

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALVE CORPORATION,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

Case IPR2024-00582
Patent 11,175,738

**DECLARATION OF CRAIG ROSENBERG, PH.D.
IN SUPPORT OF IMMERSION CORPORATION'S
PATENT OWNER PRELIMINARY RESPONSE**

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I, Craig Rosenberg, declare as follows:

1. I have been retained by Folio Law Group PLLC, counsel for Patent Owner Immersion Corporation (“Immersion”) to assess the challenged claims of U.S. Patent No. 11,175,738 (“the ’738 Patent”) in connection with this case which is the Petition for Inter Partes Review of the ’738 Patent (“the Petition”).

2. I am being compensated for my work on this case and my fee is not contingent on the outcome of this case or on any of my opinions or the technical positions I explain in this report. In addition, I have no financial interest in the outcome of this case or any of the parties involved in this case.

3. I believe I am qualified to serve as a technical expert in this proceeding based on my educational and work experience, including my 30+ years of experience in human factors, user interface design, user interaction design, human-computer interaction, and software engineering from 1988 through today.

4. This declaration sets forth my opinions, which I formed based on my study of the evidence; my understanding as an expert in the field; and my training, education, research, knowledge, and personal and professional experience. All of my opinions stated in this declaration are based on my own personal knowledge, expertise, training, education, and professional judgment. In forming my opinions, I have relied on my knowledge and experience in human factors, user interface design, user interaction design, human-computer interaction, and software engineering.

5. If I am called upon to do so, I would be competent to testify to the matters set forth herein. My qualifications to testify about the technical subject matter in this case and the relevant technology are outlined in my curriculum vitae and this section of this declaration. A copy of my current curriculum vitae is provided for this proceeding as Exhibit 2002.

6. This declaration is based on the information currently available to me. If additional information becomes available to me, I reserve the right to continue my analysis, which may include a review of documents and information that may be provided to me, as well as testimony from depositions that have not yet been taken at this time.

I. BACKGROUND AND QUALIFICATIONS

7. I earned my Bachelor of Science degree in Industrial Engineering, my Master of Science degree in Human Factors, and Doctor of Philosophy in Human Factors from the University of Washington School of Engineering. For over 30 years, I have worked in human factors, user interface design, software development, software architecture, systems engineering, and modeling and simulation across various application areas, including aerospace, communications, entertainment, and healthcare.

8. I graduated from the University of Washington in 1988 with a Bachelor of Science in Industrial Engineering. After graduation, I continued my studies at the

University of Washington College of Engineering. In 1990, I obtained a Master of Science degree in Human Factors. Human Factors is an engineering discipline that studies the design of products, processes, equipment, and systems to work more efficiently with humans. Human factors is concerned with reducing human error, increasing productivity and efficiency, and enhancing safety and comfort with a specific focus on the interactions and interfaces between humans and the products, processes, or systems with which they interact. In 1994, I graduated with a Doctor of Philosophy in Human Factors, focusing on advanced interface design. My Bachelor of Science, Master of Science, and Doctor of Philosophy degrees were all obtained at the University of Washington College of Engineering.

9. During my doctoral studies, I worked as an Associate Assistant Human Factors Professor at the University of Washington Industrial Engineering Department. My duties included teaching, writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, and hiring and supervising students. While studying at the University of Washington, I also worked as a human factors researcher. I designed and performed advanced human factors experiments relating to virtual environments and interface design, stereoscopic displays, and advanced visualization research, which the National Science Foundation funded. My duties included user interface design,

systems design, software development, graphics programming, experimental design, and hardware and software interfacing.

10. I have published twenty-one research papers in professional journals and proceedings in user interface design, computer graphics, and the design of spatial, stereographic, and auditory displays. I also authored a book chapter on augmented reality displays in the book “Virtual Environments and Advanced Interface Design” (Oxford University Press, 1995). In addition, I created one of the first virtual spatial musical instruments called the MIDIBIRD that, utilized the MIDI protocol, two six-dimensional spatial trackers, a music synthesizer, and a computer graphics workstation to create an advanced and novel musical instrument.

