

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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ZEPP HEALTH CORPORATION,  
Petitioner

v.

SLYDE ANALYTICS, LLC  
Patent Owner.

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Case No. IPR2025-00062  
U.S. Patent No. 9,804,678

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**PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT NO. 9,804,678**

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| Ex-1007 | U.S. Patent No. 9,019,230 (“Li”)                             |
| Ex-1008 | U.S. Application Publication No. 2009/0164219 (“Yeung”)      |
| Ex-1009 | U.S. Patent No. 8,914,075 (“Pasquero”)                       |
| Ex-1010 | U.S. Patent No. 8,344,998 (“Fitzgerald”)                     |
| Ex-1011 | U.S. Application Publication No. 2011/0083100 (“Fyke”)       |
| Ex-1012 | U.S. Application Publication No. 2008/0168368 (“Louch”)      |
| Ex-1013 | International Publication No. WO 2006/120211 (“Tecchiolli”)  |
| Ex-1014 | U.S. Application Publication No. 2005/0212911 (“Marvit911”)  |
| Ex-1015 | U.S. Patent No. 7,301,528 (“Marvit528”)                      |
| Ex-1016 | U.S. Application Publication No. 2006/0097991 (“Hotelling”)  |
| Ex-1017 | U.S. Application Publication No. 2010/0146463 (“Cho”)        |

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<sup>1</sup> Four-digit pin citations that begin with 0 are to the branded numbers added in the bottom right corner of the exhibits. All other pin citations are to original page, column, paragraph, or line numbers.

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| Ex-1018 | U.S. Application Publication No. 2008/0248838 (“Chiang”) |
| Ex-1019 | U.S. Application Publication No. 2007/0211042 (“Kim”)    |
| Ex-1020 | Claim Mapping for the ’678 Patent                        |

|         |                                                                                                                                                                                                                                                             |
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| Ex-1021 | Josh Lowensohn, A brief history of smartwatches (pictures), CNET, <a href="https://www.cnet.com/pictures/a-brief-history-ofsmartwatches-pictures/">https://www.cnet.com/pictures/a-brief-history-ofsmartwatches-pictures/</a> (last visited Oct. 28, 2023). |
| Ex-1022 | LIS3L02DQ Data Sheet, STMicroelectronics.                                                                                                                                                                                                                   |
| Ex-1023 | U.S. Application Publication No. 2005/0216867 (“Marvit867”)                                                                                                                                                                                                 |
| Ex-1024 | U.S. Application Publication No. 2006/0236014 (“Yin”)                                                                                                                                                                                                       |
| Ex-1025 | zCover Universal Armband (2007).                                                                                                                                                                                                                            |
| Ex-1026 | INTENTIONALLY LEFT BLANK                                                                                                                                                                                                                                    |
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| Ex-1029 | Weisstein, Eric W. “Subset.” From MathWorld--A Wolfram Web Resource. <a href="https://mathworld.wolfram.com/Subset.html">https://mathworld.wolfram.com/Subset.html</a> .                                                                                    |
| Ex-1030 | Linux Watch, IBM, <a href="https://researcher.watson.ibm.com/researcher/view_group_subpage.php?id=6102">https://researcher.watson.ibm.com/researcher/view_group_subpage.php?id=6102</a> (last visited Sept. 29, 2023).                                      |
| Ex-1031 | Chandra Narayanaswami et al., IBM’s Linux Watch: The Challenge of Miniaturization 33-41 (2002).                                                                                                                                                             |

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| Ex-1032 | Mercedes Casamayor and Claire Croke, How to Save Power in Battery Applications Using the Power-Down Mode in an ADC, Analog Dialogue (2003),<br><a href="https://www.analog.com/media/en/analog-dialogue/volume37/number-3/articles/save-power-with-power-down-mode.pdf">https://www.analog.com/media/en/analog-dialogue/volume37/number-3/articles/save-power-with-power-down-mode.pdf</a> . |
| Ex-1033 | Eija Kaasinen, User acceptance of mobile services: Value, ease of use, trust and ease of adoption, VTT Technical Research Centre of Finland (June 22, 2005).                                                                                                                                                                                                                                 |
| Ex-1034 | U.S. Patent No. 5,612,931 (“Sato”)                                                                                                                                                                                                                                                                                                                                                           |
| Ex-1035 | Certified Translation of Japanese Patent Application Publication No. JP2007-41143 (“Nishijima”)                                                                                                                                                                                                                                                                                              |
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| Ex-1037 | Certified Translation of Chinese Patent Application Publication No. CN101458557 (“Zhenghao”)                                                                                 |
| Ex-1038 | U.S. Patent No. 9,122,735 (“Locker”)                                                                                                                                         |
| Ex-1039 | Seungyon Claire Lee, Bohao Li, and Thad Starner, AirTouch, Synchronizing in-air hand gesture and on-body tactile feedback to augment mobile gesture interaction 3-10 (2011). |
| Ex-1040 | Benjamin B. Bederson & James D. Hollan, Pad++: A Zooming Graphical Interface for Exploring Alternate Interface Physics 17-26 (1994).                                         |
| Ex-1041 | David Rogers, Feimo Hou, Chandelle Vuolo & Benjamin B. Bederson, Tossing Objects in a Desktop Environment (1996).                                                            |
| Ex-1042 | Benjamin B. Bederson, Fisheye Menus 217-225 (2000)                                                                                                                           |
| Ex-1043 | Leslie E. Chipman, Benjamin B. Bederson & Jennifer A. Golbeck, SlideBar: Analysis of a linear input device 1-9 (2004).                                                       |

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| Ex-1044 | Hilary Browne et al., Designing a Collaborative Finger Painting Application for Children (2000).                                                                                                   |
| Ex-1045 | Pekka Parhi, Amy K. Karlson & Benjamin B. Bederson, Target Size Study for One-Handed Thumb Use on Small Touchscreen Devices 203-210 (2006).                                                        |
| Ex-1046 | Amy K. Karlson, Benjamin B. Bederson & José Contreras-Vidal, Understanding One-Handed Use of Mobile Devices 1-22 (2007).                                                                           |
| Ex-1047 | David Dearman, Amy Karlson, Brian Meyers, Ben Bederson, Multi-Modal Text Entry and Selection on a Mobile Device 19-26 (2011).                                                                      |
| Ex-1048 | Test of Time Awards, VIS2021, <a href="https://ieevis.org/year/2021/info/awards/test-of-time-awards">https://ieevis.org/year/2021/info/awards/test-of-time-awards</a> (last visited Oct. 3, 2023). |
| Ex-1049 | Test of Time Awards, VIS2022, <a href="https://ieevis.org/year/2022/info/awards/test-of-time-awards">https://ieevis.org/year/2022/info/awards/test-of-time-awards</a> (last visited Oct. 3, 2023). |
| Ex-1050 | "Choosing the Right Architecture for Real-Time Signal Processing Designs" ( <a href="https://www.ti.com/lit/wp/spra879/spra879.pdf">https://www.ti.com/lit/wp/spra879/spra879.pdf</a> )            |

## I. INTRODUCTION

Zepp Health Corporation (“Petitioner”) request *inter partes* review (“IPR”) of Claims 1-15 of U.S. Patent No. 9,804,678 (“the ’678 Patent”) (Ex-1001), currently assigned to Slyde Analytics LLC (“PO”).

## II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

Real Parties-in-Interest: Petitioner identifies the following real parties-in-interest: Zepp Health Corporation.

Related Matters:

- *Slyde Analytics, LLC v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.*, Case No. 3:23-cv-00083-RWS-RSP (E.D. Tex.); and
- *Slyde Analytics, LLC v. Zepp Health Corporation*, Case No. 3:23cv-00172-RWS-RSP (E.D. Tex.).
- *Slyde Analytics, LLC v. Garmin Ltd. and Garmin Corporation*, Case No. 2:24-cv-00215-RWS-RSP (E.D. Tex.); and
- *Slyde Analytics, LLC v. Apple Inc.*, Case No. 2:24-cv-00331-RWS-RSP (E.D. Tex.)
- IPR2024-00040, Samsung (Petitioner) v. Slyde Analytics, LLC, U.S. Patent no. 9,804,678.

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### III. FEE AUTHORIZATION

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 132725.

### IV. GROUNDS FOR STANDING

Petitioner certifies that the '678 Patent is available for review, and Petitioner is not barred or estopped from requesting review.

### V. PRECISE RELIEF REQUESTED

Petitioner requests review and cancellation of Claims 1-15 as unpatentable based on the following grounds, supported by a declaration from Dr. Benjamin Bederson. Ex-1002 ¶¶1-234; Ex-1003.

| Ground | Summary                                                                      |
|--------|------------------------------------------------------------------------------|
| 1      | Claims 1-5, 7, 10-12, 14 are obvious over Orr in view of Orr682              |
| 2      | Claims 6, 8, 9, 15 are obvious over Orr-Orr682 in view of Li                 |
| 3      | Claims 1-5, 7, 10-12, 14 are obvious over Orr in view of Orr682 and Pasquero |
| 4      | Claims 6, 8, 9, 15 are obvious over Orr-Orr682-Pasquero in view of Li        |
| 5      | Claims 12-13 are obvious over Orr-Orr682-Pasquero in view of Yeung           |

|   |                                                                       |
|---|-----------------------------------------------------------------------|
| 6 | Claims 1-5, 7, 10-14 are obvious over Orr in view of Orr682 and Yeung |
|---|-----------------------------------------------------------------------|

## VI. THE CHALLENGED PATENT

The '678 Patent is directed to a wristwatch wherein some components can be operated in multiple power modes. Ex-1001, Abstract, 5:48-57. For example, the display, the touch sensor, and/or other components may operate in a “power saving mode” (or “low consumption mode”) “for preserving battery,” while the whole wristwatch can be powered on for displaying time on the display in a “time display mode.” *Id.*, 5:48-57.

The '678 Patent discloses a “touch panel” and an “inertial sensor” for use in “switch[ing] from a first power mode, such as a power saving mode, to a second power mode, such as a time display mode.” *Id.*, 6:3-22. In particular, from a sleep state, an inertial sensor may detect a tap, which wakes up a touchscreen, and the touchscreen may then detect an additional gesture, which transitions the device to a higher power mode. *Id.*, 6:3-22, 7:40-49. For example, a switch between power modes may be triggered by detecting a tap with the inertial sensor and/or a user gesture on the touch panel. *Id.* The inertial sensor (e.g., “accelerometer” with “processor”) “is always powered on in the first low power mode,” while the touch panel is off. *Id.* Thus, for example, a “power on signal” generated by the inertial

sensor “is used to wake up” the “touch panel” and “touch controller” “after detection of a likely tap,” and, later, the touch controller “generates a second wake up signal” “to wake up the microcontroller” and the “display” when the touch controller “confirms the tap detection.” *Id.*, 7:40-49, 7:65-8:3, 9:18-26.

To that end, to further conserve power and extend battery life, the ’678 Patent also discloses “discriminat[ing] between changes in” “acceleration signals” “caused by” “a tap” versus “any other acceleration” based on the “frequency,” “duration,” “amplitude,” “direction,” and/or “slope of the acceleration.” *Id.*, 6:23-7:23.

## **VII. PROSECUTION HISTORY OF THE ’678 PATENT**

The ’678 Patent, filed as Application No. 14/352,727 and claiming priority to a Swiss application filed on October 18, 2011, was allowed as none of the references discloses “a portable device whose powering up comprises ... in response ... to a detection of a gesture by an inertial sensor, waking up a touch controller for interpreting touch signal provided by a touch panel; and ... waking up the microcontroller in said wristwatch upon a detection of a tap gesture by the touch controller.” *See* Ex-1004, 0463, 0465, 0515. However, this was well-known in the art, as shown below (§XIII).

### VIII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art at the relevant time (“POSITA”) would have had a bachelor’s degree in electrical engineering, computer science, computer engineering, or a related field, and 2-3 years of experience in the research, design, development, or testing of user interfaces, inertial sensors, touchscreens, and human-computer interaction in mobile devices, with additional education substituting for experience and vice-versa. Ex-1002 ¶47.

### IX. PRIORITY DATE

The earliest possible priority date for the ’678 Patent is October 18, 2011. Petitioner takes no position on the proper priority date for each claim of the ’678 Patent. Assuming this earliest date, all references asserted in this Petition are prior art under pre-AIA 35 U.S.C. §102.

### X. CLAIM CONSTRUCTION

Petitioner interprets the claims of the ’678 Patent according to the *Phillips* claim construction standard. 37 C.F.R. §42.100(b). Claims 1 and 14 recite “***a processor and/or other processing means***” and “[using the] ***processor and/or other processing means*** [being arranged] for discriminating between gesture and no gesture.” Ex-1001, Claims 1, 14.<sup>2</sup> While the “means for” language might invoke

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<sup>2</sup> Unless indicated otherwise, all emphasis is added.

35 U.S.C. §112(6), these claims recite a “processor” and “other processing means” in the alternative. Because the prior art applied in this Petition discloses the claimed “processor,” it is not necessary to determine whether §112(6) applies to resolve this Petition.

Dependent Claim 15 recites “**powering means** arranged for powering only a first subset of said touch area upon detection of a gesture by said accelerometer, and for powering a larger subset in said second power mode.” This phrasing presumptively invokes 35 U.S.C. §112(6). The recited function is “powering only a first subset of said touch area upon detection of a gesture by said accelerometer, and for powering a larger subset in said second power mode.” The closest corresponding structure is described in the specification at 5:4-13 and 7:49-61. Column 5, lines 4-13 and Column 7, lines 49-61.

Thus, the minimum structure required to perform the recited function is “power supply 20,” which supplies power to all the components, and logic associated with touch controller 24 for powering up only a portion of the touch area and for powering a larger subset, or their equivalents.<sup>3</sup>

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<sup>3</sup> Petitioner has identified the closest disclosed structure in the ’678 Patent that relates to the recited function, but by doing so, Petitioner does not waive any argument that the structure for performing the claimed function is not sufficiently disclosed in the ’678 Patent. The parties have not yet submitted claim construction contentions in district court. To the extent the district court provides a determination

To resolve the grounds presented in this Petition, Petitioner does not believe any additional term requires explicit construction.<sup>4</sup>

**XI. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION UNDER §325(d) TO DENY INSTITUTION**

While Orr is similar to EP1785808, which was presented to the PTO during prosecution in an Information Disclosure Statement (IDS), here Petitioner applies Orr only in combination with art that was not of record during prosecution, and the Examiner never applied EP1785808 in a rejection or provided a view on its relevance. The Board should decline to exercise its discretion under §325(d) to deny institution, as the grounds and arguments presented herein are not cumulative of any considered during prosecution.

The first *Advanced Bionics* prong is not met—none of the references relied upon in this Petition in combination with Orr (i.e., Orr682, Li, Pasquero, and Yeung) was before the Examiner. *See, e.g., Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential); *Godbersen-Smith Constr. Co. d/b/a/ Gomaco Corp. v. Guntert & Zimmerman Const. Div., Inc.* IPR2021-00050, Paper 24 at 19-21 (PTAB May 7,

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on this term or others, Petitioner will submit such determination for the record. 37 C.F.R. §42.100(b).

<sup>4</sup> Petitioner respectfully reserves all rights to raise claim construction and other arguments in district court.

2021). Nor were any similar teachings of other references discussed by the Examiner. Ex-1002 ¶¶42-45. As explained above (§VII), the '678 Patent was allowed based on the applicants' arguments, and the Examiner's agreement, that the prior art does not disclose "a portable device whose powering up comprises ... in response ... to a detection of a gesture by an inertial sensor, waking up a touch controller for interpreting touch signal provided by a touch panel; ***and ... waking up the microcontroller in said wristwatch upon a detection of a tap gesture by the touch controller***" (see Ex-1004, 0463, 0465, 0515), yet Pasquero and Yeung teach such features in a wristwatch, and Orr682 teaches such tap detection. Ex-1002 ¶¶42-45. Moreover, no prior art reference that was before the Examiner discloses Orr682's tap-detection methods that depend on the slope and/or frequency of acceleration measurements. In sum, the grounds presented here are material and not cumulative of previous art considered by the Examiner. *See Advanced Bionics*, Paper 6 at 9-10 (discussing prong one in the context of degree of overlap between art previously presented and grounds presented in IPR); *see also, e.g., Godbersen-Smith Constr. Co.*, Paper 24 at 19-21.

Although the first prong is not met, the second *Advanced Bionics* prong makes clear that institution should not be denied under §325(d) because it was material error to overlook the clear and unambiguous teachings of EP1785808. Ex-1002 ¶45. Again, as explained above (§VII), the '678 Patent was allowed based on

the applicants' arguments, and the Examiner's agreement, that the prior art does not disclose "a portable device whose powering up comprises ... in response ... to a detection of a gesture by an inertial sensor, waking up a touch controller for interpreting touch signal provided by a touch panel" (*see* Ex-1004, 0463, 0465, 0515), but Orr indisputably teaches these features. Ex-1002 ¶¶42-45. However, the record is silent on the Examiner's view of EP1785808. *See Advanced Bionics*, Paper 6 at 10 (if record not well developed or silent on material prior art, error can be shown by "something persuasive"). Accordingly, the Board should not exercise its discretion under §325(d) to deny institution.

## **XII. BRIEF DESCRIPTION OF THE APPLIED PRIOR ART**

### **A. U.S. Patent No. 7,606,552 ("Orr") (Ex-1005)**

Orr issued October 20, 2009, and is thus §102(b) prior art.

Orr is directed to a "system and method for activating an electronic device from a low power state." Ex-1005, Abstract. As shown in Figure 3, Orr's device includes a motion detection subsystem (red), a touch subsystem (yellow), and a microprocessor (orange). *Id.*, 6:41-54; 9:32-34. After "a period of inactivity," "it will enter its sleep state." *Id.*, 9:45-48. "[A] two-stage approach is used to re-activate [the] device." *Id.*, 6:41-54. While the microprocessor (orange) and touch subsystem (yellow) are in a sleep state, the motion detection subsystem (red) awaits a motion gesture: "trigger circuit 38 is used with motion sensor 32 to detect an

initial movement or intent to use device 10.” *Id.*, 6:45-47. Once that initial motion has been detected, “monitoring circuit 36 [(yellow)] is activated with input device 34 [(touchscreen)] to detect any further indication that the device is meant to be reactivated.” *Id.*, 6:49-51. And “[o]nce monitoring circuit 36 [(yellow)] determines that device 10 is meant to be re-activated, it sends a re-activation signal to microprocessor 18.” *Id.*, 6:52-54.

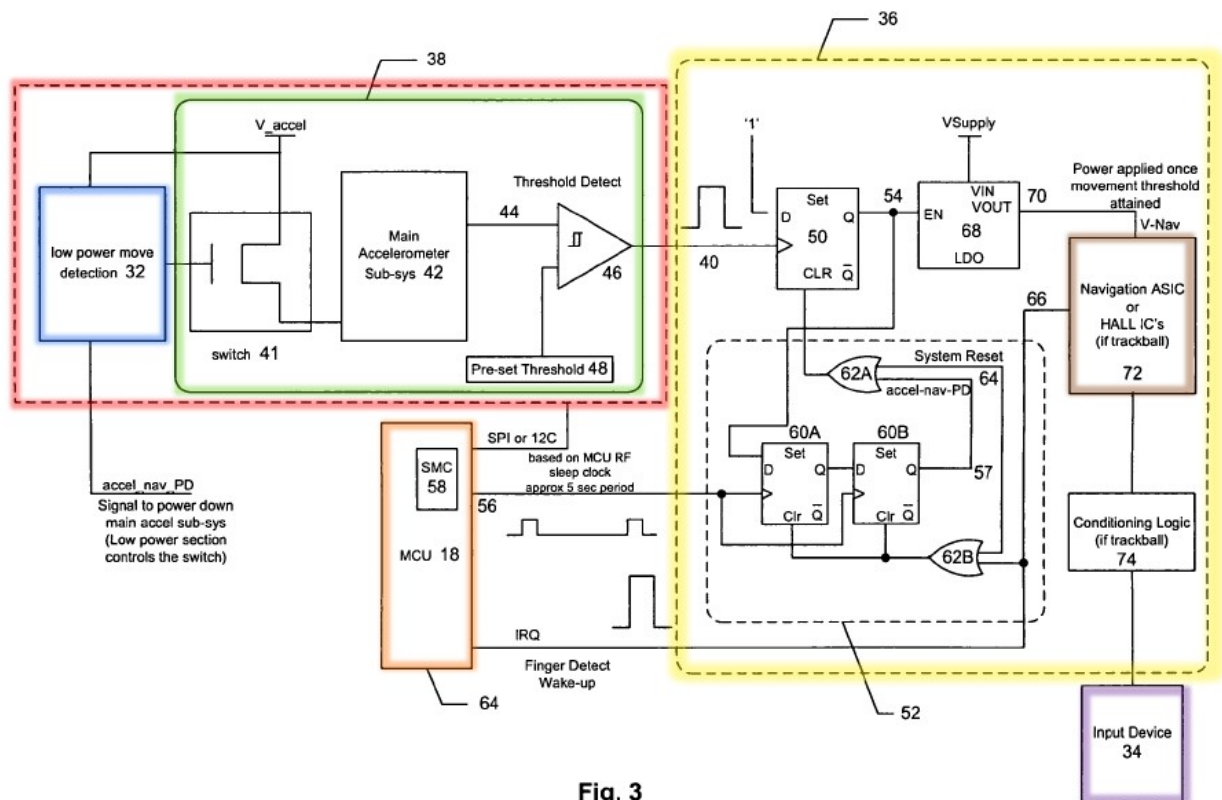


**Fig. 3**

Thus, when motion detection subsystem (red) detects an appropriate motion event, power is applied to navigation ASIC 72 (brown) (*id.*, 11:6-9; Fig. 3), which monitors input device 34 (purple), which may be a touchscreen (*id.*, 9:32-34). The touchscreen and touch controller (navigation ASIC 72) then wait for a confirming

gesture, and “when ... an acceptable signal has been received,” navigation ASIC 72 “generates wake-up signal 66,” which is sent to “microprocessor 18 which is activated upon the receipt of the wakeup signal 66.” *Id.*, 11:49-55.

