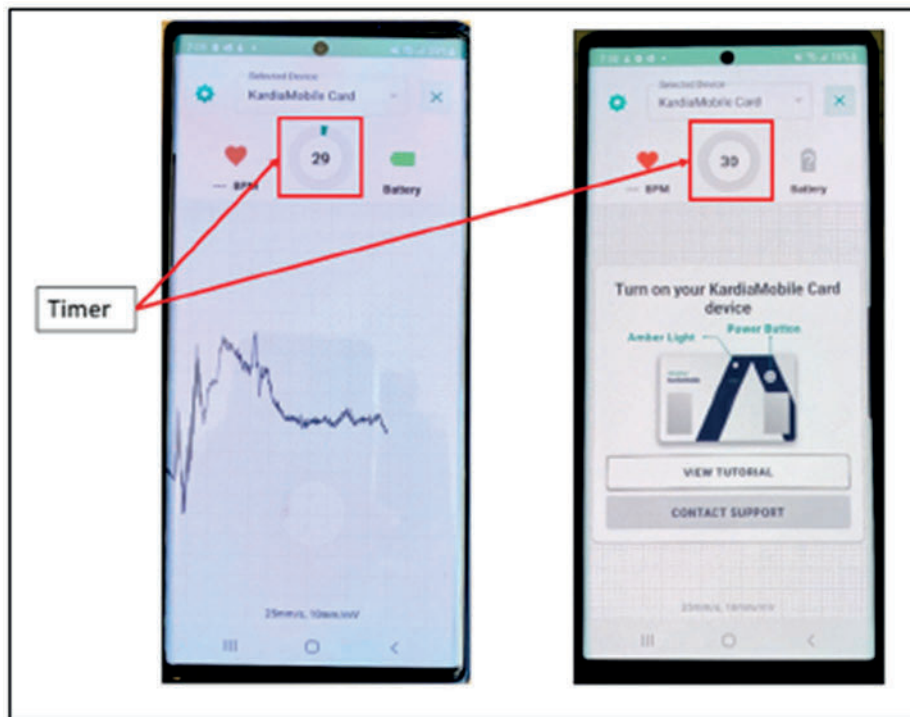
Claim 37, Element [37]: The non-transitory computer-readable storage medium of claim 20, wherein the indication of progress is a countdown timer.

399. *Petterson, Albert, and Nakada* render obvious claim element [37] (both [37.pre] and [37.a]).

400. As set forth above, *Petterson, Albert, and Nakada* render obvious all of the elements of claim 20. Thus, *Petterson, Albert, and Nakada* render obvious [37.pre]. *Petterson* renders obvious [37.a].

401. In Apple’s Infringement Contentions, Apple includes “Screenshots of the Kardia App,” annotated to indicate an alleged “indication of progress” that “is a countdown timer” (Ex. 1023, p. 57).

Ex. 1023, p. 57 (annotations in original)



402. *Petterson* discloses an indication of progress that is a countdown timer.

FIG. 3 of *Petterson* (reproduced and annotated below) shows “an exemplary patient interface a patient encounters during the sensing of an ECG – displayed on the interface at 300 – using an ECG sensing device” (Ex. 1009, 9:38-41). *Petterson* discloses that the “patient interface may display an ECG at 300 and heart rate recordings at 304 over a period of time” (Ex. 1009, 10:13-16).

Ex. 1009, Fig. 3 (annotated)