11. For the past 21 years, I have been a consultant for Global Technica, Sunny Day Software, Stanley Associates, Tchrizon, CDI Corporation, and the Barr Group. In this capacity, I have provided advanced engineering services for many companies.

12. I consulted for the Boeing Company for 15 years as a senior human factors engineer, user interface designer, and software architect for various advanced commercial and military programs. Many of the projects that I was involved with at Boeing involved advanced software development, user interface design, agent-based software, and modeling and simulations in the areas of missile defense, homeland security, battle command management, computer-aided design, networking and

communications, air traffic control, location-based services, flight simulation, and Unmanned Aerial Vehicle (“UAV”) command and control. Additionally, I was the lead system architect developing advanced air traffic controller workstations and air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management.

13. I was also the architect of the Boeing Human Agent Model. The Boeing Human Agent Model is an advanced model for the simulation of human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers, pilots, and UAV operators. In another project, I was the lead human factors engineer and user interface designer for Boeing’s primary vector and raster computer-aided drafting and editing system that produces the maintenance manuals, shop floor illustrations, and service bulletins for aircraft produced by the Boeing Commercial Aircraft Company. Additional responsibilities in my time as a consultant include system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis, and design, as well as UML, C++, C#, and Java software development.

14. In 1995 and 1996, I was hired as the lead human factors engineer and user interface designer for the first two-way pager produced by AT&T. Before this technology, individuals could receive pages but had no way to respond utilizing their

pager. This new technology allowed users to use a small handheld device to receive and send canned or custom text messages, access and update an address book, and access and update a personal calendar. This high-profile project involved designing the entire feature set, user interface/user interaction design and specification, and all graphical design standards. In addition, I designed the notification alerts for the pager associated with receiving messages, timers, alarms, etc.

15. From 1999 to 2001, I was the lead human factors engineer and user interface designer for a company called Eyematic Interfaces, where I was responsible for all user interface design and development activities associated with real-time mobile handheld three-dimensional facial tracking, animation, avatar creation, and editing software for a product for Mattel. My work involved user interface design, human factors analysis, requirements gathering and analysis, and functional specifications.

16. I was the lead user interface designer for a company called ObjectSpeed, which developed a portable handheld telephone for use in homes and businesses with many of the same capabilities we take for granted in mobile cellular phones. This portable multifunction device supports voice, email, chat, video conferencing, internet radio, streaming media, Microsoft Outlook integration, photo taking, sharing, notifications, etc. I designed all the user interface elements for this

device. The ObjectSpeed device was specifically designed and developed as a portable handheld device.

17. I was the lead user interface designer for Ahaza, which was building IPv6 routers. I designed the user interfaces to configure and control these advanced network hardware devices. My responsibilities included requirements analysis, functional specification, user interface design, user experience design, and human factors analysis.

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

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

20. I am the co-founder of a medical technology company called StratoScientific. StratoScientific is developing an innovative case for a smartphone that turns a standard handheld smartphone into a full-featured digital stethoscope

that incorporates visualization and machine learning for telemedicine and automated diagnosis.

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

22. I have worked on multiple user interface projects involving haptics for AT&T, Boeing, Disney, and ObjectSpeed. For AT&T, I designed and developed the entire user interface for AT&T's first two-way pager, including vibratory alerts associated with new messages. For Boeing, I worked on improving realism of flight simulators, including the fidelity of vibratory alerts associated with their stick shakers. For Disney, I investigated the use of vibrotactile alerting for MagicBand users. For ObjectSpeed, I designed the vibratory alerting associated with notifications.

23. I have worked on many projects that utilized touchscreen interfaces, including projects for ObjectSpeed, WhereWuz, Disney, US ARMY, Healium, and StratoScientific.

24. I have received several awards for my engineering work relating to interface design, computer graphics, and the design of spatial, stereographic, and auditory displays, including a \$10,000 scholarship from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation and a Link Foundation award for furthering the field of flight simulation and virtual interface design. I have also created computer graphic illustrations for several popular book covers and animations for a movie produced by MIRAMAR.