Orr discloses that prior-art power-management techniques suffer from “unnecessary re-activations of the microprocessor” due to “[f]alse positives,” resulting in “draining a significant amount of power.” *Id.*, 1:32-42. Orr’s invention addresses these deficiencies by requiring confirmation of the user’s intended input. *Id.*

**B. U.S. App. Pub. No. 2010/0194682 (“Orr682”) (Ex-1006)**

Orr682 published August 5, 2010, and is thus §102(b) prior art.

Orr682 discloses a “handheld electronic device” and a “method for tap detection” by both the device’s accelerometer and its touchscreen. Ex-1006, Abstract, ¶¶24-26, 28-31; *see also id.* ¶¶3-4, 34, 38. Using the accelerometer, Orr682 measures acceleration, determines a “rate of change of acceleration,” and registers a tap input when the rate of change exceeds a “predetermined tap threshold.” *Id.* ¶¶24-26, 74-75. As a “tap event will have a higher rate of change of acceleration (e.g., a greater or ‘steeper’ slope) than other events,” such as hand gestures or other rapid movements, when the rate of change of acceleration exceeds a predetermined tap threshold, a tap input is registered. *Id.* ¶¶82-91.

**C. U.S. Patent No. 9,019,230 (“Li”) (Ex-1007)**

Li was filed on October 31, 2010, and is thus §102(e) prior art.

Li discloses “a capacitive touchscreen system” with means “for reducing the portions of touchscreen that are to be scanned” to reduce power consumption. Ex-1007, Abstract, 13:57-14:29. In one embodiment, “only a fraction of touchscreen 90” is activated (e.g., “[d]rive lines outside of the area of interest on touchscreen 90 are turned off, resulting in power savings”). *Id.*, 14:30-53.

**D. U.S. App. Pub. No. 2009/0164219 (“Yeung”) (Ex-1008)**

Yeung published June 25, 2009, and is thus §102(b) prior art.

Yeung uses “accelerometer-based orientation and/or movement sensing” to control “wrist-worn audio recorders and wristwatches.” Ex-1008 ¶¶5, 36-37. Yeung discloses a wrist-worn audio recorder and electronic wristwatch that includes a realtime clock, so that the recorder can provide a time-keeping function. *Id.* ¶36.

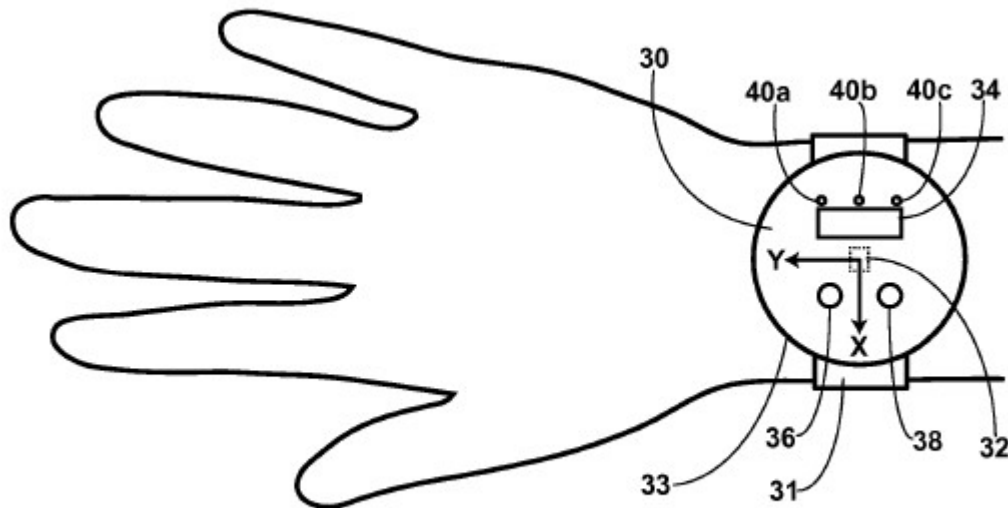


**FIG. 1**

Yeung detects a motion gesture and automatically switches to a higher power mode in which its audio recording function is turned on only after the wristwatch “has completed a predetermined movement.” *Id.* ¶48. For example, the wristwatch can detect a “predetermined movement, such as the natural movement of lifting the arm upwards from a resting position (i.e., from the side of the body or from in front of the lower end of the torso) and tilting the wrist towards the mouth.” *Id.* ¶47, Fig. 6.

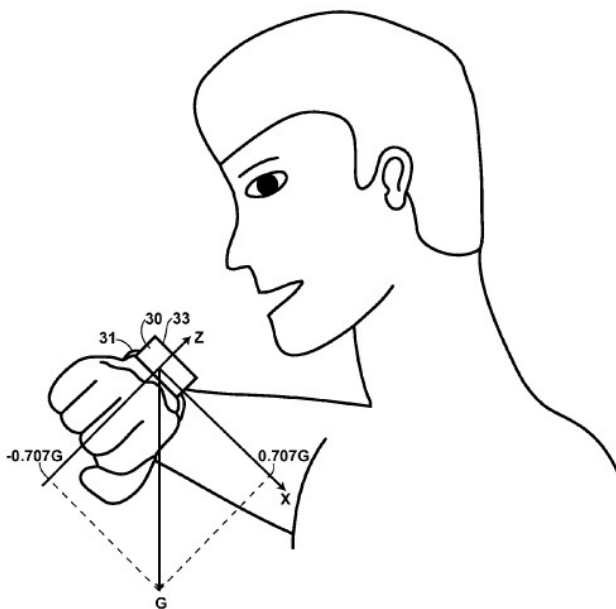


FIG. 6

**E. U.S. Patent No. 8,914,075 (“Pasquero”) (Ex-1009)**

Pasquero was filed on September 17, 2010, and is thus §102(e) prior art.

Pasquero discloses a “portable electronic device” that may be in the form of “a watch” that is “worn at or near the wrist of a user.” Ex-1009, 2:29-30, 3:38-50, Figs. 2-3.

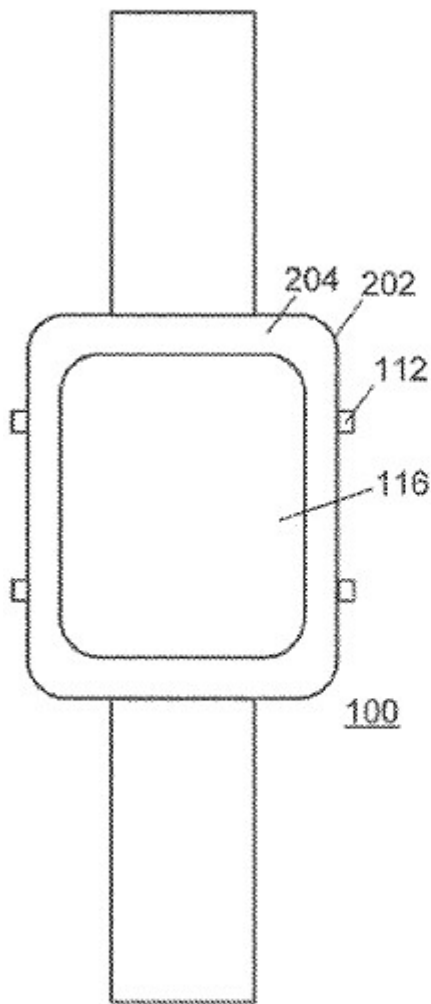


FIG. 2

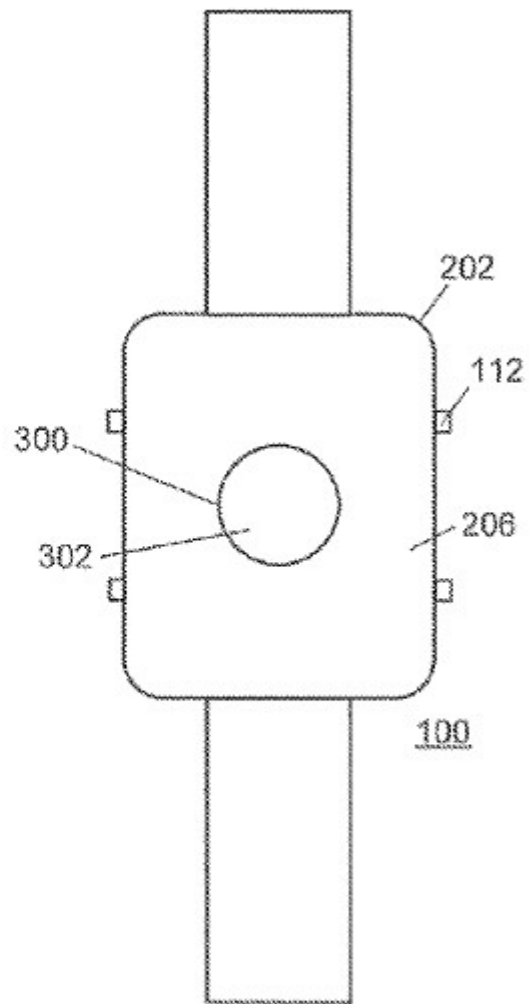


FIG. 3

Pasquero's wristwatch includes "touch-sensitive" "display 116," capacitive "touch" "sensors 114," and "accelerometer 113." *Id.*, Abstract, 3:23-50, 9:10-38; *see also id.*, 7:33-41, 8:10-20. "User interaction with the graphical user interface" is performed "through the buttons 112 and the sensors 114." *Id.*, 2:46-60, 5:15-38, 8:10-20. In addition, a motion input such as a "nudge" may be detected utilizing the accelerometer. *Id.*, 9:10-38.

### **XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS**

The '678 Patent includes two independent claims—Claims 1 and 14—that are substantially similar in scope but directed to different classes. *See* Ex-1020.

Claim 14 is addressed first because it is easier to parse.

Grounds 1-2 render obvious the claimed wristwatch based on Orr, Orr682, and the knowledge of a POSITA. To the extent an express disclosure of a wristwatch is necessary, Grounds 3-5 rely on Pasquero's explicit disclosure of a wristwatch in combination with Orr-Orr682. Ground 6 is presented as an alternative to Grounds 35 in the event PO is able to swear behind Pasquero (Ex-1009).

#### **A. Ground 1: Claims 1-5, 7, 10-12, and 14 Are Obvious Over Orr In View of Orr682**

- 1. A POSITA would have been motivated to combine Orr's and Orr682's teachings and would have had a reasonable expectation of success.**

A POSITA would have been motivated to combine the teachings of Orr and Orr682 and would have had a reasonable expectation of success in doing so, because each relates to the same technologies, names a common lead inventor, Kevin Orr, and was assigned to the same company, Research in Motion (maker of BlackBerry products). Ex-1002 ¶95. Both relate to gesture detection in portable

electronic devices using accelerometers and touchscreens. Ex-1005, 9:2-7, 11:1118; Ex-1006 ¶¶28, 91. And Orr and Orr682 provide compatible solutions for reducing power consumption in electronic devices. Ex-1005, Abstract, 1:32-42, 6:32-54; Ex-1006, Abstract, ¶¶3-4, 80-91. The proposed combination improves Orr in four aspects.

First, Orr discloses “a two-stage approach ... to re-activate [the] device” involving the accelerometer’s detecting a gesture input followed by the touch panel’s confirming the user’s intended input. Ex-1005, 6:44-50. Orr682 teaches specific methods for “tap detection” using an accelerometer processor that include determining a direction and “rate of change of acceleration” (i.e., “slope” of the acceleration signal) and registering a tap input when the rate of change exceeds a “predetermined tap threshold.” Ex-1006 ¶¶24, 83, 106. Orr682 explains that the accelerometer processor consists of a Motion detection subsystem 249 (FIG. 2) that is elaborated on in FIG. 6. *Id.* [0011].

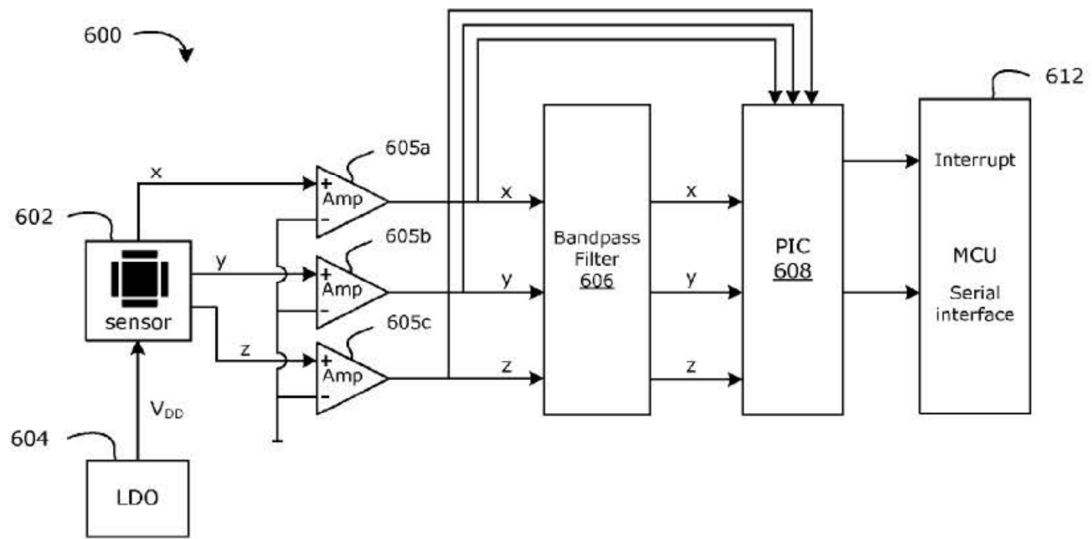


**FIG. 6**

'The circuit 600 comprises a three-axis analog accelerometer 602 having the outputs of each of three-axes connected to Amp 605a, Amp 605b and Amp 605c (referred to as Amps 605 collectively).' *Id.* [0126]. "The output of the Amps 605 is connected to a bandpass filter 606. The bandpass filter 606 has three outputs corresponding to each of the measured axes of the accelerometer 602. The outputs of the bandpass filter 606 are connected to a **Programmable Interface Controller (PIC) 608** with a built-in ADC. In other embodiments, the PIC 608 could be replaced with a 3-input MUX followed by an ADC. **The PIC 608 may be implemented using any suitable microprocessor** having a built-in ADC and sufficient sampling rate.' *Id.* [0127] (emphasis added). It would have been obvious to a POSITA that the output of an accelerometer could have been processed by

dedicated hardware or through software running on a processor. Either approach would have been well-known and suitable and the choice as to which to use would be a straightforward matter of considering the trade-offs behind each approach. For example, a software-based approach would be more flexible, easier to implement for more complicated algorithms, and much easier to upgrade. This understanding is supported by a 2002 article from Texas Instruments titled "Choosing the Right Architecture for Real-Time Signal Processing Designs" (<https://www.ti.com/lit/wp/spra879/spra879.pdf>), Ex-1050, that shows in Table 1 that using an MCU for designers of real-time applications was a well-known option and would be "Excellent" in terms of Time to Market, Price, and Feature Flexibility. Ex-1002 ¶96.



SPRA879

Table 1. Decision Table for Designers of Real-Time Applications

|              | Time to Market | Performance | Price     | Development Ease | Power     | Feature Flexibility | Summary   |
|--------------|----------------|-------------|-----------|------------------|-----------|---------------------|-----------|
| ASIC         | Poor           | Excellent   | Excellent | Fair             | Good      | Poor                | Fair      |
| ASSP         | Fair           | Excellent   | Good      | Fair             | Excellent | Poor                | Good      |
| Configurable | Poor           | Excellent   | Good      | Poor             | Good      | Fair                | Fair      |
| DSP          | Excellent      | Excellent   | Good      | Excellent        | Excellent | Excellent           | Excellent |
| FPGA         | Good           | Excellent   | Poor      | Excellent        | Poor      | Good                | Fair      |
| MCU          | Excellent      | Fair        | Excellent | Good             | Fair      | Excellent           | Good      |
| RISC         | Good           | Good        | Fair      | Good             | Fair      | Excellent           | Good      |

The architectural considerations are listed on the left side of the table. The criteria used to evaluate these various options are listed along the top, according to importance of the criteria and the effectiveness of individual choices in meeting them.

Following is an in-depth discussion of each of these signal processing alternatives and how they address the issues of today's developer.

Between 2002 and 2011, the value of using processor-based signal processing solutions generally increased due to lower cost and growth of options in the marketplace. Orr682's accelerometer processor also further improves the "accuracy of tap detection" by analyzing the "duration of each of the positive and negative peaks [of the acceleration signal], the duration of the peaks, and possibly the duration between the peaks," i.e., the frequency of the acceleration signal. *Id.* ¶84. Orr682's methods "increase the accuracy" and reduce "erroneous tap inputs." *Id.* ¶89. A POSITA would have been motivated to enhance Orr's accelerometer and inertial sensor processor to include Orr682's accelerometer processing capabilities of measuring direction, slope (including amplitude), and frequency of the acceleration signal (Ex-1006 ¶24) in order to more reliably detect a tap gesture with the accelerometer and avoid "unnecessary re-activations of the microprocessor" due to "[f]alse positives" (Ex1005, 1:32-42, 6:41-54). Ex-1002 ¶96.

Second, once Orr detects a tap using the accelerometer processor, it wakes up a "touchscreen" ("input device 34"), which can "detect movement of a finger of the user across its sensor." Ex-1005, 9:21-24, 9:33-39. This touchscreen-detected gesture is used to provide a "further check for activation inputs" to validate that the initial input detected by the accelerometer was intentional, though Orr does not specifically state this touchscreen gesture may be a tap. *Id.*, 9:21-26. However, Orr682 also discloses a touchscreen and touchscreen controller that receives touch

inputs from the touchscreen surface *to detect taps*. Ex-1006 ¶¶28-29. A POSITA would have been motivated to modify Orr's touchscreen controller to detect a tap on the touchscreen surface, which would have provided additional safeguards against a misidentified gesture that might otherwise wake up the device's microprocessor unnecessarily. Ex-1002 ¶97.

Third, Orr describes a “display 14” and an “input device 34” and states that the input device 34 can be a touchscreen. Ex-1005, 9:32-34. A POSITA would have understood that in such a case, display 14 would have been implemented as a touch-sensitive display such that “display 14” and “input device 34” are combined as a single unit, i.e., a touchscreen display. Ex-1002 ¶98. However, Orr does not describe the structure of its touchscreen display 14/34. On the other hand, Orr682's touchscreen is implemented as “an electrode layer sandwiched between a glass member and a transparent protective cover sheet on which the touch-sensitive input surface 108 is located.” Ex-1006 ¶43. A POSITA would have recognized that Orr682's transparent protective cover sheet could have been implemented as a glass layer. Ex-1002 ¶98. Indeed, using a glass layer to cover a touchscreen was well-known in the art, as was implementing such cover sheets as a glass layer. *Id.* (discussing Hotelling (Ex-1016)). A POSITA would have been motivated to implement Orr's touchscreen display according to Orr682's teachings because a POSITA would have understood that touchscreens routinely comprise a protective

cover glass on which a user can perform touch gestures in order to protect the system's components from the elements, particularly as glass is more scratchresistant than other protective cover sheet options, such as plastic or acrylic. Ex-1002 ¶98.