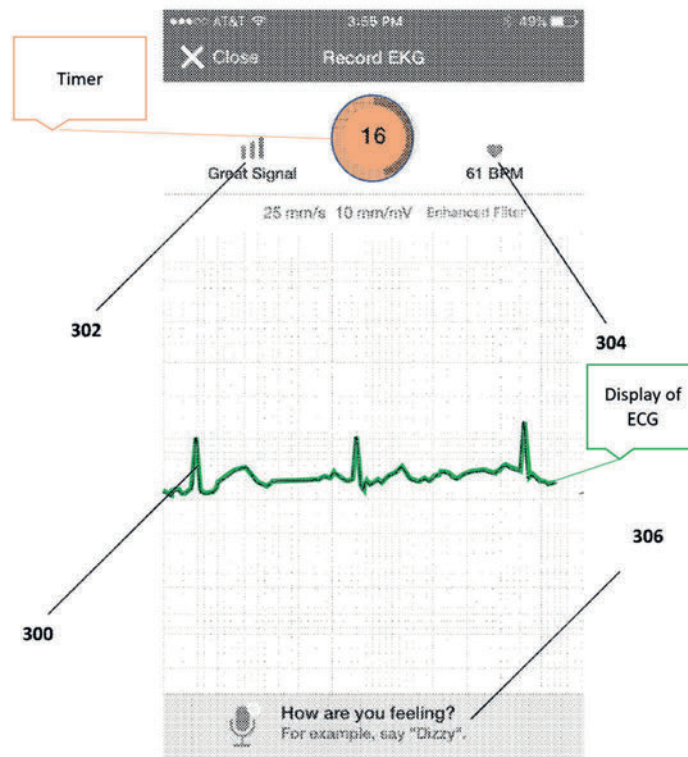


FIG. 3

403. A person of ordinary skill in the art would have understood the interface element including the number “16” near the top of the interface depicted in FIG. 3 of *Petterson* to be countdown timer and indication of progress because the person of

ordinary skill in the art would have been familiar with progress indicators associated with biometric recordings. The person of ordinary skill in the art would have further understood, in view of *Petterson*'s description that FIG. 3 is an interface encountered “during the sensing of an ECG,” that the number would be associated with a recording in progress.

404. Thus, *Petterson, Albert, and Nakada* render obvious claim element [37].

D. Ground 4: *Petterson, Albert, Nakada, and Mayor* Render Obvious Claim 22 of the '533 patent.

405. *Petterson, Albert, Nakada* and *Mayor* render obvious claim 22 of the '533 patent.

Motivation to Combine Petterson, Albert, Nakada, and Mayor

406. In addition to the reasons described above with respect to *Motivation to Combine Petterson, Albert, and Nakada*, a person of ordinary skill in the art would have been motivated to combine *Mayor* with the combination of *Petterson, Albert, and Nakada* because the person of ordinary skill in the art would have understood that the devices of *Petterson, Albert, and Nakada* could have several applications installed thereon and the person of ordinary skill in the art would have sought out mechanisms for convenient access via a user interface to any of the applications of the device. *Mayor* provides such express disclosure, including enabling a user to “select an application user interface shortcut to invoke [an] application user interface

or subscreen associated with the shortcut” (Ex. 1012, ¶ [0003]). *Mayor* explicitly provides for a “graphical user interface 100 for invoking applications on a mobile device,” where “GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶[0021]). *Mayor* explicitly teaches that there are shortcomings with having to “navigate through menus and make multiple inputs to view a desired application user interface” and “requiring a user to make multiple menu selections to access a desired user interface can waste time and cause frustration for the user” (Ex. 1012, ¶[0002]). As a solution, *Mayor* discloses advantageously creating icons so as to be able to more quickly access the application (Ex. 1012, ¶[0029]).

407. A person of ordinary skill in the art would have had a reasonable expectation of success in combining the graphical objects for invoking respective applications of *Mayor* with *Pettersen*, *Albert*, and *Nakada* given the ubiquitous nature of applications (see, e.g., VI.B) as well as the explicit teachings of *Pettersen*, *Albert*, and *Nakada*, and *Mayor* of the use of applications on their respective devices (see, e.g., Ground 3).

408. For at least the reasons outlined above in the section entitled *Motivation to Combine AHIT, Hooper, Cho, and Mayor*, and those discussed further below, it is my opinion that a person of ordinary skill in the art would have been motivated to combine the teachings of *AHIT*, *Hooper*, *Cho*, and *Mayor*.

Claim 22, Element [22.pre]: The non-transitory computer-readable storage medium of claim 20, wherein the one or more programs further include instructions for:

409. *Petterson, Albert, and Nakada* render obvious claim element [22.pre].

410. As set forth above, *Petterson, Albert, and Nakada* render obvious all of the elements of claim 20.

411. Thus, *Petterson, Albert, and Nakada* render obvious claim element [22.pre].

Claim 22, Element [22.a]: prior to displaying the first user interface, displaying a homescreen that includes an application affordance corresponding to a health monitoring application;

412. *Petterson and Mayor* render obvious claim element [22.a].

413. FIG. 2A of *Petterson* shows an “initial home screen interface encountered by a patient when he or she has not yet signed into a patient application that is operating on a computing device” (Ex. 1009, 8:20-23, FIG. 2A). A person of ordinary skill in the art would have understood that the “Log In” element of FIG. 2A of *Petterson* was an application affordance corresponding to a health monitoring application because, upon selection of the “Log In” element, the patient encounters FIG. 2B of *Petterson*, which depicts “a patient interface component 204” “that provides the patient with the ability to select to record an ECG” using “an ECG sensing device” “configured to interact with the software application” after the patient has logged in (Ex. 1009, 9:7-15, FIG. 2B).