25. More information about my educational and professional background can be found in my curriculum vitae, Exhibit 2002.

26. The combination of my education, research, training, and work experience in software development, human factors, user interface design, user interaction design, and human-computer interaction enables me to provide analysis and opinions on the subject matter of this litigation.

II. BASES OF OPINIONS

27. In the course of performing my analysis and forming my opinions, I have reviewed the Petition and its Exhibits 1001–1033 including the materials listed below:

- IPR Petition IPR2024-00582
- U.S. Patent No. 11,175,738 (“the ’738 Patent”) (Ex. 1001)
- Prosecution History of the ’738 Patent. (Ex. 1002)
- Declaration of Gregory Welch (Ex. 1004)
- U.S. Patent Application Publication 2012-0249474A1 (“Pratt”) (Ex. 1006)
- Ex. 1008 U.S. Patent No. 8,531,319 (“Ku”) (Ex. 1008)
- U.S. Patent Application Publication 2015-0061703 (“Jiang”) (Ex. 1010)

III. SUMMARY OF OPINIONS

28. The Petition raises four grounds of invalidity:

- Ground 1 of the Petition argues that Claims 1-3, 5-6, 14-15, and 19 of the ’738 patent are anticipated by or rendered obvious by Pratt under 35 U.S.C. §§ 102 and 103.
- Ground 2 of the Petition argues that Claims 1-6, 14-16, and 19 of the ’738 patent are obvious over Pratt in view of Ku.
- Ground 3 of the Petition argues that Claims 1-5, 14-16, and 19 of the ’738 patent are obvious over Ku.
- Ground 4 of the Petition argues that Claims 1-6, 14-16, and 19 of the ’738 patent are obvious over Ku in view of Jiang.

29. Based on my analysis of the Petition and the exhibits cited in the Petition, it is my opinion that none of the asserted prior art references anticipate and/or render obvious the claims of the '738 Patent.

IV. APPLICABLE LEGAL STANDARDS

A. Ordinary Skill in the Art

30. My opinions in this declaration are based on the understandings of a person of ordinary skill in the art—sometimes referred to as an “ordinary artisan” or by the acronyms “POSITA” or “POSITA” (person of ordinary skill in the art)—as of the time of the invention, which I understand to be the earliest priority date (December 13, 2016) of the '738 Patent. I understand that the person of ordinary skill in the art is a hypothetical person who is presumed to have known the art relevant to the challenged claims of the '738 Patent at the time of the invention.

31. I understand that, in assessing the level of skill of a person of ordinary skill in the art, one should consider the type of problems encountered in the art, the prior solutions to those problems found in the prior art references, the rapidity with which innovations are made, the sophistication of the technology, the level of education of active workers in the field, and my own experience working with those of skill in the art at the time of the invention. I have considered these factors in reaching my opinion as to the hypothetical POSITA that I set forth below.

32. I understand that the Petitioner has proposed a POSITA at the time of the '738 Patent would have possessed a bachelor's degree in electrical engineering, computer science, or a related field, plus at least two years of industry or graduate-level academic experience with human-computer interaction. Pet., 6. Petitioner also states that a person could have qualified as an ordinarily skilled artisan with more formal education and less practical or industry experience , or vice versa. *Id.*

33. In my opinion, the definition of a POSITA should be one with:
a bachelor's degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human-computer interaction (HCI), including implementation of computer-based systems and software for providing haptic feedback effects to a user.

34. Consistent with either definition, I was at the time of invention, and am, a POSITA through my education, research experience and work experience. As of the date of the invention, I was familiar with the types of problems encountered in systems that use haptic feedback and the rapidity at which innovations are made.

B. Claim Construction

35. My opinions do not require any special construction of the terms discussed in this declaration. Therefore, in my analysis of the challenged claims throughout this Declaration, I apply the plain and ordinary meaning of each claim term as understood by a POSITA in the context of the '738 Patent specification.

36. I understand that in interpreting the claims of the '738 Patent in this IPR according to their plain and ordinary meaning, one must take into consideration the so-called “intrinsic evidence” of the patent consisting of (1) the claim language; (2) the specification; and (3) the prosecution history.