Fourth, Orr teaches waking a microprocessor from a sleep state after detecting a gesture on the touchscreen. Ex-1005, 9:27-31. Orr682 also discloses a microprocessor ("processor 240 of the device") and notes that "detection of a touch event ... and/or determining the location of the touch event ... may be performed by either the *controller* of the touchscreen display ... or the *processor* ... of the device." Ex-1006 ¶49. In other words, once Orr682's microprocessor is awake, it can perform gesture detection from the touchscreen inputs independently of the touch controller. A POSITA would have been motivated to enhance Orr's microprocessor programming with the touch-processing software of Orr682 to enable the microprocessor to detect touch gestures independently of the touch controller because this would allow more flexibility in the type and complexity of gestures that could be detected by the system once fully powered up. Ex-1002 ¶99. Because Orr's touchscreen controller must detect certain gestures before the microprocessor is awakened, it should operate at a low power and detect only a limited number of gestures. *Id.* But once the system is fully awake, a more capable

system, in which software on the microprocessor could recognize a large variety of gestures, would be advantageous. *Id.*

Thus, the combined system of Orr-Orr682 would include (1) Orr's accelerometer and inertial sensor processor enhanced to detect a direction, slope (including amplitude), and frequency of acceleration, as disclosed by Orr682's accelerometer processor; (2) Orr's touch controller enhanced to detect tap gestures at the touchscreen, as disclosed in Orr682; (3) Orr's touchscreen implemented underneath a cover glass such that user gestures are performed (and detected) on the cover glass, as disclosed by Orr682; and (4) Orr's microprocessor enhanced with the capability of detecting touchscreen gestures independently of the touch controller, as disclosed by Orr682. Ex-1002 ¶100.

Modifying Orr to include these Orr682 features would have been a straightforward engineering task for a POSITA as both Orr and Orr682 disclose standard mobile computing devices that can detect gestures. Ex-1002 ¶101. Accordingly, a POSITA would have understood that implementing the approaches described in Orr682 into Orr's system would have been a matter of using familiar elements that would have yielded predictable results. *Id.*

Furthermore, a POSITA would have had a reasonable expectation of success in combining the teachings of Orr and Orr682, as both patent publications are by the same inventor and assigned to the company. Ex-1002 ¶102. Moreover, each

purports to solve problems relevant to portable electronic devices in similar and predictable ways. For example, Orr teaches a “two-stage approach” involving added confirmation for input gesture detection, and Orr682 teaches a method to discriminate a purposeful tap from a false input using features inherent to a tap gesture. Ex-1005, 6:32-54; Ex-1006 ¶¶24-31; Ex-1002 ¶102. A POSITA would have understood that the teachings of Orr and Orr682 could have been combined with no change in the respective functions in Orr and Orr682’s compatible systems. Ex-1002 ¶102.

**2. Independent Claim 14**

**a. Element 14[pre]: A wristwatch which can be operated in a plurality of power modes including a first power mode and a second power mode, comprising:**

Orr in view of Orr682 (“Orr-Orr682”) teaches the preamble of Claim 14, to the extent that the preamble is limiting. Ex-1002 ¶¶103-112.

Although Orr does not expressly disclose a wristwatch, it would have been obvious to implement Orr on a wristwatch. Orr is directed to an electronic device that is “optimally” “lightweight, compact and [has] long battery life.” Ex-1005, 1:20-22. Its design is “based on construction design and functionality of other electronic devices, such as smart telephones, desktop computers pagers or laptops having telephony equipment.” *Id.*, 3:44-48. While an exemplary embodiment of an electronic device that is a small handheld device is shown in Figure 1, Orr’s teachings are equally applicable to a device that is worn on the wrist. Ex-1002

¶¶104-111.

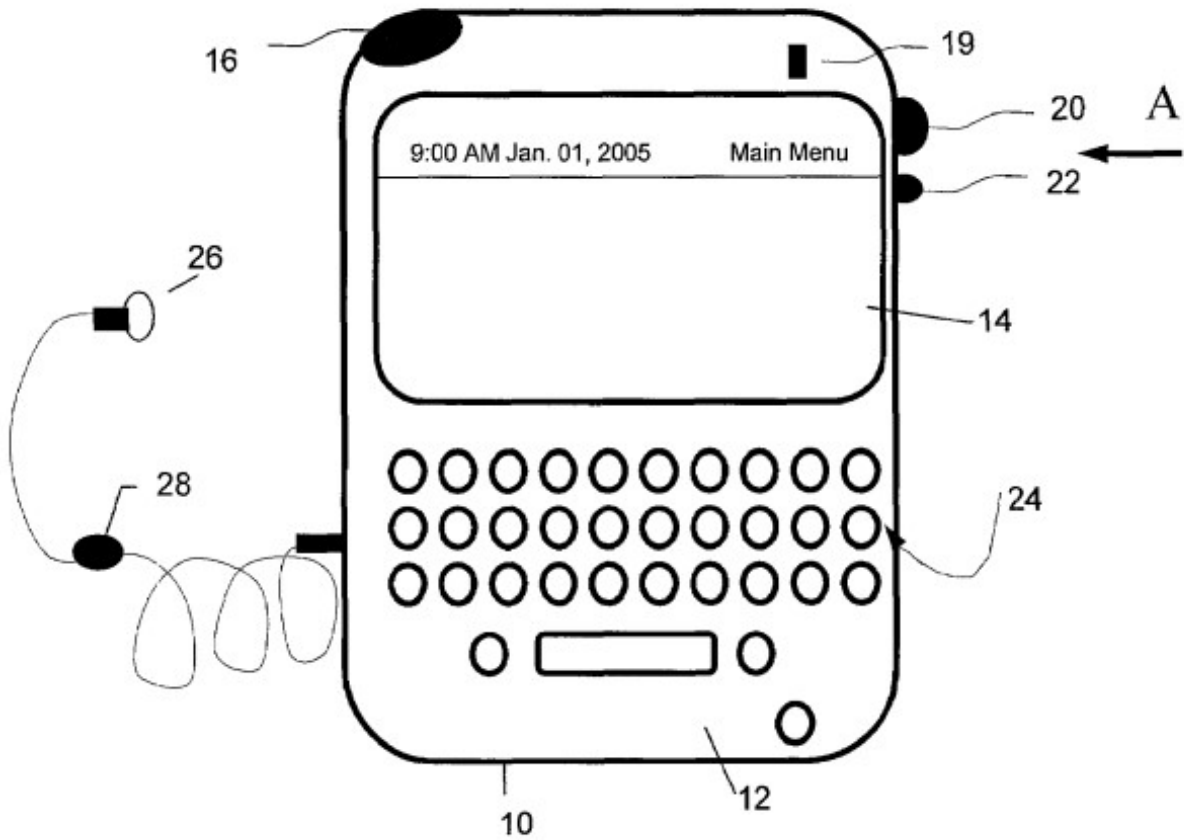
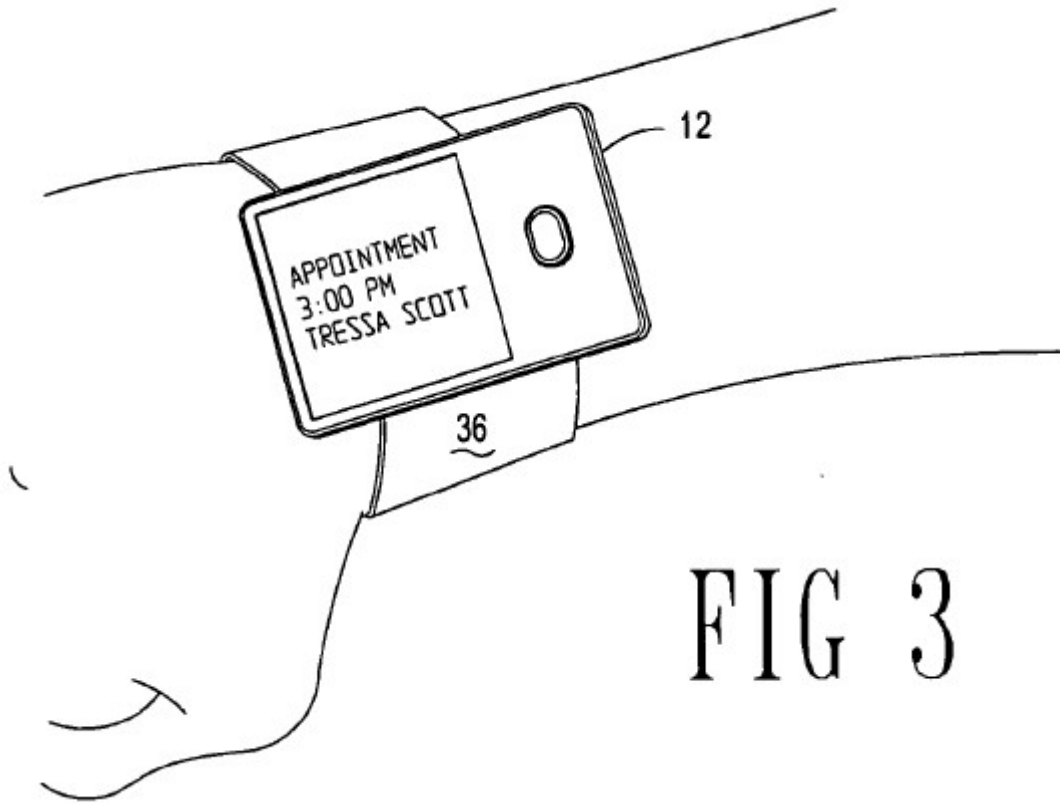


**Fig. 1**

In fact, it was known that a PDA or smartphones could be made wrist-wearable by attaching a wrist strap, essentially converting it to a wristwatch, for convenient viewing without having to hold it in hand. Ex-1002 ¶105 (discussing Yin (Ex-1024), zCover (Ex-1025)).



Ex-1024, Fig. 3.



Ex-1025

Although not required by the claim, a POSITA would have further recognized that a wrist-wearable PDA, such as the kind described in Orr, could be further scaled to the size and form of a typical wristwatch. Ex-1002 ¶106.

Wristwatches having multiple power modes, motion detectors/accelerometers, and/or touchscreen displays were well-known in the art, including several listed on the face of the Orr patent, indicating that Orr or the Examiner found them to be relevant to Orr's disclosure. *Id.* (discussing Marvit911 (Ex-1014), Marvit867 (Ex1023)). Other references similarly show watches with touchscreens and/or accelerometers were well-known. Ex-1002 ¶106 (discussing Yeung (Ex-1008), Pasquero (Ex-1009), Fitzgerald (Ex-1010), Fyke (Ex-1011), Louch (Ex-1012), Tecchiolli (Ex-1013), Marvit528 (Ex-1015)). Moreover, watches incorporating cellular telephony (as described by Orr (Ex-1005, 3:59-61)), were well-known in the art, and implementing such features of Orr in a watch form factor would not have presented any obstacle. Ex-1002 ¶¶107-110 (discussing Cho (Ex-1017), Chiang (Ex-1018), Kim (Ex-1019), CNET survey (Ex-1021)). Thus, applying Orr's teachings to a wristwatch format would have been well within the capabilities of a POSITA and would have been a matter of ordinary engineering and not the product of innovation. Ex-1002 ¶111.

As set forth below (§§XIII.A.2.f-XIII.A.2.h), Orr-Orr682 also discloses a plurality of power modes including a first power mode (or "low power state" or

“sleep mode”) and a second power mode (or “higher power state” or “normal operating mode”). Ex-1005, Abstract, 1:4-10; *see also id.*, 1:22-28, 6:15-31.

**b. Element 14[A]: a display;**

Orr-Orr682 discloses Element 14[A]. Ex-1002 ¶¶113-114. Orr’s display 14 may be touch-sensitive such that Orr’s input device 34 is implemented as the display 14. *See* Ex-1005, 9:32-37. Orr discloses that “a received signal,” such as a text message or web page download, is provided as an input to the microprocessor, which further processes the received signal and “then *generate[s] an output to display 14.*” Ex-1005, 5:38-51, Figs. 1-2; Ex-1002 ¶¶113-114.

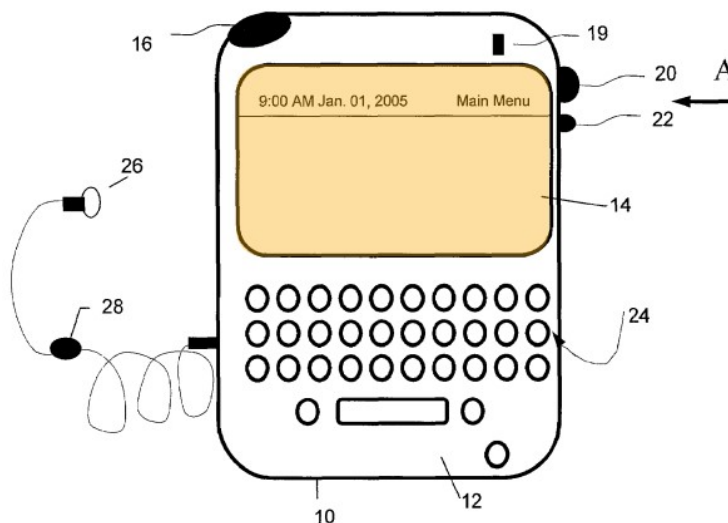


Fig. 1

**c. Element 14[B]: a microcontroller;**

Orr-Orr682 discloses Element 14[B]. Ex-1002 ¶¶115-117. As shown in Figure 2, Orr discloses “microprocessor 18” to control the overall operation of the device and to control and receive data, transmissions, inputs and outputs related to

the device. Ex-1005, 4:6-26; *see also id.*, 4:40-67; Ex-1002 ¶¶115-117. For purposes of these claims, a POSITA would have understood the terms “microprocessor” and “microcontroller” to be referring to roughly the same device. Ex-1002 ¶¶115-117.

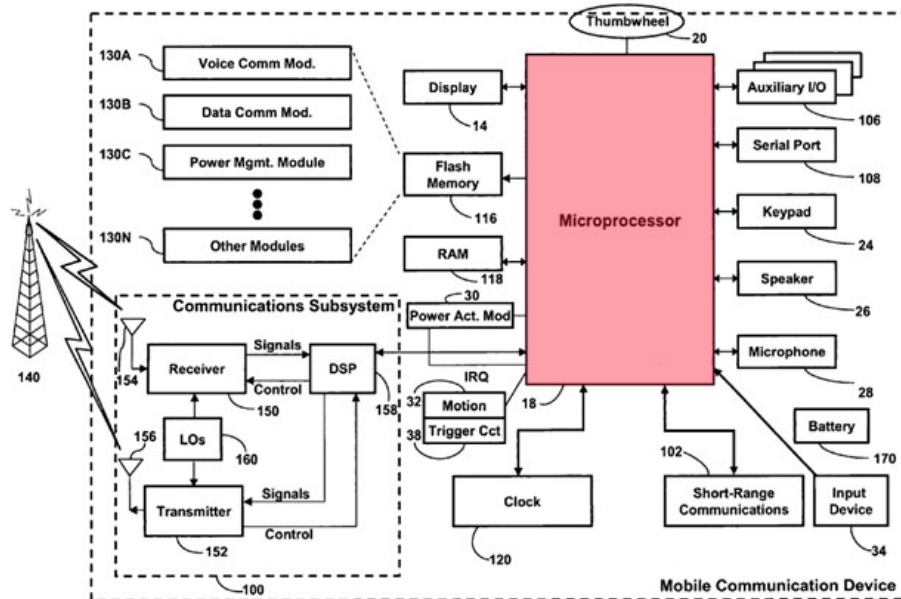


Fig. 2

- d. **Element 14[C]: a touch panel underneath a cover glass of said wristwatch for detecting a gesture on said cover glass;**

Orr-Orr682 teaches Element 14[C]. Ex-1002 ¶¶118-119.

Orr-Orr682 teaches a touch panel underneath a cover glass for detecting a gesture on said cover glass. Orr teaches a “touchscreen” “input device 34” (i.e., touch panel) that detects an “indication that the device is meant to be reactivated” (Ex-1005, 9:21-43, 11:6-20), where “*a specific gesture ... may be required.*” Ex1005, 6:45-51, 8:64-65. Orr682 teaches such touchscreens comprising “an electrode layer sandwiched between a glass member and a transparent protective

cover sheet on which the touch-sensitive input surface 108 is located.” Ex-1006

¶43. A POSITA would have recognized that such protective cover sheets were typically made from glass, particularly as glass is more scratch-resistant than other protective cover sheet options, such as plastic or acrylic. Ex-1002 ¶119 (discussing Ex-1016). A POSITA would have been motivated to apply Orr682’s teachings to Orr’s system, such that the combined system comprises Orr’s touchscreen input device (i.e., touch panel) implemented underneath a cover glass for detecting a gesture on said cover glass, as taught in Orr682 (Ex-1006 ¶43). Ex-1002 ¶119. A POSITA would have had a reasonable expectation of success in doing so, for the reasons discussed above (§XIII.A.1). Ex-1002 ¶119. Indeed, a POSITA would have understood that a cover glass was routinely used as the top layer of a touchscreen to provide a smooth surface, particularly for user input (e.g., a gesture), and to protect the circuitry underneath. *Id.*

**e. Element 14[D]: a touch controller for interpreting touch signal provided by the touch panel and for converting said signals into command signal;**

Orr-Orr682 discloses Element 14[D]. Ex-1002 ¶¶120-121.

Orr discloses a touch controller for interpreting touch signals provided by the touch panel and for converting said signals into command signals. As shown in Figure 3, Orr’s “navigation circuit 72” (brown) (i.e., touch controller) “receives signals generated by” touchscreen input device 34 (purple) (i.e., touch panel) “and

has logical circuits ... which evaluates the signals” (i.e., interprets the touch signals from the touch panel). Ex-1005, 6:45-51, 11:6-20.

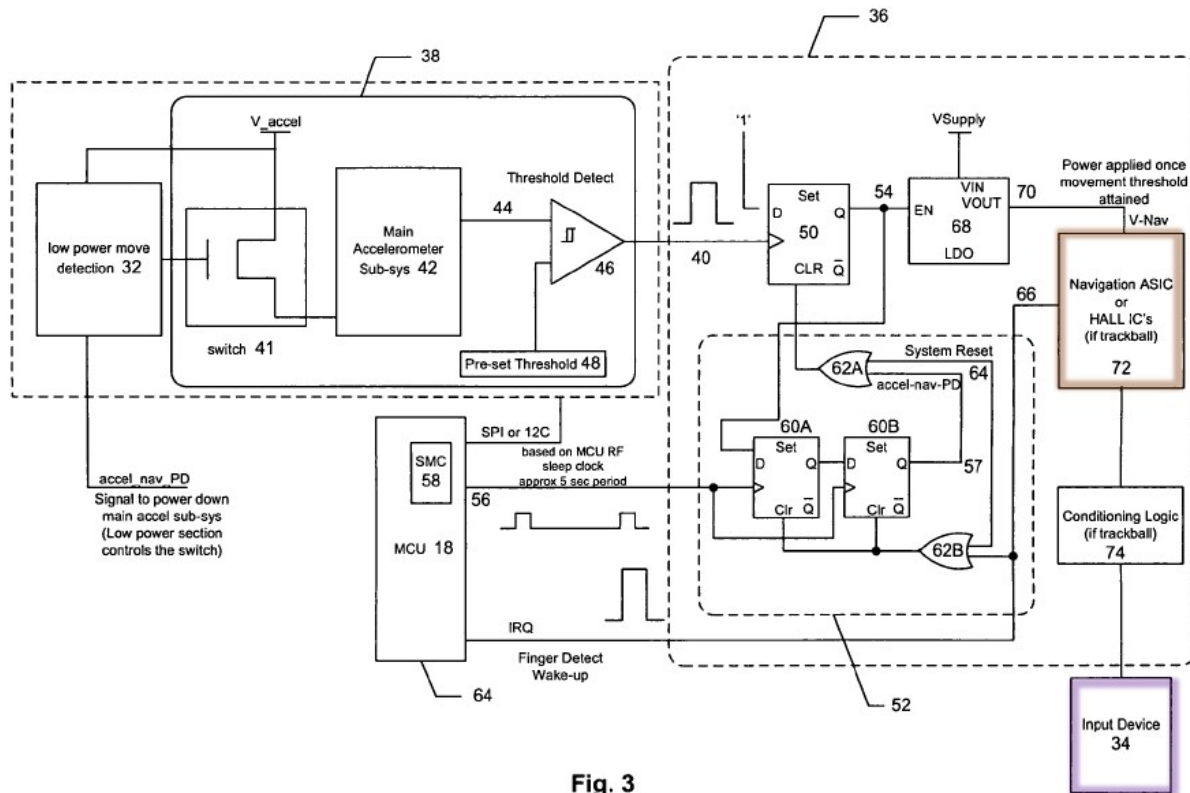


Fig. 3

The navigation circuit 72 (i.e., touch controller) “may evaluate the signals and may require them to be of a certain direction, force, duration, speed or any combination of those characteristics” in order to **convert** the touch signal into a “re-activation signal” to **command** the device to be reactivated. Ex-1005, 6:45-51 (discussing monitoring circuit 36, which comprises navigation circuit 72), 11:6-20 (same); Ex1002 ¶121. Thus, the “re-activation signal” is the claimed “command signal.” Ex1002 ¶121.