Ex. 1009, Fig. 2A (annotated)



FIG. 2A

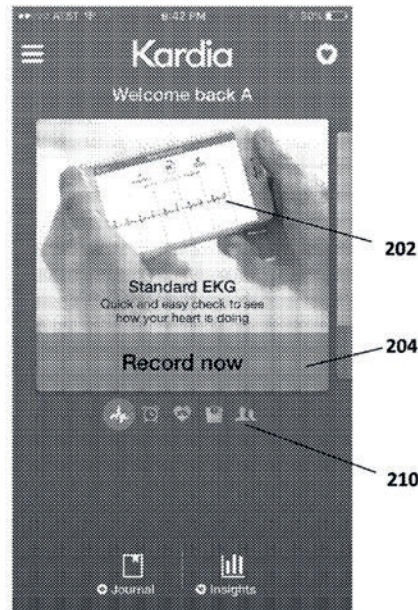


FIG. 2B

414. To the extent it is argued that *Petterson* does not explicitly disclose or suggest element [22.a], a person of ordinary skill in the art would have been very familiar, at least as evidenced by *Mayor*, with displaying a homescreen that includes an application affordance corresponding to a health monitoring application.

415. *Mayor* discloses enabling a user to “select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut” (Ex. 1012, ¶ [0003]). *Mayor* explains that advantages provided for by the implementations disclosed include creation of an “application user interface shortcut for directly invoking or accessing an application user interface” (Ex. 1012, ¶ [0004]).

416. With reference to FIG. 1 (reproduced below), *Mayor* describes a “graphical user interface 100 for invoking applications on a mobile device,” where “GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶ [0021]).

Ex. 1012, FIG. 1 (annotated)

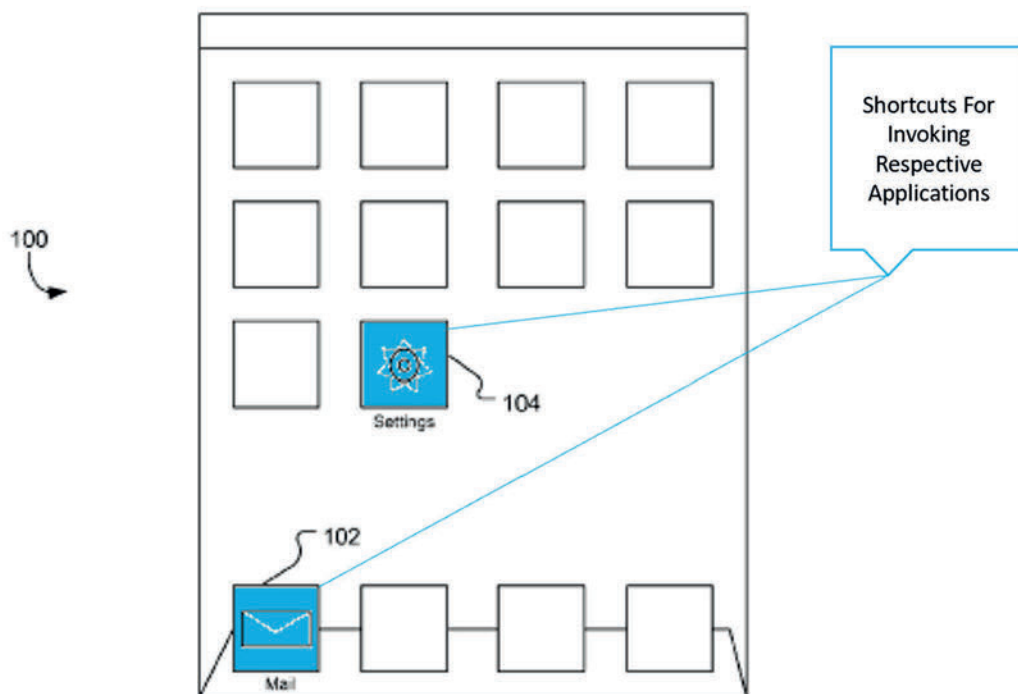


FIG. 1

417. *Mayor* discloses that “graphical objects 102 and 104 can be icons or images that, when selected by a user, cause invocation of a corresponding application that is installed on the mobile device” (Ex. 1012, ¶ [0021]). For example, “[g]raphical object 102” “can be selected to invoke an email application on the

mobile device,” and “[g]raphical object 104 can be selected to invoke a settings application or function of the mobile device” (Ex. 1012, ¶ [0021]).