37. I understand that claim terms may be explicitly defined in the patent specification or they may be implicitly defined through consistent usage in the specification. I also understand that the scope of claim terms may be limited by statements in the specification or prosecution history where the applicant unambiguously disavows or disclaims subject matter.

C. Anticipation

38. Counsel has informed me, and I understand, that a showing of anticipation involves a comparison of the construed claims to the alleged prior art and, to anticipate a patent claim, a single prior art reference must disclose each element of the claimed invention, either expressly or inherently. The prior art reference must also have disclosed each element prior to disclosure of the claimed invention.

39. Further, a party claiming inherency must prove that the alleged inherent element or feature necessarily is present by clear and convincing evidence. The fact that the feature is likely to have existed is not sufficient. It must be shown that the feature was necessarily present in the reference to show inherency.

D. Obviousness

40. Counsel has informed me, and I understand, that an issued patent claim is invalid as obvious if it can be shown that the differences between the patented subject matter and the prior art are such that the subject matter as a whole would have been obvious, at the time the invention was made, to a person having ordinary skill in the art. Relevant considerations include the level of ordinary skill in the art; the scope and content of the prior art; differences between the prior art and the claims at issue; and the objective indicia, or secondary considerations, of non-obviousness.

41. In this regard, I am informed and I understand that the secondary considerations of non-obviousness could include factors such as commercial success, long-felt but unresolved needs, the failure of others, skepticism by experts, praise by others, awards and accolades, and copying.

42. Counsel has informed me, and I understand, that in order to evaluate the obviousness of any claim of the '067 Patent over a given prior art combination, I should analyze whether the prior art references, included collectively in the combination, disclose each and every element of the allegedly invalid claim as those references are read by the person of ordinary skill in the art at the time of the invention.

43. Counsel has informed me, and I understand, that even where all of the claim limitations are expressly disclosed in the prior art references, there must be

some showing that a person of ordinary skill in the art would have been motivated to combine such prior art references, and explanation of how the combination would be achieved, and that there would have been a reasonable expectation of successfully achieving the claimed invention from such combination.

44. Counsel has informed me, and I understand, that absent some additional reasoning, mere routine optimization for a person of ordinary skill in the art to arrive at the claimed invention through the combination of prior art references is insufficient to support a conclusion of obviousness.

45. Counsel has informed me, and I understand, that to rely on a reference it must be analogous prior art. Counsel has informed me and I understand that a reference is considered analogous prior art: (1) if the reference is from the same field of endeavor as the claimed subject matter, or (2) if the reference “is reasonably pertinent to the particular problem with which the inventor is involved,” even though the reference is not within the field of the inventor’s endeavor.

46. Counsel has informed me, and I understand, in considering the obviousness of a claimed invention, one should not view the invention and the prior art with the benefit of hindsight. In an obviousness analysis, one must be aware of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning. Counsel has instructed me, and I understand that when considering obviousness, I should not consider what is known today what was

learned from the invention of the '738 Patent itself. Instead, obviousness is assessed by the person of ordinary skill in the art at the time the invention of the '738 Patent was made, but without the knowledge of the invention.

47. In this regard, I am informed and I understand that the '738 Patent may not be used as a guide or roadmap to select, understand, and combine or modify the prior art, because such an approach would improperly apply hindsight bias to the obviousness analysis. Also, at a minimum, this approach discounts the value of combining various existing features or principles in the prior art in an inventive way so as to achieve a novel result.