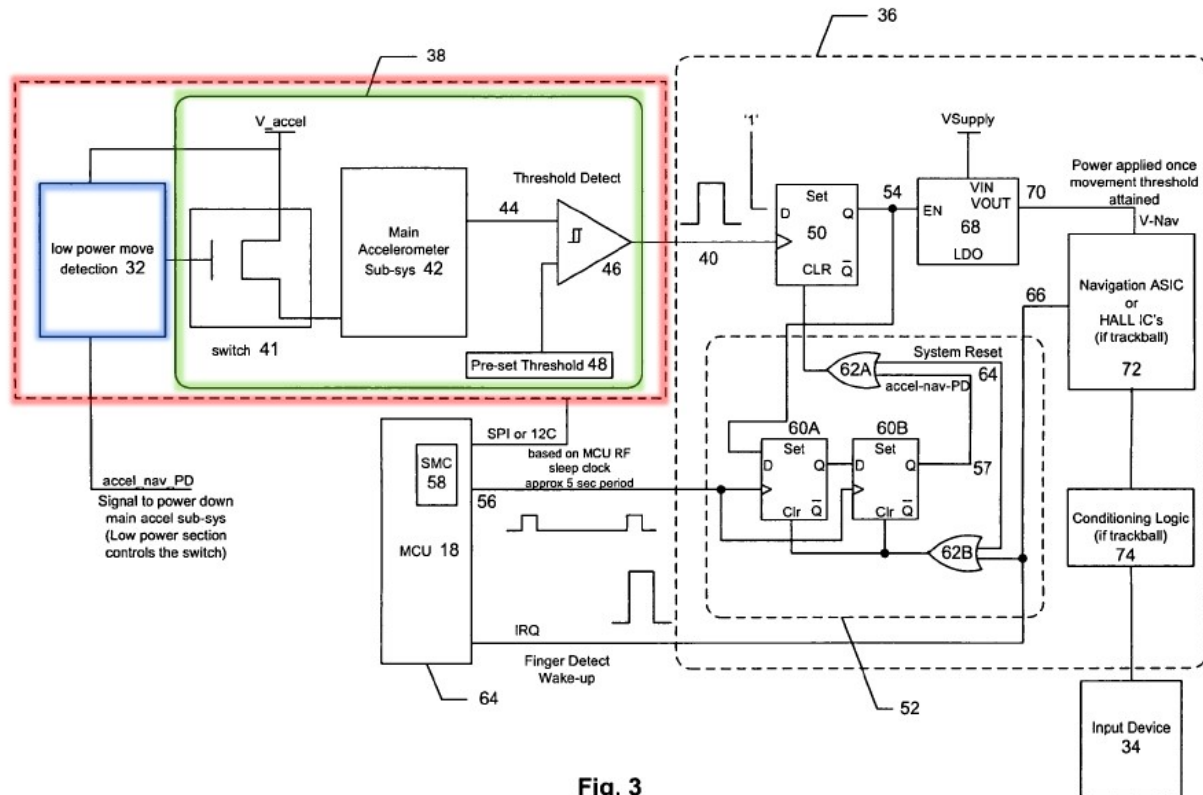
- f. **Element 14[E]: [1] an inertial sensor comprising an accelerometer and a processor and/or other processing means, [2] said accelerometer being arranged for generating an acceleration signal and [3] the processor and/or other processing means being arranged for discriminating between gesture and no gesture based on a direction of said acceleration signal as measured by said accelerometer being a three dimensional accelerometer, and [4] on a slope or frequency of said acceleration signal, [5] while the microcontroller and the touch controller are in a sleep power mode;**

Orr-Orr682 teaches Element 14[E]. Ex-1002 ¶¶122-136.

**(1) Inertial sensor comprising an accelerometer and a processor and/or other processing means**

Orr discloses an inertial sensor comprising an accelerometer and a processor. Orr's Figure 3 discloses a "motion sensor circuit" (red) (i.e., inertial sensor) comprising (1) "motion sensor 32" (blue), which may be "a low-g MEMs (microelectromechanical system) accelerometer" (Ex-1005, 6:55-7:2), and (2) "trigger circuit 38" (green) comprising "main sub-system 42." Ex-1005, 6:55-7:2; *see also id.*, 7:18-36, 7:59-65. Orr's trigger circuit 38 comprising main sub-system 42 is an inertial sensor *processor* because it detects a "specific gesture," "such as a quick 'snap' movement in a certain direction," "detects each component of the gesture," and analyzes each component "to determine whether the gesture has been properly formed." Ex-1005, 8:64-9:7; Ex-1002 ¶¶123-124. To the extent that Orr does not disclose an inertial sensor processor, it would have been obvious to use the

disclosure of Orr682's software-based accelerometer processor 600 in place of Orr's trigger circuit 38. Ex-1002 ¶¶96.



**(2) Accelerometer arranged for generating an acceleration signal**

Orr discloses an accelerometer arranged for generating an acceleration signal. Orr's accelerometer 32 can “*sense and convert an acceleration* detected from a motion (e.g. tilt, inertial, or vibration) or gravity *into an electrical signal* (producing a corresponding change in output).” Ex-1005, 6:55-7:2; *see also Id.*, 6:32-54 (discussing “signals received from motion sensor 32”), 7:3-17 (discussing “output signal generated by accelerometer 32”), 8:25-40 (describing accelerometer 32 producing a range of values representing all detected up/down movements),

8:64-9:7 (describing accelerometer 32 and sub-system 42 detecting each component of a gesture); Ex-1002 ¶125.

**(3) Processor arranged for discriminating between gesture and no gesture based on a direction of said acceleration signal as measured by said accelerometer being a three dimensional accelerometer**

Orr's inertial sensor processor (trigger circuit 38 comprising sub-system 42) discriminates between gesture and no gesture based on the acceleration signal. As a user performs a gesture, sensor 32 and sub-system 42 detects each component of the gesture and "*each component is analyzed to determine whether the gesture has been properly formed.*" Ex-1005, 9:2-6. Orr682 discloses analyzing an acceleration signal in all three axes to determine its direction. Ex-1006 ¶¶83 (measuring "*forward* acceleration" or "*backward* acceleration"), 106 ("when a tap occurs all three axes of a 3-axis accelerometer measure a response"). Ex-1002 ¶¶126-129. Orr's accelerometer is a "*three axis*" "*accelerometer*," such as "a LIS3L02AQ *tri-axis* analog *accelerometer*, available from STMicroelectronics," that can "sense and convert an acceleration detected from a motion (e.g. tilt, inertial, or vibration) or gravity into an electrical signal (producing a corresponding change in output)." Ex-1005, 6:55-7:2; Ex-1002 ¶¶126-129.

**(4) [Discriminating between gesture and no gesture based] on a slope or frequency of the acceleration signal**

Orr-Orr682 teaches the inertial sensor processor is arranged for discriminating between gesture and no gesture based on a slope or frequency of the acceleration signal. As discussed above (§XIII.A.1), a POSITA would have been motivated to enhance Orr's three-axis accelerometer and inertial sensor processor with Orr682's capability of determining the direction, slope, and frequency of an acceleration signal, and would have had a reasonable expectation of success in doing so. Ex-1002 ¶¶130-132.

Orr682 calculates a "rate of change of acceleration" or "*slope* (i.e., rise/fall per unit time)" of the acceleration signal. Ex-1006 ¶90. "A tap event will have a higher rate of change of acceleration (e.g., a greater or 'steeper' *slope*) than other events such as, for example, hand gestures or other rapid movements." *Id.* ¶91. And "*when the rate of change of acceleration*" (i.e., slope) (Figure 16, step 1606) exceeds a "predetermined tap threshold," a tap input is registered (Figure 16, step 1608). *Id.* ¶¶94-95; *see also id.*, Abstract, ¶¶41, 53, 77, 105-108, 126; Ex-1002 ¶¶130-132.

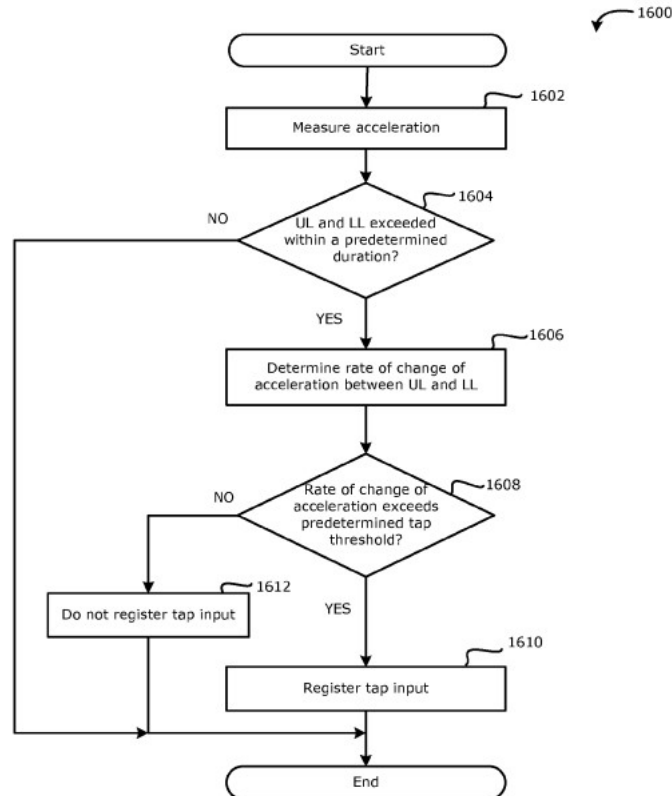


**FIG. 16**

Although only a “slope” or “frequency” is required by the claim, Orr682 also determines a frequency of acceleration. The ’678 Patent notes that tap signals have a high frequency characterized by “a pulse function with a first step of fast increase of the acceleration almost immediately followed by a step of fast deceleration, the duration of the whole pulse being typically in the range of 10 to 20 ms.” Ex-1001, 6:35-43. Orr682 measures these frequency-characterizing parameters of the acceleration pulse, as described with reference to Figure 7, which illustrates a “tap response” of the accelerometer. Ex-1006 ¶83. The tap response exhibits two narrow

peaks 702 and 704, and Orr682 measures the “duration of the time that the accelerometer output is above the upper limit,” or  $\Delta t_1$ ; the “duration of the time that the accelerometer output is below the lower limit,” or  $\Delta t_2$ ; and the “difference between the start time ... and end time” of the accelerometer pulses, denoted  $t_{1,1}$ ,  $t_{1,2}$ ,  $t_{2,1}$ , and  $t_{2,2}$ . *Id.* ¶85.

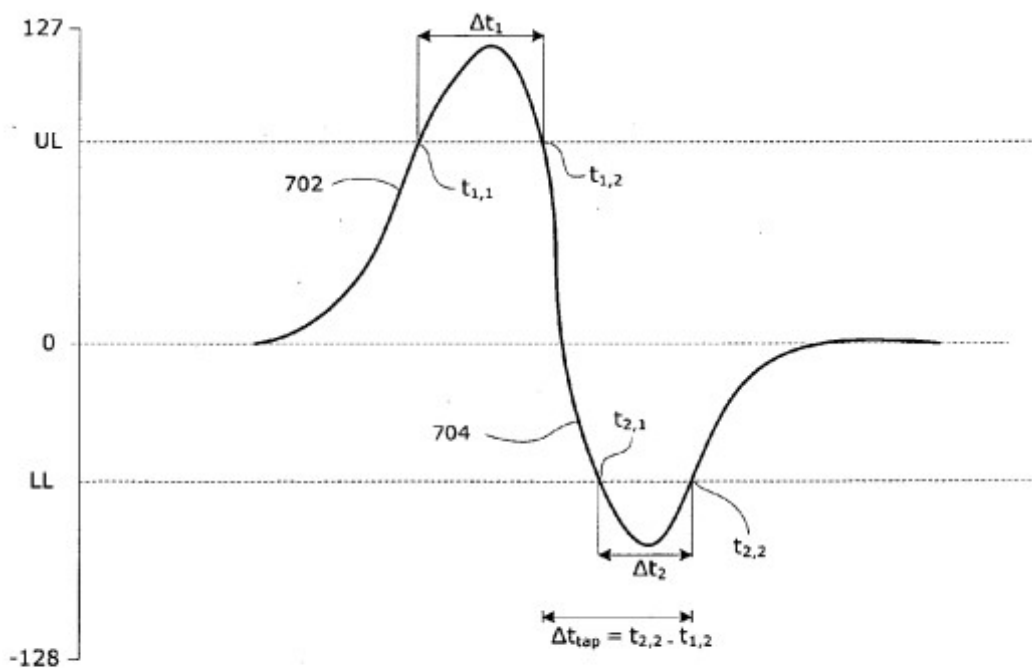


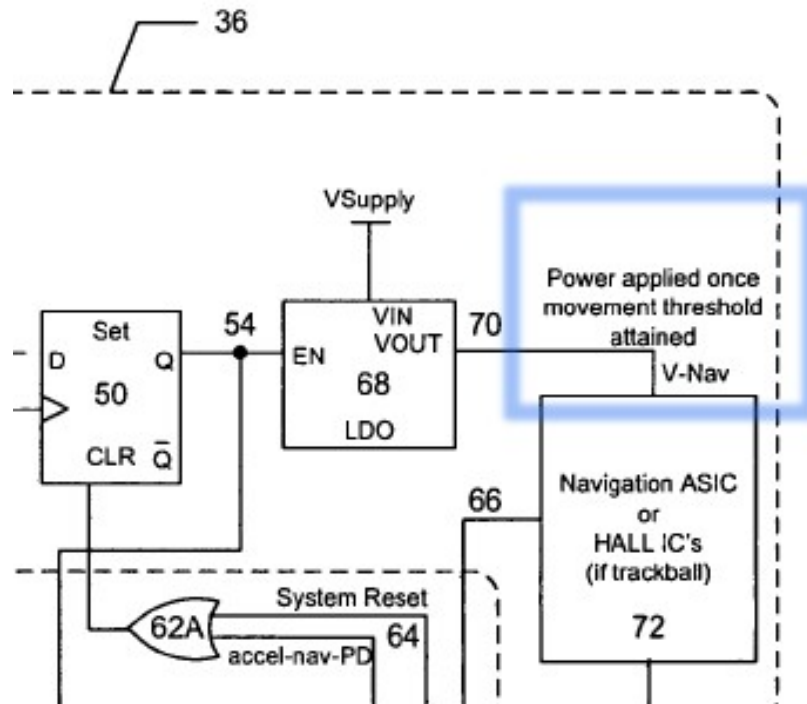
**FIG. 7**

Orr682 makes such measurements because the “accuracy of tap detection” “can be further improved by analysing the duration of each of the positive and negative peaks, the duration of the peaks, and possibly the duration between the peaks.” *Id.* ¶¶84-85. Orr682’s processor “determines that a tap ... has occurred when the interrupt signals corresponding to the upper and lower threshold are received

within a predetermined duration of each other.” *Id.* ¶86. In other words, Orr682 uses the frequency of the acceleration signal as characterized by its quick rise and fall and overall duration (just as taught in the ’678 Patent) to detect a tap gesture. Ex-1002 ¶¶130-132.

**(5) While microcontroller and touch controller are in a sleep power mode**

Orr’s “motion sensor circuit,” including accelerometer and inertial sensor processor (trigger circuit 38 comprising sub-system 42) (outlined in red in Figure 3, above), detects the initial wake-up gesture—“an initial movement or intent to use device 10”—while the microcontroller and touch controller are in a sleep power mode. *See* Ex-1005, 6:45-47. Figure 3 states that power is applied to navigation ASIC 72 (i.e., touch controller) only *after* this initial movement has been detected. *Id.*, Fig. 3 (excerpt) (“power applied once movement threshold attained”), 10:5711:9 (ASIC 72 is “activated by output signal 70” once “trigger signal 54” has been generated based on the accelerometer output).



As explained in more detail below, a POSITA would have recognized that the activation of the touch controller (“navigation ASIC 72”) based upon accelerometer output indicates that the touch controller was in a “sleep power mode” when the accelerometer input was received. Ex-1002 ¶¶133-136. Next, the touch panel and touch controller wait for a touch input confirming that the user intended to reactivate the device (as discussed below (§XIII.A.2.h)), and “a re-activation signal” is then sent to microprocessor 18. Ex-1005, 6:52-54. As explained further below, a POSITA would have recognized that the activation of the microcontroller (“microprocessor 18”) *after* receipt of touch sensor output indicates that the microcontroller was also in a “sleep power mode” when both the accelerometer input and the touch input were received. Ex-1002 ¶¶133-136.

Orr illustrates this two-step wake-up process in Figure 5. In states 502-508 (blue), both the touchscreen and microprocessor are in low-power sleep states. The touchscreen is not awakened until state 510 (red), and the microprocessor is not awakened until state 512 (green). Ex-1005, 12:28-64; Ex-1002 ¶¶133-136.