418. With reference to FIG. 9 (reproduced below), *Mayor* depicts an example graphical user interface “for invoking applications and GUI shortcuts on a mobile device,” where the “graphical user interface 900” includes “GUI shortcut 902 and/or GUI shortcut 904” (Ex. 1012, ¶ [0036]). *Mayor* explains that “GUI shortcut 902 can be selected to invoke” a “’Friends’ email folder” (Ex. 1012, ¶ [0036]). When “GUI shortcut 902 is invoked (e.g., selected by a user),” an application identifier associated therewith “can be used by the mobile device to invoke the application” (Ex. 1012, ¶ [0037]).

Ex. 1012, FIG. 9 (annotated)

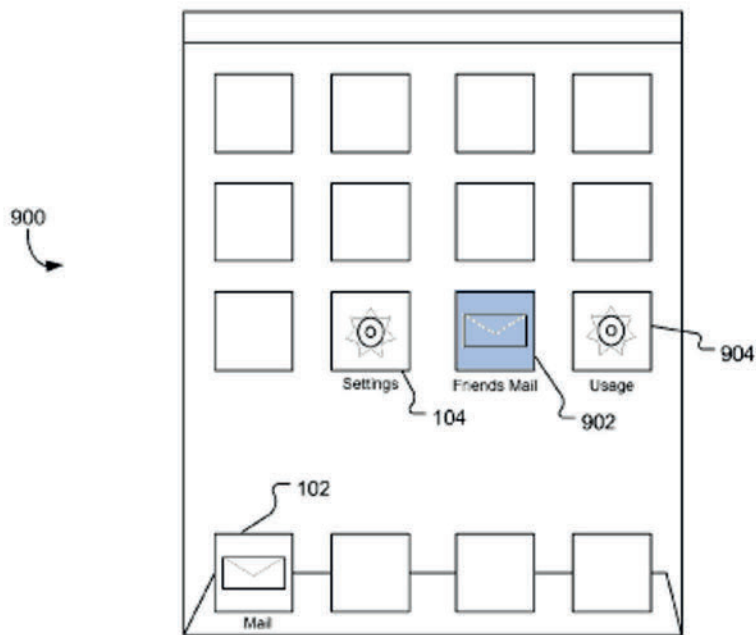


FIG. 9

419. With reference to FIG. 10B (reproduced below), *Mayor* discloses an example process “for invoking an application using a graphical user interface shortcut” (Ex. 1012, ¶ [0046]).

Ex. 1012, FIG. 10B (annotated)

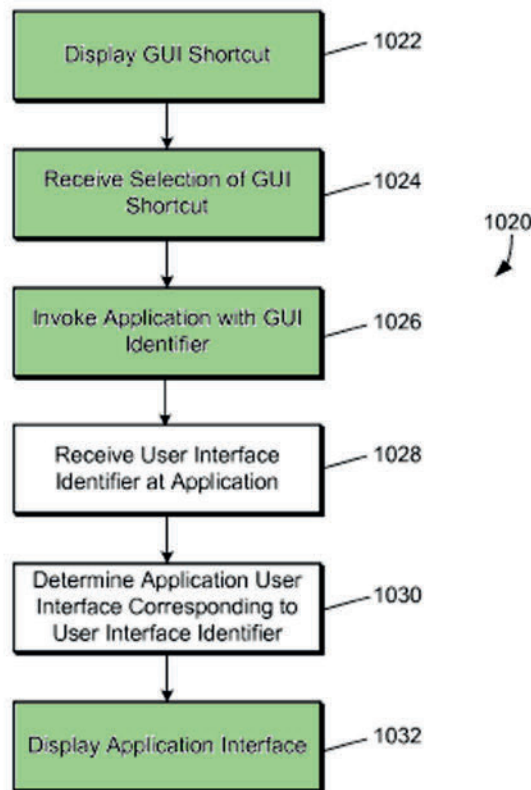


FIG. 10B

420. Thus, *Petterson* and *Mayor* render obvious claim element [22.a].

Claim 22, Element [22.b]: detecting, via the one or more input devices, a user activation of the application affordance; and in response to detecting the user activation of the application affordance, displaying, on the display, the first user interface.