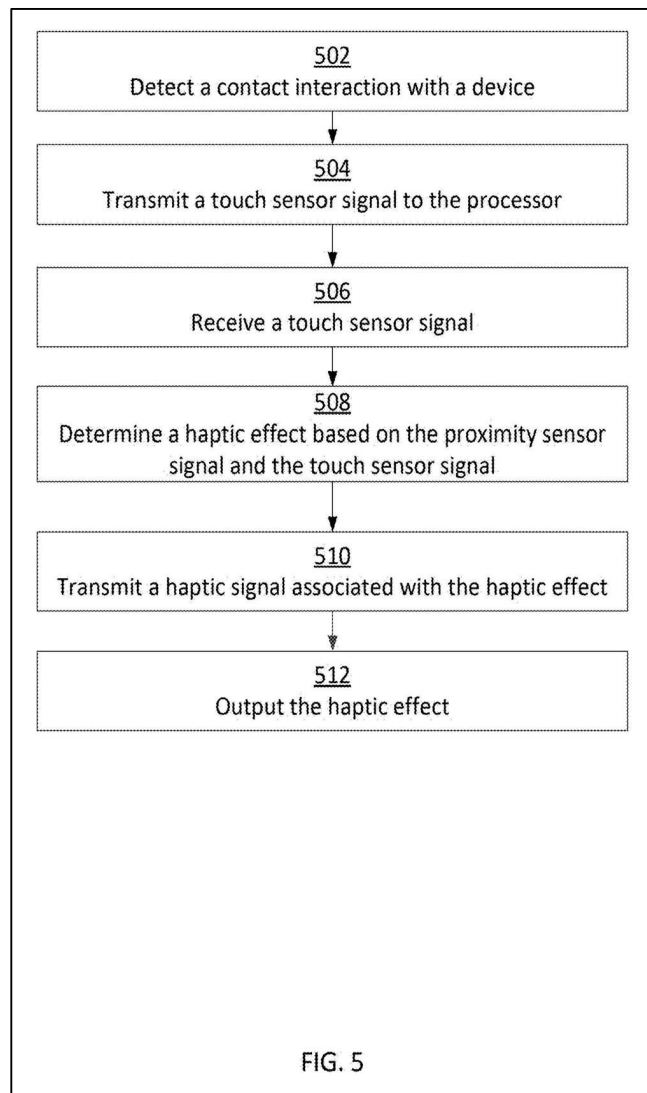
48. Counsel has informed me, and I understand, that obviousness cannot be predicated on what was unknown at the time of the invention, even if the inherency of a certain feature is later established. Counsel has also informed me, and I understand, that unknown or undisclosed properties of the prior art (such as features in the prior art that the obviousness combination or rationale to combine might rely on, but are not disclosed or taught by the reference) may not be relied upon to provide the rationale for modifying or combining the prior art to reach the claimed subject matter.

49. Counsel has informed me, and I understand, that a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would

be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant of the '738 Patent.

V. OVERVIEW OF THE '738 PATENT

50. The '738 patent is directed to a system and method for detecting interactions with a touch-sensitive device, including proximity interactions where the user's finger is close but does not actually contact the touch-sensitive surface, and touch interactions where there is contact with the touch-sensitive surface. The '738 patent then uses inputs from both interactions to generate a haptic effect. EX1001, 1:14-20, 11:26-40. The flow chart below illustrates this process:



51. The teaching of the '738 patent is of techniques to enhance a user's experience in interacting with a touch-sensitive device by taking into account both proximity and touch in generating a haptic effect. In prior systems a touch-sensitive device may convey information either about the proximity signal or the touch signal but they did not take *both* into account when generating a single haptic effect. *Id.*

VI. EXEMPLARY CLAIM OF THE '738 PATENT

53. Independent claim 1 is recited below:

1. A device comprising:

[1A] a proximity sensor capable of detecting a non-contact interaction with a touch-sensitive device and outputting a first sensor signal;

[1B] a touch sensor capable of detecting a touch with the touch-sensitive input device and outputting a second sensor signal;

[1C] a haptic output device configured to receive a haptic output signal and output a haptic effect in response to the haptic output signal; and

[1D] a processor configured to:

[1E] receive the first sensor signal and the second sensor signal;

[1F] generate a haptic output signal based at least in part on the first and second sensor signals; and

[1G] transmit the haptic output signal to the haptic output device.

EX1001, 14:6-23.