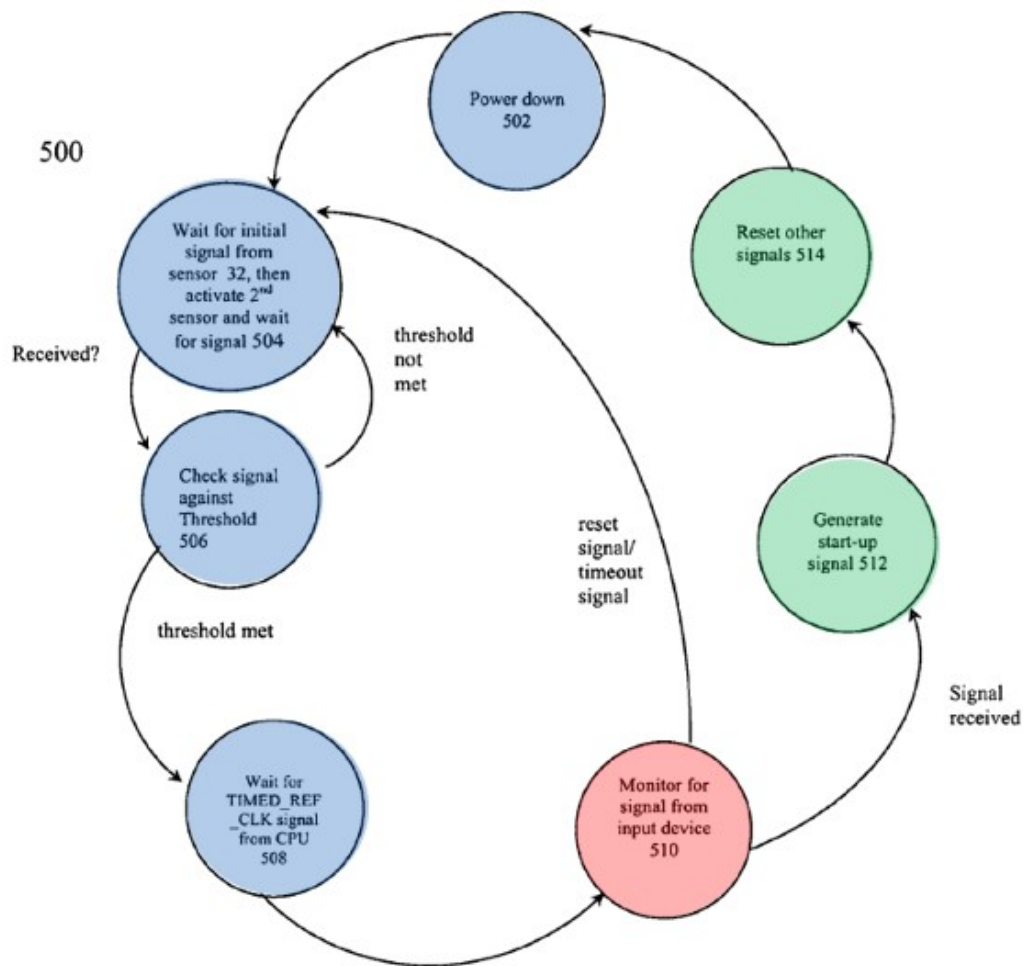


Fig. 5

Specifically, “Initial state 502” (also called “Power down 502” in Figure 5 above) corresponds with the device entering a “low power mode,” which, for

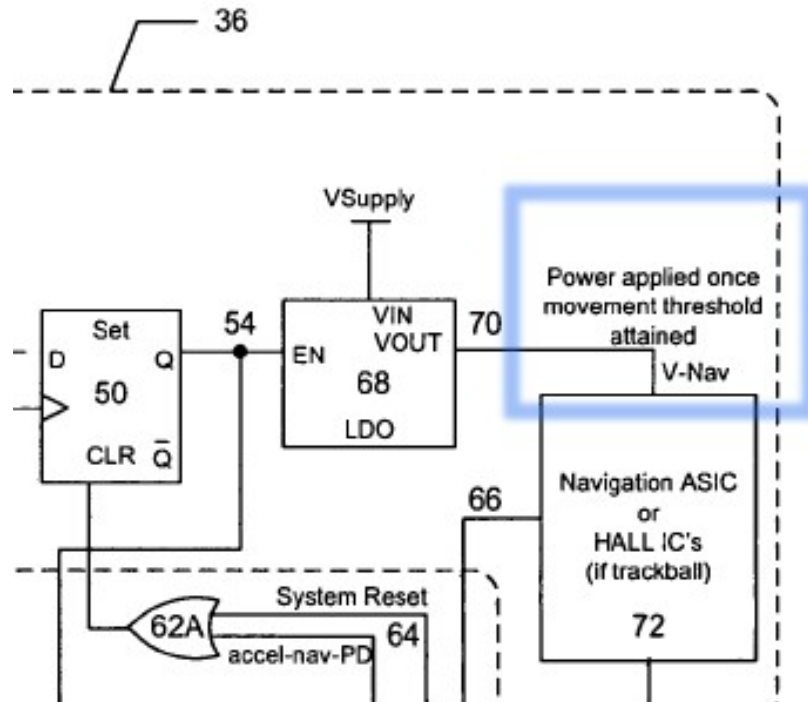
microprocessor 18, may comprise “a ‘slow clock’ mode, wherein the clocking signal for the microprocessor is slowed” (“causing device 10 to operate slower and conserve battery power”). Ex-1005, 6:15-31, 12:28-64. In this lower-power state, navigation ASIC 72 (i.e., touch controller) is also powered down and only selectively activated by signal TIMED\_REF\_CLK. *Id.*, 11:30-38. A POSITA would have considered these low power states to be a sleep power mode. Ex-1002 ¶¶133-136.

- g. Element 14[F]: wherein touch controller is commanded so as to be switched to said second power mode upon gesture detection by said inertial sensor and for detecting a tap gesture on the cover glass with the touch panel; and**

Orr-Orr682 teaches Element 14[F]. Ex-1002 ¶¶137-141.

Orr discloses that its inertial sensor detects a gesture and, accordingly, commands the activation of its touch controller. In Orr’s “two-stage approach ... to re-activate [the] device,” first, “motion sensor circuit” (i.e., inertial sensor) detects an “initial movement” or “intent to use [the] device;” then, input device 34 (i.e., touch panel and touch controller) is activated (i.e., switched to a second power mode) “to detect any further indication that the device is meant to be reactivated.” Ex-1005, 6:44-51. Indeed, as shown in Figure 3, power is applied to navigation

ASIC 72 (i.e., touch controller) “once movement threshold [has been] attained.” *Id.*,  
Fig. 3 (excerpt).



Determining whether the accelerometer gesture is valid is reflected in states 504 and 506 of Figure 5. When a valid gesture is detected, the system transitions to state 508, where it waits for a TIMED\_REF\_CLK signal, which selectively activates navigation circuit 72 (Ex-1005, 11:30-38) and then moves to state 510. *Id.*, 12:41-44. In state 510, the system waits for receipt of a signal from input device 34 (i.e., touch panel). *Id.*, 12:43-46. Thus, state 510 is “for detecting a tap gesture on the cover glass with the touch panel,” as recited in the claim.

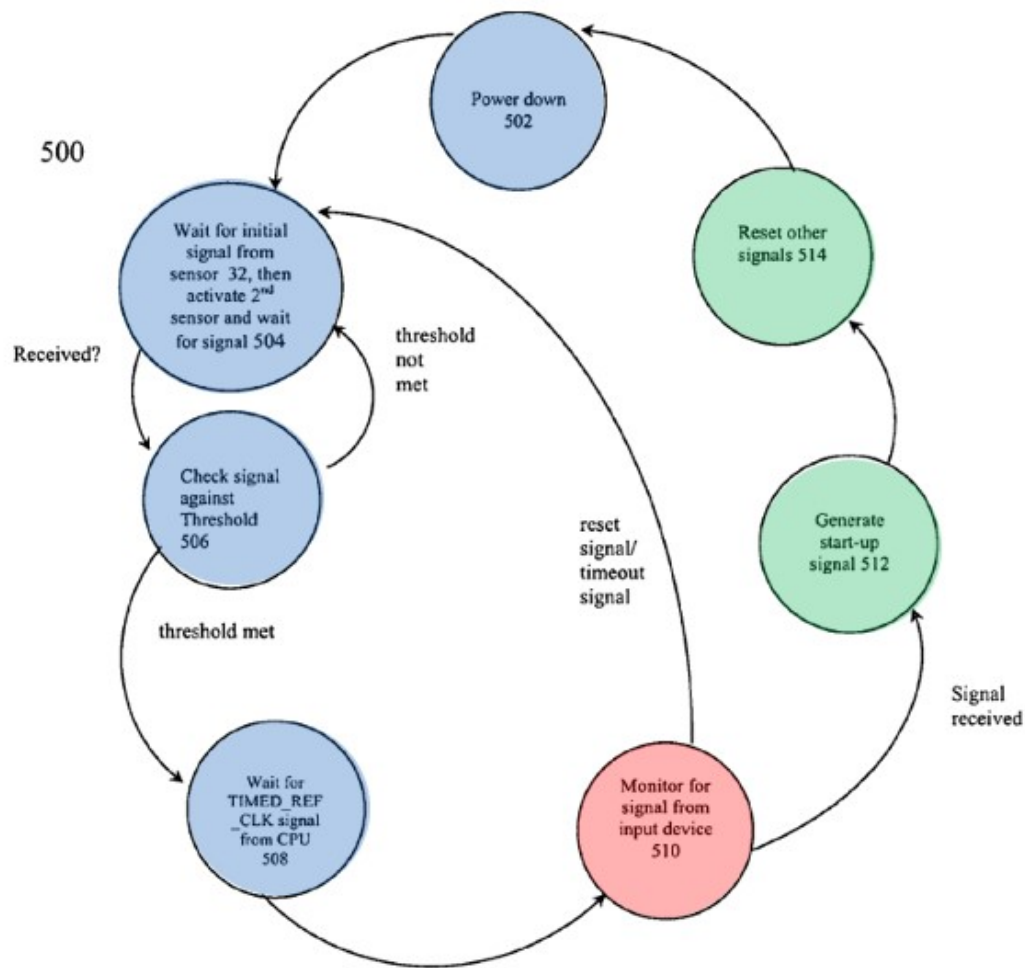


Fig. 5

Specifically, the “signal from input device 34” disclosed in Orr may be from a tap gesture on the cover glass. Orr discloses that its touchscreen input device 34 (i.e., touch panel) and navigation ASIC 72 (i.e., touch controller) “*detect any further indication that the device is meant to be reactivated*” (Ex-1005, 6:32-54), where “*a specific gesture ... may be required.*” *Id.*, 8:64-9:7 (describing a “snap” gesture), 11:6-20 (describing a circular gesture). In the context of the touchscreen

input device, Orr682 teaches that this “specific gesture” can be a tap gesture on the cover glass. Orr682 discloses “tap detection” by the device’s touchscreen. Ex1006, Abstract, ¶¶24-26, 28-31. The “controller of the touchscreen” detects a tap via “receiv[ing] touch inputs resulting from the application of a strike force to [the] input surface of the touchscreen.” *Id.*, Abstract, ¶¶28-31, 37, 44, 49, 80. And as described above (§XIII.A.1), Orr682’s touchscreen comprises an “electrode layer sandwiched between a glass member and a transparent protective cover sheet,” which a POSITA would have understood to be a glass layer, “on which the touchsensitive input surface 108 is located” (Ex-1006, ¶43). Ex-1002 ¶¶140. So the tap gesture would be detected on the cover glass of the touch panel.

As discussed above (§XIII.A.1), a POSITA would have been motivated to enhance Orr’s touchscreen input device (i.e., touch panel) (Ex-1005, 9:32-37) and navigation ASIC (i.e., touch controller) to include Orr682’s capability of detecting a tap gesture on the cover glass with the touch panel, and would have had a reasonable expectation of success in doing so. Ex-1002 ¶141.

- h. Element 14[G]: wherein [1] the microcontroller is arranged for controlling a display of indication on the display and [2] commanded so as to be switched to said second power mode upon a tap gesture detection by said touch controller and [3] for discriminating between gesture and no gesture based at least on signals from said touch panel.**

Orr-Orr682 teaches Element 14[G]. Ex-1002 ¶¶142-146.

**(1) Microcontroller controlling a display of indication on the display**

Orr discloses a microcontroller arranged for controlling a display of indication on the display. Orr discloses that *microprocessor 18* receives a signal (e.g., “a text message or web page download”), *then further processes the received signal, and “generate[s] an output to display 14.”* Ex-1005, 5:38-51, Fig. 2 (showing microcontroller 18 connected to display 14); Ex-1002 ¶143.

**(2) Microcontroller commanded to be switched to said second power mode upon a tap gesture detection by the touch controller**

Orr also discloses a microcontroller commanded to be switched to a second power mode upon a tap gesture detection by the touch controller. Orr-Orr682 teaches detection of a tap gesture by the touch controller (§XIII.A.2.g). And Orr discloses that its microcontroller is commanded to be switched to a second power mode upon detection of such a tap gesture by the touch controller. In Figure 5’s state 510, Orr’s navigation ASIC 72 (i.e., touch controller) has been powered on and is waiting for “receipt of a signal” from touchscreen input device 34 (i.e., touch panel). Ex-1005, 12:41-64; *see also id.*, 11:30-38 (if no signal received from input device 34, power may be reduced or turned off). Once navigation ASIC 72 (i.e., touch controller) has received such a signal and determined it to be a tap (§XIII.A.2.g), the system transits to state 512, where a “wake-up signal” is

generated and sent to microprocessor 18, “so that a ***transition to higher power level may occur.***” Ex-1005, 12:41-64; *see also id.*, 6:15-31 (describing moves between power modes, particularly for microprocessor 18), 9:21-34 (“[I]f deemed appropriate signals are received” “from input device,” “activation signal(s) are ... provided to microprocessor” “as a wake-up signal to cause microprocessor” “to initiate a reactivation routine.”); Ex-1002 ¶144.

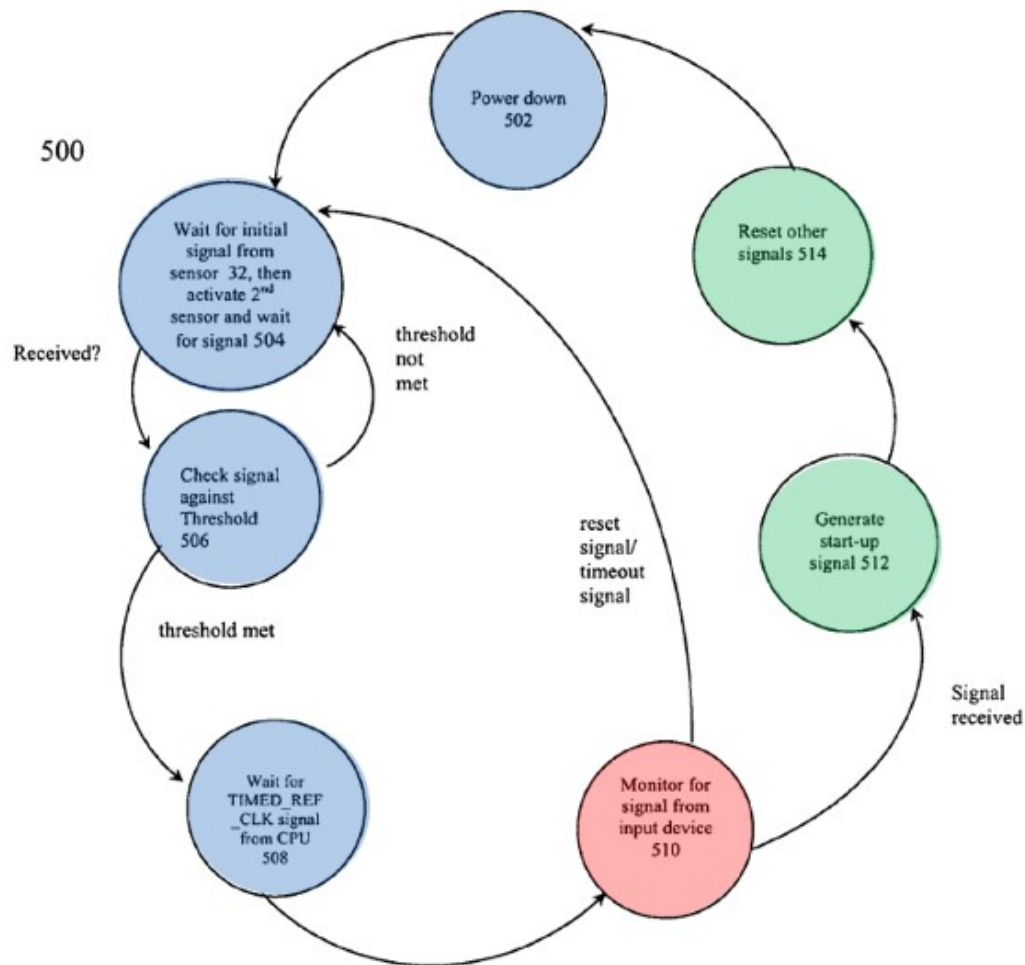


Fig. 5

**(3) Microcontroller for discriminating between gesture and no gesture based at least on signals from said touch panel**

Orr-Orr682 also teaches this last element of 14[G]. Orr682 discloses discriminating between gesture and no gesture based on signals from the device's touchscreen. Ex-1006, Abstract, ¶¶24-26, 28-31. And Orr682 discloses that this determination can be made *directly by the microcontroller* itself and not only by the touch controller: "detection of a touch event and/or determining the location of the touch event" "*may be performed by either* the controller of the touchscreen display ... *or the processor* ... of the device." *Id.* ¶49; Ex-1002 ¶¶145-146. Thus, while the initial tap gesture could be detected by the touch controller, subsequent gesture detection "may be embodied ... in software" in the microcontroller (Ex1006 ¶¶49, 99). Ex-1002 ¶¶145-146. Indeed, Orr682 discloses that although "the location of [a] touch input (i.e., external force) is typically supplied by a controller of the touchscreen," "the device processor could determine the location of the external force *from raw data feed from the touchscreen.*" Ex-1006 ¶¶37, 53. A POSITA would have recognized that, because Orr's touchscreen controller must detect certain gestures before the microprocessor is awakened, it should operate at a low power and detect only a limited number of gestures, but once the system is fully awake, a more capable system, in which software on the microprocessor could recognize a large variety of gestures, would be advantageous. Ex-1002 ¶145.

As discussed above (§XIII.A.1), a POSITA would have been motivated to apply Orr682's teachings to Orr's system, such that the combined system comprises Orr's touchscreen input device (i.e., touch panel), navigation ASIC (i.e., touch controller), and microcontroller, modified to include Orr682's microcontroller's processing capability of discriminating between gesture and no gesture based on signals from the touch panel, and would have had a reasonable expectation of success in doing so. Ex-1002 ¶146.

**3. Independent Claim 1**

- a. Element 1[pre][1]: A method combining gesture detection by an inertial sensor and gesture detection with a touch panel for switching a wristwatch from a first power mode to a second power mode,**  
**Element 1[pre][2]: wherein the inertial sensor comprises an accelerometer and a processor and/or other processing means,**  
**Element 1[pre][3]: and wherein the wristwatch comprises a microcontroller controlling a display of indication on a digital matrix display of the wristwatch**  
**Element 1[pre][4]: and a touch controller for interpreting touch signal provided by a touch panel underneath a cover glass and for converting said signals into command signal, the method comprising;**

Orr-Orr682 teaches Element 1[pre][1] for the same reasons as Element 14[pre] (§XIII.A.2.a); Element 1[pre][2] for the same reasons as Element 14[E] (§XIII.A.2.f); most of Element 1[pre][3] for the same reasons as Elements 14[A], 14[B], and 14[G] (§§XIII.A.2.b, XIII.A.2.c, XIII.A.2.h); and Element

1[pre][4] for the same reasons as Elements 14[C] and 14[D] (§§XIII.A.2.d, XIII.A.2.e). Ex1020, Element 1[pre][1]-1[pre][4].

Orr-Orr682 also teaches the remainder of Element 1[pre][3]: “a digital matrix display.” Ex-1002 ¶¶147-148. A POSITA would have understood Orr’s display 14 to be a digital matrix display. Ex-1002 ¶148. For example, Orr discloses that the device may receive “a text message or web page download” which would be “processed by microprocessor” “which can then generate an output to display.” Ex-1005, 5:38-43. A POSITA would have understood that a typical web page would be displayable by a digital matrix display (as opposed to a fixed segment display or other limited display) and that Orr therefore discloses a digital matrix display. Ex-1002 ¶148.

- b. Element 1[A]: using the accelerometer of the inertial sensor for generating an acceleration signal used for detecting a gesture on the cover glass of said wristwatch, while the microcontroller and the touch controller are in a sleep power mode;**

Orr-Orr682 teaches Element 1[A] for the same reasons as Element 14[E] (§XIII.A.2.f). Ex-1020, Element 1[A].

- c. **Element 1[B]: using the processor and/or other processing means of the inertial sensor for discriminating between gesture and no gesture based on a direction of said acceleration signal and on a slope or frequency of said acceleration signal as measured by said accelerometer being a three dimensional accelerometer,**

Orr-Orr682 teaches Element 1[B] for the same reasons as Element 14[E]  
(§XIII.A.2.f). Ex-1020, Element 1[B].

- d. **Element 1[C]: in response to a detection of a gesture by said inertial sensor, waking up the touch controller;**

Orr-Orr682 teaches Element 1[C] for the same reasons as Element 14[F]  
(§XIII.A.2.g). Ex-1020, Element 1[C].

- e. **Element 1[D]: using the touch controller for detecting a tap gesture on the cover glass with the touch panel;**

Orr-Orr682 teaches Element 1[D] for the same reasons as Elements 14[C],  
14[D], and 14[F] (§§XIII.A.2.d, XIII.A.2.e, XIII.A.2.g). Ex-1020, Element 1[D].

- f. **Element 1[E]: waking up the microcontroller in said wristwatch upon detection of a tap gesture by said touch controller,**

Orr-Orr682 teaches Element 1[E] for the same reasons as Element 14[G]  
(§XIII.A.2.h). Ex-1020, Element 1[E].

- g. **Element 1[F]: using said microcontroller for detecting said gesture and for discriminating between gesture and no gesture based at least on signals from the touch panel.**

Orr-Orr682 teaches Element 1[F] for the same reasons as Element 14[G] (§XIII.A.2.h). Ex-1020, Element 1[F].