421. *Petterson* and *Mayor* render obvious claim element [22.b].

422. FIG. 2A of *Petterson* shows an “initial home screen interface encountered by a patient when he or she has not yet signed into a patient application

that is operating on a computing device” (Ex. 1009, 8:20-23). *Petterson* explains that “FIGS. 2B-E show screenshots of exemplary interfaces of a patient application that are viewed by the patient once the patient logs in to the patient application” (Ex. 1009, 9:7-9). A person of ordinary skill in the art would have understood a patient logging into an application to be an activation of an application affordance that led to the display of the first user interface, which is FIG. 2B.

423. To the extent it is argued that *Petterson* does not explicitly disclose or suggest element [22.b], a person of ordinary skill in the art would have been very familiar, at least as evidenced by *Mayor*, with “detecting, via the one or more input devices, a user activation of the application affordance,” and “in response to detecting the user activation of the application affordance, displaying, on the display, the first user interface.”

424. *Mayor* discloses enabling a user to “select an application user interface shortcut to invoke [an] application user interface or subscreen associated with the shortcut” (Ex. 1012, ¶ [0003]). *Mayor* explains that advantages provided for by the implementations disclosed include creation of an “application user interface shortcut for directly invoking or accessing an application user interface” (Ex. 1012, ¶ [0004]).

425. With reference to FIG. 1 (reproduced below), *Mayor* describes a “graphical user interface 100 for invoking applications on a mobile device,” where

“GUI 100 can include graphical objects 102 and 104 for invoking respective applications” (Ex. 1012, ¶ [0021]).

Ex. 1012, FIG. 1 (annotated)

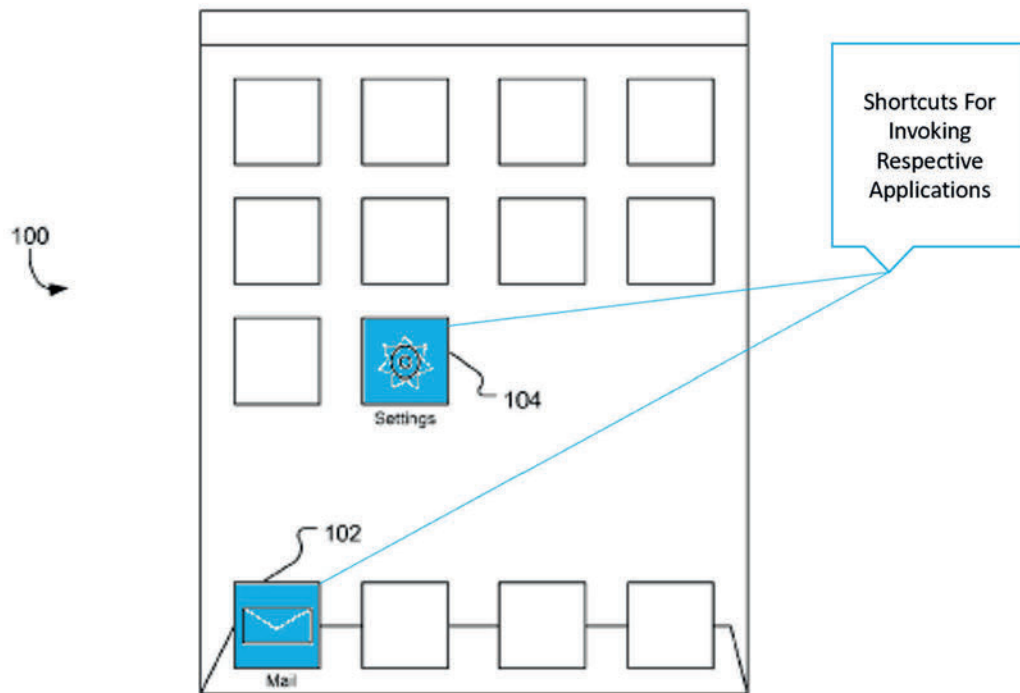
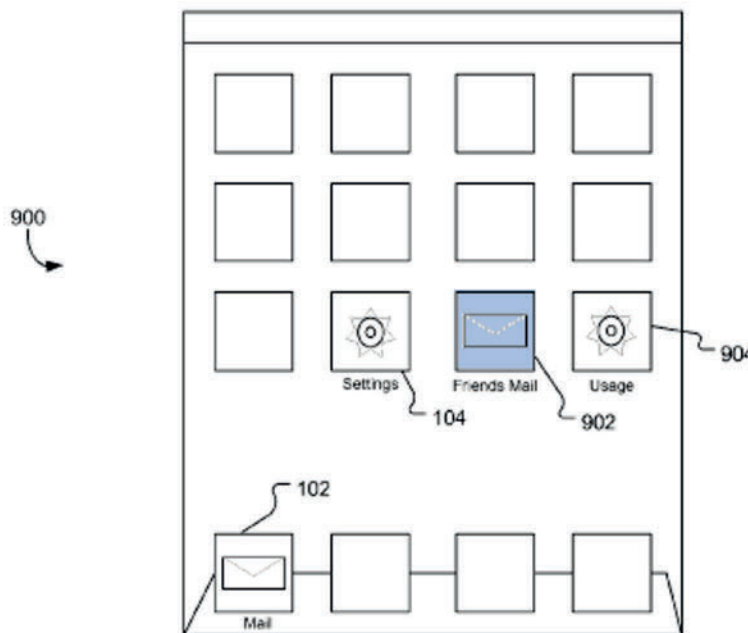