**4. Dependent Claims 2-5, 7, and 10-12**

- a. **Claim 2: The method of claim 1, wherein the discrimination between gesture and no gesture is also based on a duration of said acceleration signal.**

Orr-Orr682 teaches Claim 2. Ex-1002 ¶¶155-156. As discussed above (§XIII.A.2.f) (Element 14[E]), Orr682 discloses a tap-detection method comprising “registering a tap input when the rate of change of acceleration exceeds a predetermined tap threshold.” Ex-1006 ¶24. Orr682 further discloses that the discrimination between gesture and no gesture may also be based on a duration of the acceleration signal: “the accuracy of tap detection” “can be further improved by analysing the *duration*” of the acceleration signals. *Id.* ¶84. As shown in Figure 7, Orr682 measures the durations  $\Delta t_1$ ,  $\Delta t_2$ , and  $\Delta t_{\text{tap}}$  of the acceleration signal. *Id.* ¶85; Ex-1002 ¶¶155-156.

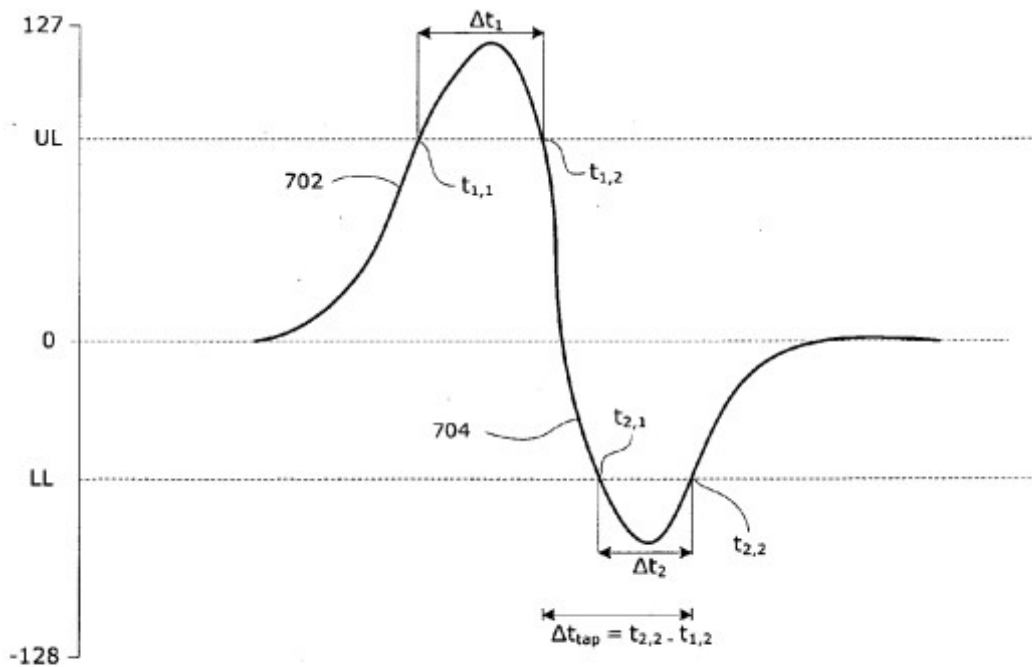


**FIG. 7**

- b. **Claim 3: The method of claim 2, wherein the discrimination between gesture and no gesture is also based on an amplitude of said acceleration signal.**

Orr-Orr682 teaches Claim 3. Ex-1002 ¶¶157-158. Orr682 discloses that the discrimination between gesture and no gesture may also be based on an amplitude of the acceleration signal: “the accuracy of tap detection may be increased by measuring both the positive and negative peaks of an accelerometer tap response” (i.e., the amplitude of the acceleration signal). Ex-1006 ¶84. As shown in Figure 7, Orr682 discloses that “an upper limit (UL) threshold and lower limit (LL) threshold are defined and detected for the accelerometer response” (*id.* ¶85), where UL and LL represent “predetermined strike force threshold[s]” that must be exceeded for a

predetermined time duration,  $\Delta t_1$  and  $\Delta t_2$ , for a tap to be detected (*id.* ¶¶85, 171).

Ex1002 ¶¶157-158.

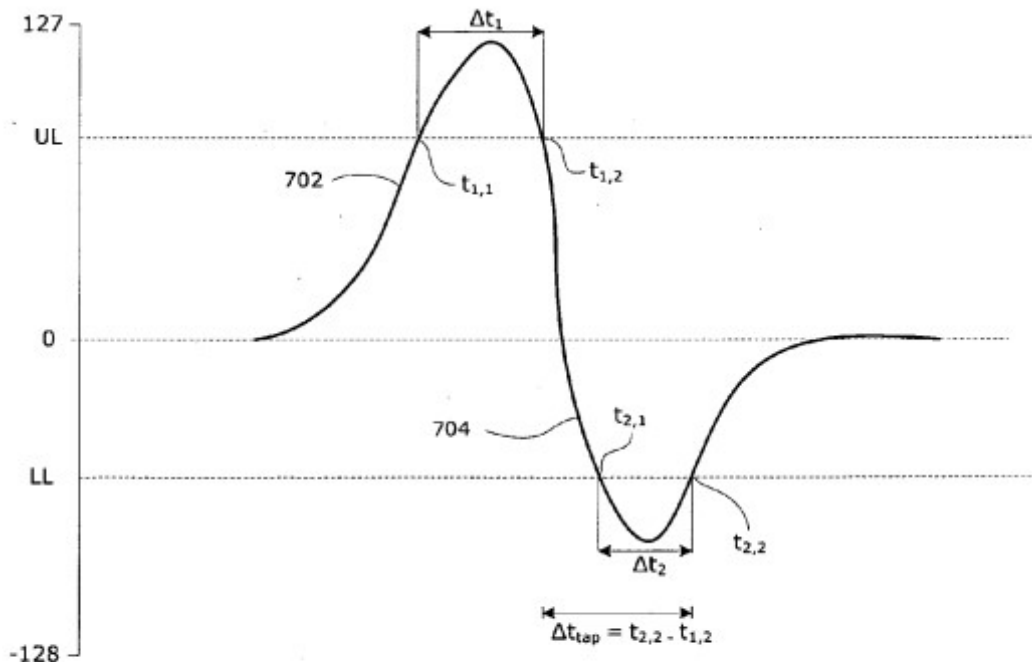


**FIG. 7**

- c. **Claim 4: The method of claim 1, said step of discriminating between gesture and no gesture comprises determining said frequency and determining that there is no gesture if said frequency is not in a predetermined frequency range compatible with a tap.**

Orr-Orr682 teaches Claim 4. Ex-1002 ¶¶159-161. Orr682 discloses that discriminating between gesture and no gesture may also be based on determining a frequency of the acceleration signal and determining that there is no gesture if the frequency is not in a predetermined frequency range compatible with a tap.

As discussed for Element 14[E] above, Orr682 measures parameters of the acceleration pulse that characterize its frequency, as shown in Figure 7, which illustrates a “tap response” of the accelerometer. Ex-1006 ¶83, Fig. 7. The tap response exhibits two narrow peaks 702 and 704, and Orr682 measures the “duration of the time that the accelerometer output is above the upper limit,” or  $\Delta t_1$ ; the “duration of the time that the accelerometer output is below the lower limit,” or  $\Delta t_2$ ; and the “difference between the start time ... and end time” of the accelerometer pulses, denoted  $t_{1,1}$ ,  $t_{1,2}$ ,  $t_{2,1}$ , and  $t_{2,2}$ . *Id.* ¶85. Orr682 makes such measurements because the “accuracy of tap detection” “can be further improved by analysing the duration of each of the positive and negative peaks, the duration of the peaks, and possibly the duration between the peaks.” *Id.* ¶¶84-85. Orr682’s processor “determines that a tap ... has occurred when the interrupt signals corresponding to the upper and lower threshold are received within a predetermined duration of each other.” *Id.* ¶86. In other words, just as taught in the ’678 Patent (Ex-1001, 6:35-43), Orr682 uses the frequency of the acceleration signal, as characterized by its quick rise and fall and overall duration, to distinguish between a tap gesture and no tap gesture. Ex-1002 ¶¶159-161.

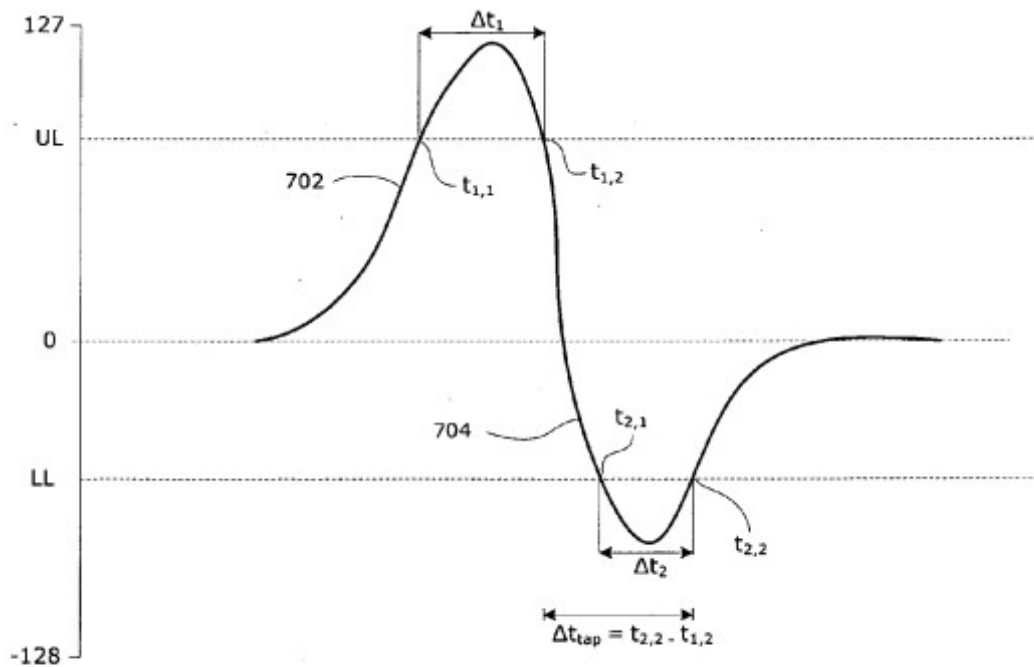


**FIG. 7**

A POSITA would have understood Orr682's disclosure that a tap requires an acceleration signal to have a start and end point within a certain time range to comprise determining that there is no tap gesture if its frequency is not in a predetermined frequency range compatible with a tap. Ex-1002 ¶161.

- d. **Claim 5: The method of claim 1, said step of discriminating between gesture and no gesture comprises determining said direction and determining that there is no gesture if said direction is not substantially perpendicular to said cover glass.**

Orr-Orr682 teaches Claim 5. Ex-1002 ¶¶162-164. Orr discloses that the discrimination between gesture and no gesture is also based on determining a direction of the acceleration signal and determining that there is no gesture if the direction is not substantially perpendicular to the cover glass: Orr discloses that its

“motion sensor” (i.e., accelerometer and processor) detects movement along a “desired axis”—the “**Z’ axis**,” which is perpendicular to the cover glass—and may require such movement to be in a “**certain direction**” to be considered a signal that is meant to turn on the device. Ex-1005, 7:66-8:4, 11:6-20. A POSITA would have understood that detecting the direction of acceleration, including along a desired Z axis (perpendicular to the cover glass), and requiring a certain direction comprises determining the direction and determining that there is no gesture if said direction is not substantially perpendicular to said cover glass. Ex-1002 ¶¶162-164.

- e. **Claim 7: The method of claim 1, wherein discrimination between gesture and no gesture depends on a duration between a detection signal from said accelerometer and a detection signal with said touch panel.**

Orr-Orr682 teaches Claim 7. Ex-1002 ¶¶165-166. Orr discloses that the discrimination between gesture and no gesture may also be based on a duration between a detection signal from the accelerometer and a detection signal with the touch panel. In Figure 5’s state 510, if a signal is not received at the touch panel within “a predetermined length of time” after a signal is received at the accelerometer, the system stops waiting for a “notable signal” from the touch panel and times out, or reverts back to state 504. Ex-1005, 12:28-64, Fig. 5 (annotated, showing “reset signal/timeout signal” in yellow). Thus, the detection signal from accelerometer subsystem and the detection signal from the touch panel must occur

within a particular time interval, and the gesture discrimination method thus depends on a duration between the two. *Id.*, 12:28-64; Ex-1002 ¶¶165-166.

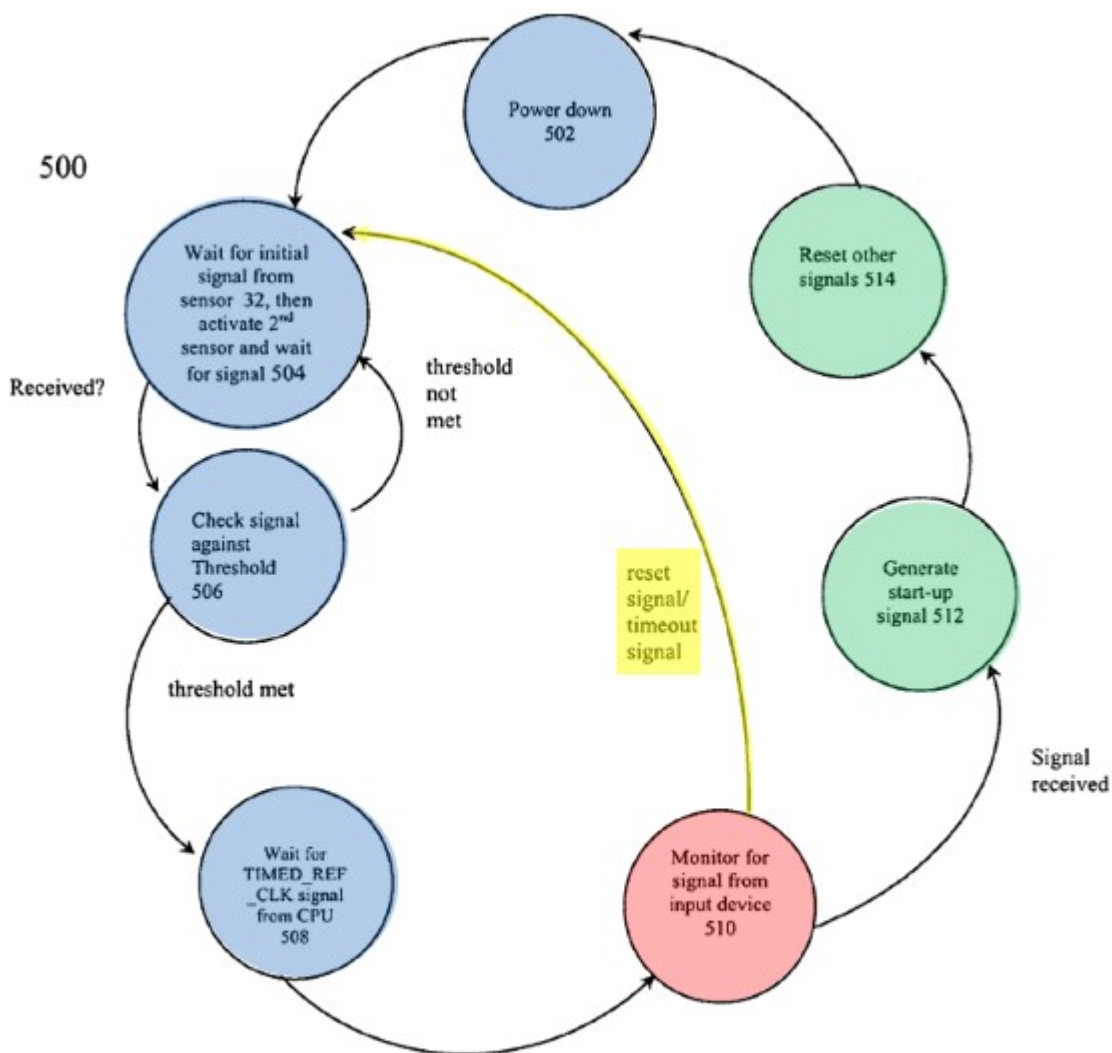


**Fig. 5**

- f. **Claim 10: The method of claim 1, comprising a step of waking up a microcontroller in said wristwatch upon detection of a gesture by said accelerometer and with said touch panel.**

Orr-Orr682 teaches Claim 10. Ex-1002 ¶¶167-168. The following process is performed in Orr’s “two-stage approach ... used to re-activate [the] device”:

First, trigger circuit 38 is used with motion sensor 32 to detect an initial movement or intent to use device 10 [(i.e., ***gesture detection by accelerometer***)]. Collectively, trigger circuit 38 and motion sensor 32 may be considered to be a motion sensor circuit. Once the trigger circuit 38 generates its activation signal, monitoring circuit 36 is activated with input device 34 [(i.e., ***touch panel***)] to detect any further indication that the device is meant to be reactivated. Once monitoring circuit 36 determines that device 10 is meant to be re-activated, it ***sends a reactivation signal to microprocessor 18***.

Ex-1005, 6:45-54. Thus, the microcontroller is awakened after detecting a gesture by the accelerometer and by the touch panel. *Id.*, Fig. 5 (step 12 “generate start-up signal”); Ex-1002 ¶¶167-168.

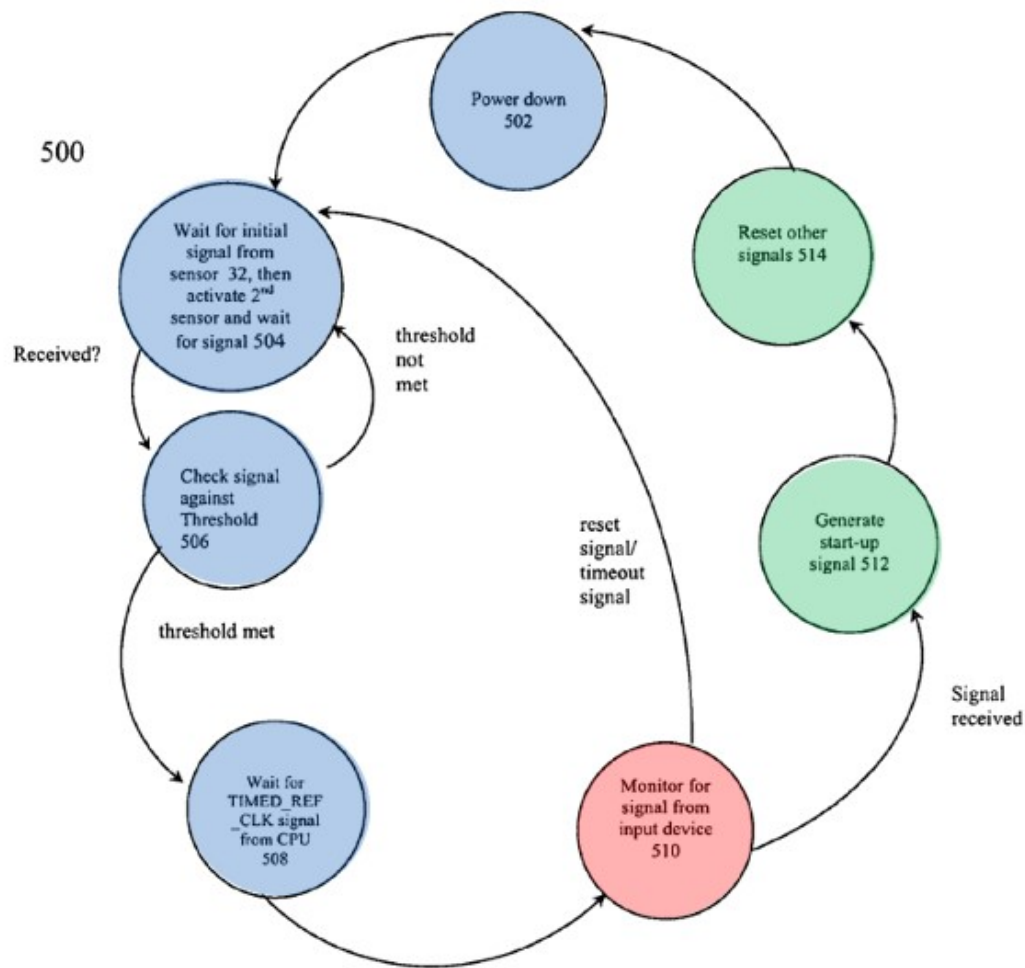


**Fig. 5**

**g. Claim 11: The method of claim 1, said gesture being a tap or a double tap.**

Orr-Orr682 teaches Claim 11. Ex-1002 ¶¶169-171. Orr discloses that its motion sensor 32 (i.e., accelerometer and processor) evaluates the acceleration signals and “may require them to be of a certain direction, force, duration, speed or any combination of those characteristics to be considered a signal which is meant to turn on device 10.” Ex-1005, 11:6-20. Indeed, “a specific gesture ... may be

required.” *Id.* A POSITA would have understood that such gestures may include a tap or a double tap. Ex-1002 ¶170.

Furthermore, Orr-Orr682 teaches using an accelerometer and processor for detecting a tap gesture. As shown in Figure 16, Orr682 discloses using an accelerometer and a processor associated with the accelerometer in a “method for tap detection” comprising measuring acceleration and registering a tap input when the “rate of change of acceleration” exceeds a “predetermined tap threshold.”

Ex1006 ¶¶24-26, 74-75; Ex-1002 ¶171. A POSITA would have been motivated to enhance Orr’s accelerometer with Orr682’s processing capability for detecting a tap gesture and would have had a reasonable expectation of success in doing so, for the reasons discussed above (§XIII.A.1). Ex-1002 ¶171.

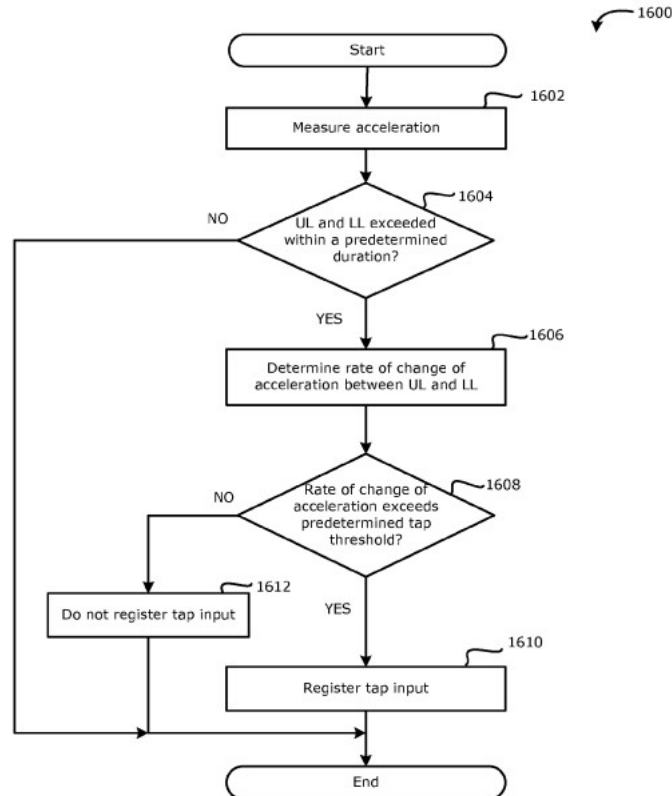


**FIG. 16**

- h. **Claim 12: The method of claim 1, further comprising a step of detecting a wristturn with said accelerometer, and switching said wristwatch from said first power mode to said second power mode when a wristturn has been detected.**

Orr-Orr682 teaches Claim 12. Ex-1002 ¶¶172-173. Orr discloses detecting a wristturn with the accelerometer, and switching the wristwatch from a first power mode to a second power mode when a wristturn has been detected: in an embodiment, a “specific gesture,” “such as a quick ‘snap’ movement,” (i.e.,

detecting a wristturn) detected by sensor 32 (i.e., accelerometer) and/or sub-system 42 (i.e., processor) “may be required to activate device 10” (i.e., switching the device from a first power mode to a second power mode when a wristturn has been detected). Ex-1005, 8:64-9:7; *see also Id.*, Abstract, 6:41-7:2, 9:21-43, 11:6-20. A POSITA would have understood that a wristturn is a “snap movement” and thus that Orr teaches detecting a wristturn with the accelerometer, and switching the electronic device from a first power mode to a second power mode when a wristturn has been detected. Ex-1002 ¶173; *see also* §XIII.A.2.

**B. Ground 2: Claims 6, 8, 9, and 15 Are Obvious Over Orr In View of Orr682 and Further In View of Li**

**1. A POSITA would have been motivated to combine Orr-Orr682’s and Li’s teachings and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine the teachings of Orr-Orr682 with Li and would have had a reasonable expectation of success in doing so because each relates to input gesture detection using a touchscreen in portable electronic devices. Ex-1005, 11:11-18; Ex-1006 ¶91; Ex-1007, Abstract; Ex-1002 ¶174. And Orr, Orr682, and Li all provide compatible solutions for reducing power consumption. Ex-1005, 6:32-54; Ex-1006 ¶136; Ex-1007, Abstract, 13:57-61. Orr-Orr682 is directed to reducing power consumption in electronic devices by providing sleep modes in which certain hardware is put into a lower power state.

*See, e.g.*, Ex-1005, 9:46-56. Li teaches methods of selectively powering up only portions of a touchscreen “with the objective of reducing the power consumption of the capacitive touchscreen system.” Ex-1007, 13:57-14:29. A POSITA would have recognized that incorporating Li’s methods of activating only a subset of the touch panel into the Orr-Orr682 system would have furthered Orr, Orr682, and Li’s power-reduction goals as it would provide further opportunities to reduce power consumption while still allowing for the confirmation of user input at the touch panel. Ex-1002 ¶174.

Modifying Orr-Orr682 to include Li’s partial-activation features would have been a straightforward engineering task for a POSITA as Orr, Orr682, and Li all disclose standard mobile computing devices that use touchscreens for input gesture detection. Ex-1002 ¶¶175-176. Accordingly, a POSITA would have had a reasonable expectation of success as the implementation would have been a matter of using familiar elements that would have yielded predictable results. *Id.*

**2. Dependent Claims 6, 8, 9, and 15**

- a. Claim 6: The method of claim 1, wherein said touch panel comprises a plurality of touch areas, said method comprising a step of applying a power supply sufficient for detecting a gesture to only a first subset of said touch areas.**

Orr-Orr682 in view of Li (“Orr-Orr682-Li”) teaches Claim 6. Ex-1002 ¶¶177-179. Li discloses a plurality of touch areas and applying a power supply

sufficient for detecting a gesture to only a first subset of the touch areas: in one embodiment, “only a fraction of touchscreen 90” (i.e., a first subset of a plurality of touch areas), is activated. Ex-1007, 14:30-34. For example, “[d]rive lines outside of the area of interest on touchscreen 90 are turned off, resulting in power savings.”

*Id.* Similarly, “if the left half of touchscreen 90 is flagged as containing no touches,” firmware can turn off the drive lines that are associated with the left half of touchscreen. *Id.*, 14:1619. Thus, Orr-Orr682-Li renders obvious Claim 6. Ex-1002 ¶¶177-179.

**b. Claim 8: The method of claim 1, wherein said accelerometer is powered on when said wristwatch is in said first power mode, said method comprising a step of partially waking up said touch panel upon detection of a gesture by said accelerometer.**

Orr-Orr682-Li teaches Claim 8. Ex-1002 ¶¶180-182. In Orr’s “two-stage approach ... to re-activate [the] device,” first, the accelerometer detects an “initial movement” or “intent to use [the] device” (i.e., the accelerometer is powered on when the device is in a first power mode); then, input device 34 (i.e., touch panel) is activated “to detect any further indication that the device is meant to be reactivated” (i.e., waking up the touch panel upon detection of a gesture by the accelerometer). Ex-1005, 6:32-54. Orr-Orr682’s touch panel, as modified by Li, can be partially awakened, as discussed with reference to Claim 6 above. Ex-1007,

9:12-22, 14:30-53. Thus, Orr-Orr682-Li renders obvious Claim 8. Ex-1002 ¶¶180-182.

**c. Claim 9: The method of claim 6, comprising a step of waking up only a subset of the complete area of said touch panel upon detection of a gesture by said accelerometer.**

Orr-Orr682-Li teaches Claim 9. Ex-1002 ¶¶183-185. In Orr’s “two-stage approach ... to re-activate [the] device,” first, the accelerometer detects an “initial movement” or “intent to use [the] device;” then, input device 34 (i.e., touch panel) is activated “to detect any further indication that the device is meant to be reactivated” (i.e., waking up the touch panel upon detection of a gesture by the accelerometer). Ex-1005, 6:32-54. As described above for Claim 6, Li discloses methods of waking up only a subset of the complete area of a touch panel, wherein, for example, “only a fraction of touchscreen 90” is activated. Ex-1007, 14:30-53. Thus, Orr-Orr682-Li renders obvious Claim 9. Ex-1002 ¶¶183-185.

**d. Claim 15: The wristwatch of claim 14, wherein said touch panel comprises a plurality of touch areas and powering means arranged for powering only a first subset of said touch area upon detection of a gesture by said accelerometer, and for powering a larger subset in said second power mode.**

Orr-Orr682-Li teaches Claim 15. Ex-1002 ¶¶186-189. “Powering means” is governed by 35 U.S.C. §112(6), as discussed above (§X). The corresponding

structure is “power supply 20” and logic associated with touch controller 24 for powering up only a portion of the touch area and for powering a larger subset, or their equivalents, as described at Ex-1001, 7:49-61 and 5:4-13. Orr discloses logic associated with a touch controller as described for Elements 14[C] and 14[D].

Similarly, Li discloses logic associated with a touch controller: “under control of *touchscreen processor 100 and the navigation hardware controller*” drive signals are provided to certain drive lines. Ex-1007, 6:31-67. Orr also discloses a power supply: “Powering the entire electronics of the mobile handheld communication device is power source 170.” Ex-1005, 6:4-14. The combined Orr-Orr682-Li system performs the recited function using these structures, with Orr’s touch panel improved with the teachings of Li.

In Orr’s “two-stage approach ... to re-activate [the] device,” first, the accelerometer detects an “initial movement” or “intent to use [the] device;” then, input device 34 (i.e., touch panel) is activated “to detect any further indication that the device is meant to be reactivated” (i.e., powering the touch area of a touch panel upon detection of a gesture by the accelerometer). Ex-1005, 6:32-54. Li discloses a touch panel comprising a plurality of touch areas and powering only a first subset of the touch panel (e.g., “only a fraction of touchscreen 90”) initially and a larger subset once touches are detected (e.g., transition to “Full Scan Mode” once touches are detected). Ex-1007, 9:23-26, 14:30-53. More specifically, Li’s “activated”

“fraction of touchscreen 90” is the claimed “first subset of said touch area.” *See id.*, 14:30-53. Then, Li discloses a second mode in which the entire touchscreen may be powered, comprising a “larger subset in said second power mode.” *See id.*, 9:23-26 (transitioning to “Full Scan Mode” once touches are detected). A POSITA would have understood that a “larger subset” of the touchscreen could coincide with the entire touchscreen. Ex-1002 ¶188.

It would have been obvious to a POSITA to first enter this lower-power mode of touch processing because Orr teaches avoiding “unnecessary reactivations” that would consume additional power (Ex-1005, 1:40-42). Ex-1002 ¶189. Once a valid touch signal has been detected, indicating a desire to fully wake up the microprocessor, a POSITA would have been motivated to increase the fraction of the touchscreen that was powered up in order to increase the responsiveness and flexibility of the system in responding to user input. *Id.*

**C. Ground 3: Claims 1-5, 7, 10-12, and 14 Are Obvious Over Orr In View of Orr682 And Further In View of Pasquero**

While the Orr-Orr682 combination teaches the claims challenged in Ground 3 (*see* Ground 1), Petitioner presents this additional ground including Pasquero, which shares a co-inventor with Orr, and which expressly discloses a wristwatch with a touchscreen and accelerometer.

**1. A POSITA would have been motivated to combine Orr-Orr682's and Pasquero's teachings and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine the teachings of Orr-Orr682 with Pasquero and would have had a reasonable expectation of success in doing so. Ex-1002 ¶¶191-200. Orr and Orr682 share a common lead inventor, Kevin Orr, and Orr and Pasquero share a common co-inventor, Steven Fyke, and all three applications were owned by Research In Motion/BlackBerry.<sup>5</sup> Each reference also relates to input gesture detection using a touchscreen and/or accelerometer in portable electronic devices. Ex-1005, 8:64-9:7, 11:11-18; Ex-1006 ¶¶24-26, 28-31, 91; Ex-1009, 3:38-50, 9:10-38. And Orr, Orr682, and Pasquero all provide compatible systems, while disclosing various form factors. Ex-1005, Abstract, 1:14-22, 3:39-58; Ex-1006, Abstract; Ex-1009, Abstract, 3:38-50, 9:10-38. Orr-Orr682 teaches an “optimally ... lightweight [and] compact” “electronic device” that is “based on a computing platform having functionality of an enhanced personal digital assistant” and that “can be based on construction design and functionality of other electronic devices, such as smart telephones, desktop computers pagers or laptops having telephony equipment.” Ex-1005, 1:1422, 3:39-58. Pasquero teaches a “portable electronic device” that is a “Personal Digital Assistant[]” that is in the form of “a watch” that is “worn at or near the wrist of a user.” Ex-1009, 1:14-31,

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<sup>5</sup> Research in Motion changed its name to BlackBerry in 2013.

2:29-30, 3:38-50, 7:33-41. Based in particular on the teachings of Pasquero, a POSITA would have recognized the feasibility of implementing the Orr-Orr682 system in a wristwatch. Ex-1002 ¶¶191-200. Indeed, similar to the devices disclosed in Orr and Orr682, Pasquero discloses a wristwatch comprising display 116 (i.e., “touch-sensitive display”); sensors 114 (i.e., “touch sensors”); and accelerometer 113. *See* Ex-1009, Abstract, 3:38-50, 9:10-38. Moreover, a POSITA would have recognized that applying Pasquero’s teachings of implementing a PDA in a wristwatch would have furthered Orr’s goals of an “optimally ... lightweight [and] compact” form factor (Ex-1005, 1:14-22). Ex-1002 ¶¶191-200.

A POSITA also would have been motivated to implement the combined Orr-Orr682 system on a wristwatch, such as disclosed by Pasquero, as a POSITA would have understood that the combined Orr-Orr682, with its advanced tapdetection calculation abilities, possessed the required robustness and precision necessary to prevent unnecessary power mode switches based on unintentional movements associated with a wrist-worn device. Ex-1002 ¶192.

Implementing Orr-Orr682 in the wristwatch form factor described in Pasquero would have been a straightforward engineering task, and a POSITA would have had a reasonable expectation of success in doing so. Orr, Orr682, and Pasquero all disclose standard mobile computing devices that use accelerometers and touchscreens for input gesture detection, making the combination a matter of

using familiar elements that would have predictable results. Ex-1002 ¶¶191-200.

Moreover, watches incorporating cellular telephony (as described by Orr (Ex-1005, 3:59-61)), were well-known in the art, and incorporating such features of Orr into Pasquero would not have presented any obstacle. Ex-1002 ¶¶194-197 (discussing Cho (Ex-1017), Chiang (Ex-1018), Kim (Ex-1019), CNET survey (Ex-1021)).

Indeed, touchscreen wristwatches with similar features to the proposed combination were common. Ex-1002 ¶¶193 (discussing Fitzgerald (Ex-1010), Fyke (Ex-1011), Louch (Ex-1012), Tecchiolli (Ex-1013), Marvit911 (Ex-1014), Marvit528 (Ex-1015)). Thus, applying Orr-Orr628 to Pasquero's wristwatch would have been well within the capabilities of a POSITA and would have been a matter of ordinary engineering and not the product of innovation. Ex-1002 ¶¶191-200.

## **2. Claims 1-5, 7, 10-12, and 14**

Orr-Orr682 in view of Pasquero ("Orr-Orr682-Pasquero") teaches Claims 1-5, 7, 10-12, and 14 for the same reasons discussed for Ground 1 (§XIII.A). Ex1002 ¶201. Pasquero further provides an explicit disclosure, by a co-inventor of Orr, of the watch form factor recited in Claims 1-5, 7, 10-12, and 14. A POSITA would have been motivated to implement the combined Orr-Orr682 system in the wristwatch form factor disclosed in Pasquero, and would have had a reasonable expectation of success in doing so, for the reasons discussed above (§XIII.C.1). Ex-

1002 ¶202. Pasquero discloses “detecting receipt of an input” in a “portable electronic device” that is “in the form of “a watch” that is “worn at or near the wrist of a user,” as shown in Figures 2 and 3. Ex-1009, Abstract, 2:29-30, 3:38-50. Like the devices described in Orr and Orr<sup>682</sup>, Pasquero’s wristwatch comprises a “touch-sensitive display” (i.e., display 116), “touch sensors” (i.e., sensors 114), and accelerometer 113. *See id.*, Abstract, 3:23-50, 9:10-38; *see also id.*, 2:46-60, 5:15-38, 7:33-41, 8:10-20.

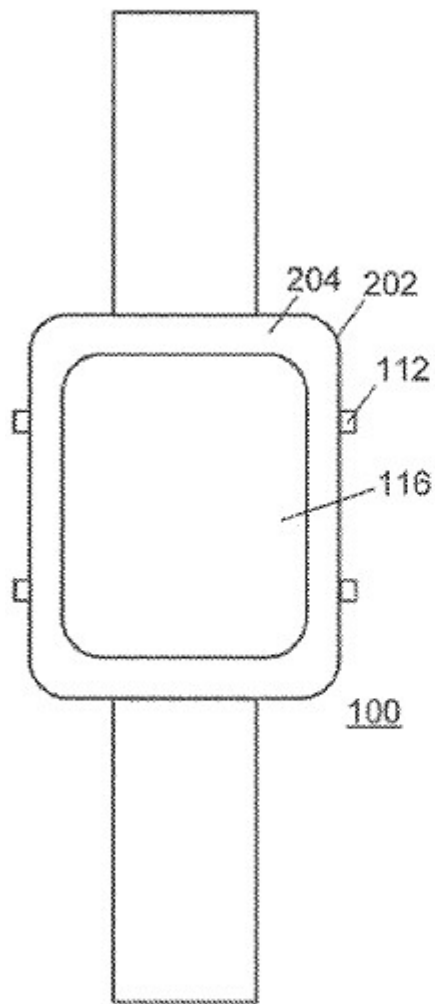


FIG. 2

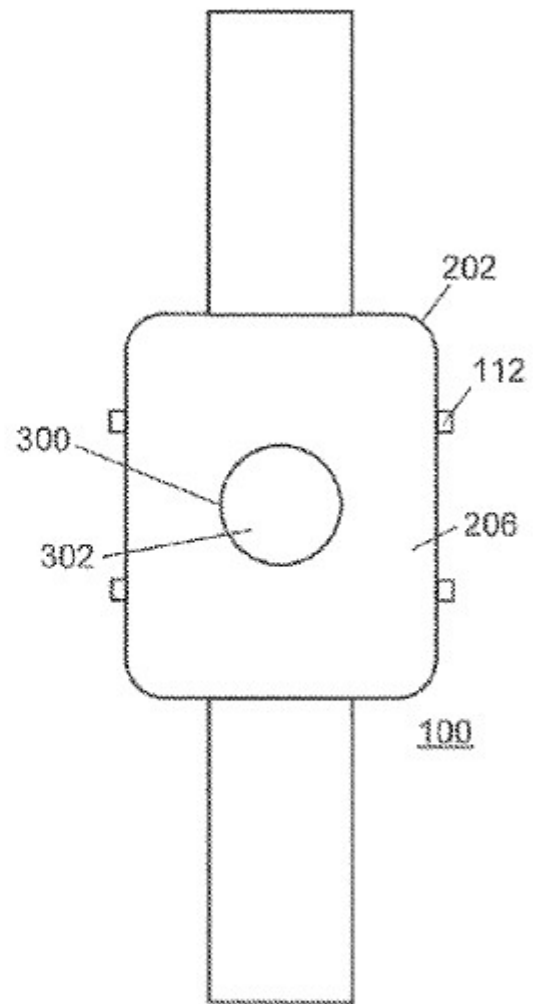


FIG. 3

Thus, Orr-Orr682-Pasquero renders obvious the wristwatch recited in Claims 1-5, 7, 10-12, and 14 for the same reasons explained in detail in the discussion of Ground 1. Ex-1002 ¶¶201-203.

**D. Ground 4: Claims 6, 8, 9, and 15 Are Obvious Over Orr In View of Orr682 and Pasquero and Further In View of Li**

While the Orr-Orr682-Li combination teaches the claims challenged in Ground 4 (*see* Ground 2), Petitioner presents this additional ground including Pasquero, which shares a co-inventor with Orr, and which expressly discloses a wristwatch with a touchscreen and accelerometer.