FIG. 1

426. *Mayor* discloses that “graphical objects 102 and 104 can be icons or images that, when selected by a user, cause invocation of a corresponding application that is installed on the mobile device” (Ex. 1012, ¶ [0021]). For example, “[g]raphical object 102” “can be selected to invoke an email application on the mobile device,” and “[g]raphical object 104 can be selected to invoke a settings application or function of the mobile device” (Ex. 1012, ¶ [0021]).

427. With reference to FIG. 9 (reproduced below), *Mayor* depicts an example graphical user interface “for invoking applications and GUI shortcuts on a mobile device,” where the “graphical user interface 900” includes “GUI shortcut 902 and/or GUI shortcut 904” (Ex. 1012, ¶ [0036]). *Mayor* explains that “GUI shortcut 902 can be selected to invoke” a “‘Friends’ email folder” (Ex. 1012, ¶ [0036]). When “GUI shortcut 902 is invoked (e.g., selected by a user),” an application identifier associated therewith “can be used by the mobile device to invoke the application” (Ex. 1012, ¶ [0037]).

Ex. 1012, FIG. 9 (annotated)



428. With reference to FIG. 10B (reproduced below), *Mayor* discloses an example process “for invoking an application using a graphical user interface shortcut” (Ex. 1012, ¶ [0046]).

Ex. 1012, FIG. 10B (annotated)

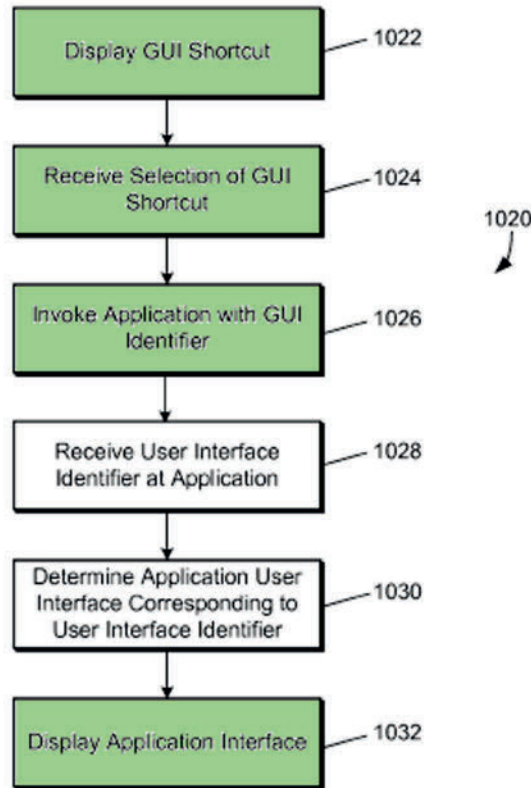


FIG. 10B

429. Thus, *Petterson* and *Mayor* render obvious claim element [22.b].

X. CONCLUSION

I declare that all statements made herein of my own knowledge are true, and

that all statements made on information and belief are believed to be true, and 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 Title 18 of the United States Code.

Dated: October 30, 2023

A handwritten signature in black ink, appearing to read 'C. Rosenberg', is written over a horizontal line.

Craig S. Rosenberg, Ph.D.