**1. A POSITA would have been motivated to combine Orr-Orr682-Pasquero's and Li's teachings and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine Orr, Orr682, and Pasquero for the same reasons discussed in Ground 3. A POSITA would further have been motivated to combine Li's teachings with the teachings of Orr-Orr682-Pasquero for the same reasons a POSITA would have been motivated to combine Li's teachings with the teachings of Orr-Orr682, discussed in Ground 2. Ex-1002 ¶205.

**2. Claims 6, 8, 9, and 15**

Orr-Orr682-Pasquero in view of Li ("Orr-Orr682-Pasquero-Li") teaches Claims 6, 8, 9, and 15 for the same reasons as discussed for Ground 2 (§XIII.B.2). Ex-1002 ¶¶205-206.

**E. Ground 5: Claims 12-13 Are Obvious Over Orr In View of Orr682 and Pasquero and Further In View of Yeung**

**1. A POSITA would have been motivated to combine Orr-Orr682-Pasquero's and Yeung's teachings and would have had a reasonable expectation of success**

A POSITA would have been motivated to combine the teachings of Orr-Orr682-Pasquero with Yeung and would have had a reasonable expectation of success in doing so because each of Orr, Orr682, and Yeung provides compatible solutions for using an accelerometer to change power modes, while Pasquero and Yeung both disclose a wristwatch comprising such an accelerometer. Ex-1005, 9:2-7; Ex-1006 ¶¶91; Ex-1008 ¶¶15, 36; Ex-1009, 2:29-30, 3:23-50, 9:10-38. Orr-Orr682 teaches “a two-stage approach ... to re-activate [the] device” involving the accelerometer’s detecting a gesture, which triggers the touch panel’s activation to confirm the user’s intended input (Ex-1005, 6:32-54, 9:21-43; Ex-1006 ¶¶24-26, 74-75), and Yeung teaches specific methods for activating functionality based on using an accelerometer to detect a specific gesture, namely, a user’s wristturn. Ex1008 ¶¶52 (“recorder controller 48 can detect *clockwise circular movement of the wrist* ... to activate fast forwarding”), 58 (“activate recording after using accelerometer 172 to detect ... a predetermined movement of the wrist, such as *rotating the wrist*”). A POSITA would have recognized that Yeung’s accelerometer-detected wristturn gesture could be a “specific gesture” used to indicate a desire to wake up Orr-Orr682-Pasquero’s wristwatch device. Ex-1002 ¶207. Moreover, a

POSITA would have recognized a wristturn as a gesture that indicates a user's desire to interact with a watch because it moves the face of the watch into the user's direct line of sight. *See* Ex-1008 ¶47, Fig. 6; Ex-1002 ¶207. Thus, a POSITA would have been motivated to modify the Orr-Orr682-Pasquero system to add Yeung's teaching of an accelerometer-detected wristturn gesture. Ex-1002 ¶¶207-209. In addition, a POSITA would have understood that the teachings of Orr, Orr682, Pasquero, and Yeung could have been combined with no change in the respective functions, as all four teach compatible systems. *Id.*

**2. Dependent Claims 12-13**

- a. Claim 12: The method of claim 1, further comprising a step of detecting a wristturn with said accelerometer, and switching said wristwatch from said first power mode to said second power mode when a wristturn has been detected.**

Orr-Orr682-Pasquero in view of Yeung ("Orr-Orr682-Pasquero-Yeung") teaches Claim 12. Ex-1002 ¶¶210-211. Yeung discloses detecting a wristturn with the accelerometer and switching the wristwatch from a first power mode to a second power mode when a wristturn has been detected: the wristwatch/audio recorder "activates audio recording" (i.e., switching the wristwatch from a first power mode to a second power mode) only when the device "is in a predetermined orientation and/or after it has completed a predetermined movement," as detected by the threeaxis accelerometer (i.e., detecting a wristturn with an accelerometer and switching the wristwatch's power mode when a wristturn has been detected). Ex-

1008 ¶¶15, 36; *see also id.* ¶¶37-46 (“[C]ontroller 48” “uses the data stored in accelerometer data memory 50 to compute the orientation and/or movement of audio recorder 30 and activate[] an audio-recorder function ... only if a predetermined orientation and/or movement is detected.”). These “predetermined movement[s]” include a wristturn—“the natural movement of lifting the arm upwards from a resting position (i.e. from the side of the body or from in front of the lower end of the torso) and tilting the wrist towards the mouth,” as shown in Figure 6. *Id.* ¶¶37, 46-47.

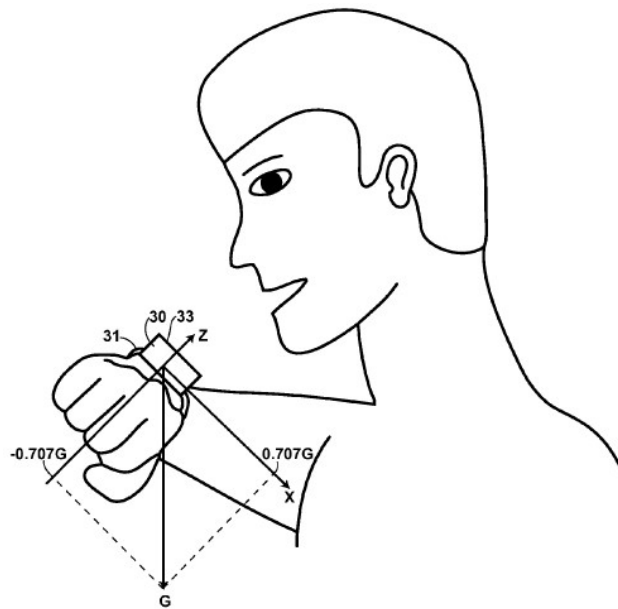


FIG. 6

A POSITA would have been motivated to apply Yeung’s teachings regarding switching power modes based on a wristturn to the Orr-Orr682-Pasquero system,

and would have had a reasonable expectation of success in doing so, for the reasons discussed above (§XIII.E.1). Ex-1002 ¶211.

- b. **Claim 13: The method of claim 12, said step of detecting a wristturn comprising:  
detecting that an orientation of the wristwatch is in a first range;  
detecting that the orientation of the wristwatch is then in a second range, different from said first range, detecting that the wristwatch remains substantially immobile during a predetermined duration.**

Orr-Orr682-Pasquero-Yeung teaches Claim 13. Ex-1002 ¶¶212-215. Yeung discloses activating certain functionality when the device's accelerometer detects a wristturn—"the natural movement of lifting the arm upwards from a resting position (i.e. from the side of the body or from in front of the lower end of the torso) and tilting the wrist towards the mouth." Ex-1008 ¶¶15, 36-37, 46-47. Yeung discloses detecting the orientation of the wristwatch is in a first range, namely, that the watch is in a "resting position" by the "side of the body" or "in front of the lower end of the torso." *Id.* ¶47.

Yeung discloses detecting that the orientation of the wristwatch is then in a second range, different from the first. Namely, Yeung detects "lifting the arm upwards" and "tilting the wrist towards the mouth," as shown in Figure 6. *Id.* A POSITA would have understood the orientation facing the mouth to be different from that when the arm is hanging by the user's side. Ex-1002 ¶214.

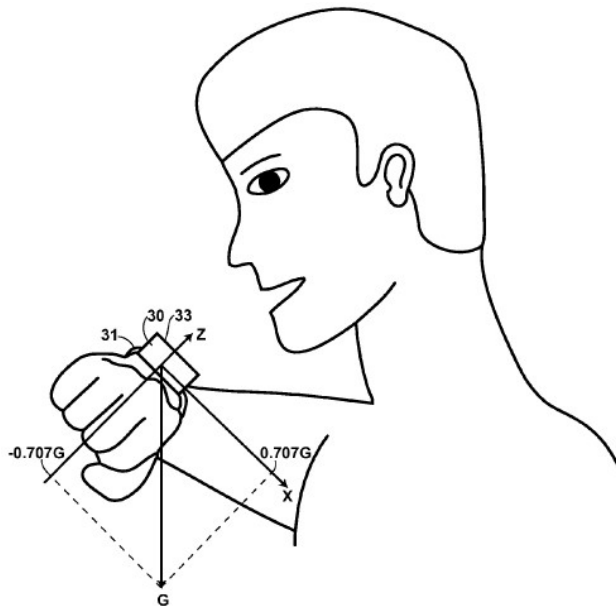


FIG. 6

And Yeung discloses detecting that the wristwatch remains substantially immobile during a predetermined duration. Yeung explains the wristwatch/audio recorder will “activate an audio-recorder function” only after the device “*remains in a static position for a predetermined period of time* after a predetermined wrist and arm movement pattern has been detected.” Ex-1008 ¶52; Ex-1002 ¶¶212-215.

**F. Ground 6: Claims 1-5, 7, and 10-14 Are Obvious Over Orr In View of Orr682 In Further View of Yeung**

1. A POSITA would have been motivated to combine Orr-Orr682 and Yeung's teachings and would have had a reasonable expectation of success.

A POSITA would have been motivated to combine the teachings of Orr-Orr682 with Yeung and would have had a reasonable expectation of success in doing so as each relates to input gesture detection using a touchscreen and/or

accelerometer in a portable electronic device. Ex-1005, 9:2-7; Ex-1006 ¶¶91; Ex-1008 ¶¶15, 36. And Orr, Orr682, and Yeung all provide compatible systems, while disclosing various form factors. Ex-1005, Abstract, 1:14-22, 3:39-58; Ex-1006, Abstract; Ex-1008 ¶¶5, 37. Orr-Orr682 teaches an “optimally ... lightweight [and] compact” “electronic device” that uses an accelerometer to change power modes. Ex-1005, 1:14-22, 3:39-58, 8:64-9:7. Yeung teaches using “accelerometer-based orientation and/or movement sensing” “to control wearable devices, such as ... wristwatches,” including by changing its power modes. Ex-1008 ¶¶5, 36-37, 47-48. Based on Yeung, a POSITA would have recognized the feasibility of implementing the Orr-Orr682 system in a wristwatch. Ex-1002 ¶216. Indeed, like Orr and Orr682, Yeung’s device includes “display 34” and “three-axis accelerometer 32.” Ex-1008 ¶¶5, 37. Moreover, a POSITA would have recognized that applying Yeung’s teachings of implementing an electronic device using an accelerometer to change power modes in a wristwatch would have furthered Orr’s goals of an “optimally ... lightweight [and] compact” form factor (Ex-1005, 1:1422). Ex-1002 ¶216.

A POSITA also would have understood that Orr-Orr682, with its advanced tap-detection calculation abilities, was suited to guard against false positive motion detections associated with a wrist-worn device. Ex-1002 ¶217.

A POSITA would have expected this combination to be successful, as the implementation would have been a straightforward engineering task yielding predictable results, since Orr, Orr682, and Yeung all disclose standard mobile computing devices that use accelerometers and/or touchscreens for input gesture detection. Ex-1002 ¶¶216-225. Moreover, POSITA would have understood that the teachings of Orr, Orr682, and Yeung could have been combined with no change in the respective functions in Orr, Orr682, and Yeung's compatible systems. *Id.*

A POSITA would have been motivated to combine Yeung's teachings regarding specific methods for activating functionality based on using an accelerometer to detect a specific gesture, namely, a user's wristturn, to the Orr-Orr682 system for the same reasons discussed for Ground 5 (§XIII.E.1).

## **2. Claims 1-5, 7, and 10-14**

Orr-Orr682 in view of Yeung ("Orr-Orr682-Yeung") teaches Claims 1-5, 7, 10-11, and 14 for the same reasons discussed for Ground 1 (§XIII.A) and Claims 12-13 for the same reasons discussed for Ground 5 (§XIII.E). Yeung further provides an explicit disclosure of the watch form factor recited in Claims 1-5, 7, and 10-14. A POSITA would have been motivated to implement the combined Orr-Orr682 system in the wristwatch form factor disclosed in Yeung, and would have had a reasonable expectation of success in doing so, for the reasons discussed above (§XIII.F.1). Ex-1002 ¶227. As shown in Figure 1, Yeung teaches using

“accelerometer-based orientation and/or movement sensing” “to control wearable devices, such as ... wristwatches,” including by changing its power modes. Ex-1008 ¶¶5, 36-37, 47-48. As in the devices described in Orr and Orr682, Yeung’s wristwatch comprises display 34 and three-axis accelerometer 32. *See id.* ¶¶5, 37.

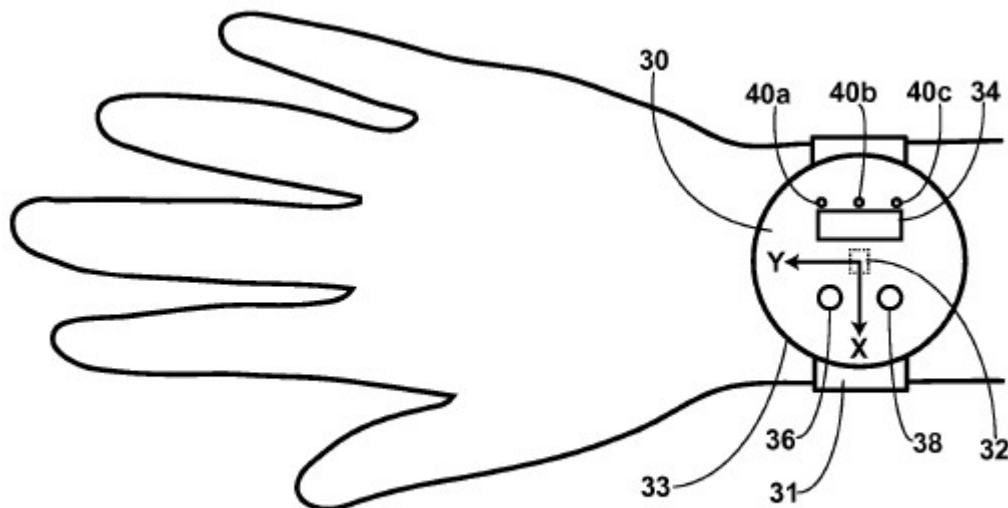


FIG. 1

Regarding Claim 12, Yeung discloses that its wristwatch/audio recorder “activates audio recording” only when the accelerometer detects that the device “is in a predetermined orientation and/or after it has completed a *predetermined movement*,” such as a wristturn—“the natural movement of lifting the arm upwards from a resting position (i.e. from the side of the body or from in front of the lower end of the torso) and *tilting the wrist towards the mouth* to activate audio recording.” Ex-1008 ¶¶15, 36-37, 46-47, Fig. 6; Ex-1002 ¶228.

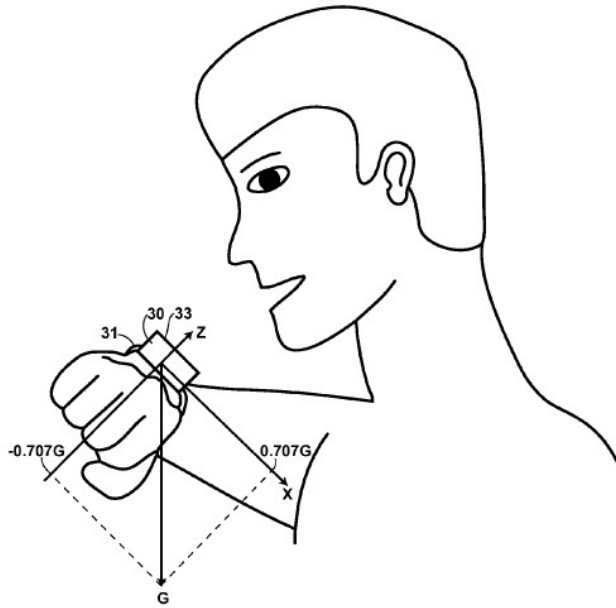


FIG. 6

Regarding Claim 13, Yeung's wristturn detection involves [a] "determin[ing] orientation when the accelerometer is at rest" (i.e., that an orientation of the wristwatch is in a first range), then [b] determining that the device has been raised and "tilt[ed] towards the mouth" (i.e., that the orientation of the wristwatch is in a second range, different from said first range when the arm was hanging by the user's side) (Ex-1008 ¶¶15, 39, 47-48), and finally [c] the wristwatch/audio recorder "remains in a static position for a predetermined period of time after a predetermined wrist and arm movement pattern has been detected" (i.e., that the wristwatch remains substantially immobile during a predetermined duration) (*id.* ¶52; *see also id.* ¶¶15, 39, 47-48). Ex-1002 ¶229.

Thus, Orr-Orr682-Yeung renders obvious the wristwatch recited in Claims 1-5, 7, and 10-14. Ex-1002 ¶¶226-230.

#### **XIV. THE BOARD SHOULD NOT USE ITS DISCRETION TO DENY INSTITUTION UNDER *FINTIV***

The Board should decline to exercise its discretion to deny institution under 35 U.S.C. §314(a). While Director Vidal’s June 21, 2022 Guidance made clear that “*Fintiv* is limited to facts of that case,” for completeness, Petitioner addresses the factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). The six factors set out in *Fintiv* do not justify denying institution.

The **first *Fintiv* factor** is neutral because Zepp has not yet moved to stay the district court proceedings pending IPR, and the PTAB will not infer how the district court would rule should a stay be requested. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

For the **second *Fintiv* factor**, the district court has set a February 18, 2025 trial date in the *Zepp* matter. Even if trial proceeds in February 2025, this timing does not tip in favor of denying this Petition. *See, e.g., Apple Inc. v. Koss Corp.*, IPR2021-00305, Paper 14, 13 (PTAB June 3, 2021). This Petition is filed in October 2024. An institution decision should be issued within six months of docketing, around May 2024. And a final written decision (FWD) should be issued in May 2025. Thus, the

earliest estimated trial date is around the same time as the FWD. Recent PTAB cases analyzing similar schedules have weighed the second factor as neutral or, at most, slightly in favor of denial. *See, e.g., Google LLC et al. v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9, 12 (PTAB Oct. 21, 2020) (trial scheduled for three months before FWD weighs “at best, neutral”); *Apple Inc. v. Koss Corp.*, IPR2021-00305, Paper 14, 13-14 (PTAB June 3, 2021) (trial scheduled for two months before FWD weighs “at most, minimally in favor” of denial).

The **third *Fintiv* factor** weighs strongly against denial. No hearing has been set and no substantive activity has occurred in the case. Because the investment in the trial has been minimal and Petitioner acted diligently, this factor weighs strongly against discretionary denial. *See, e.g., Hulu*, Paper 11, 13.

The **fourth *Fintiv* factor** also weighs against denial. A FWD in this matter will occur within about three months of the currently-scheduled district court trial (assuming that date holds). Thus, “there is a reasonable likelihood that the Board will address the overlapping validity issues prior to the district court reaching them at trial..., thereby providing the possibility of simplifying issues for trial.” *Juniper Networks, Inc. v. Packet Intelligence LLC*, IPR2020-0039, Paper 21, 18 (PTAB Sept. 10, 2020).

On the **fifth *Fintiv* factor**, the Board should give little weight to the fact that Petitioner and PO are the same parties as in district court. *See Weatherford U.S., L.P.*,

*v. Enventure Global Tech., Inc.*, Paper 16, 11-13 (PTAB Apr. 14, 2021). Although Samsung is both petitioner and litigation defendant, this factor does not outweigh the other factors that strongly weigh against discretionary denial.

“Other circumstances” under the **sixth *Fintiv* factor** further weigh against discretionary denial. The merits of the Petition are especially strong. *See Align Tech., Inc. v. 3Shape A/S*, IPR2020-01087, Paper 15, 42-43 (PTAB Jan. 20, 2021). *See supra* §XIII.

Taken together, the *Fintiv* factors strongly weigh against denial.

## **XV. CONCLUSION**

Accordingly, Petitioner requests institution of IPR for Claims 1-15 of the '678 Patent.

Respectfully Submitted,

/Daniel J. Pereira/

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**CERTIFICATE OF WORD COUNT**

Pursuant to 37 C.F.R. §42.24(d), Petitioner certifies that this Petition includes 13,876 words, as measured by Microsoft Word®, exclusive of the table of contents, mandatory notices under §42.8, certificates of service, word count, and exhibits.

**CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))**

The undersigned hereby certifies that the above document was served on October 18, 2024, by filing this document through the Patent Trial and Appeal Board P-TACTS System, as well as delivering a copy via express mail upon the following attorneys of record for the Patent Owner and Petitioner:

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U.S. Patent No. 9,804,678  
Petition for *Inter Partes* Review

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