A. Prosecution History

54. The '738 patent application was filed on December 13, 2016. EX1002, 1. On April 4, 2018, the Examiner issued a Non-Final Office Action. Aside from noting certain informalities that needed correction the Examiner (1) rejected claims 1-4, 11-13 and 15-19 under 35 U.S.C. § 102 as anticipated Choe (EX1015), (2) rejected claims 5 and 7-10 under 35 U.S.C. § 103 as rendered obvious by Choe in

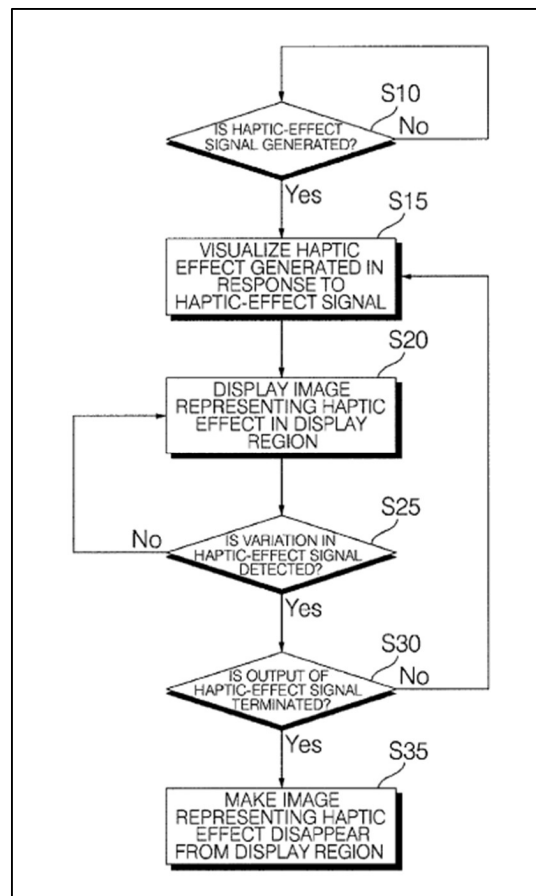
view of Rosenberg (EX1021), (3) rejected claim 6 under 35 U.S.C. § 103 as rendered obvious by either Choe in view of Rosenberg or Choe in view of Rosenberg⁸⁴⁸ (EX1022); and (4) rejected claim 14 under 35 U.S.C. § 103 as rendered obvious by Choe in view of Rosenberg⁸⁴⁸. EX1002, 51-62. As part of that office action the Examiner made note of 6 cited references, including US 2009/0322497 A1, which is the patent application that led to the Ku patent (“Ku Application”). EX1002, 62 listing Ku Application (EX2001). On May 8, 2018, Applicant filed an Information Disclosure Statement (“IDS”) listing 5 references, including EP 2141580 (EX1014) which is the European counterpart to Ku. EX1002, 86.

55. On July 24, 2018, Applicant filed a response to the Examiner’s Non-Final Office Action which corrected the informalities but left the claims substantively unchanged. Applicant traversed the Examiner’s objections, arguing that Choe does not disclose or suggest the claim limitation “generate a haptic output signal based at least in part on the first and second sensor signals.” EX1002, 154-161.

56. The Choe reference is directed to an apparatus and method of helping users navigate a touchscreen with limited display area in order to help them reach the correct icon. EX1015, ¶ [0008]. Choe discloses using the output of a proximity sensor to generating a haptic effect “whose intensity or pattern corresponds to the result of the determination performed by the proximity sensor.” EX1015, ¶ [0010].

“The proximity sensor 141 may determine whether there is an object nearby and approaching the mobile terminal 100 without any mechanical contact with the entity. More specifically, the proximity sensor 141 may detect an object that is nearby and approaching by detecting a change in an alternating magnetic field or the rate of change of static capacitance. EX1015, ¶ [0045]. The haptic module 157 generates haptic effects that can vary in pattern and intensity. EX1015, ¶ [0052].

57. In the Non-Final Office Action Examiner cited paragraphs [0076]-[0078] Choe. In those paragraphs Choe discloses a proximity sensor 141 “configured to output various proximity signals according to the distance between the display module 151 and the detected object”, i.e. the user’s finger. EX1015, ¶ [0076]. “Then, the controller 180 may control the haptic module 157 to generate a haptic-effect signal corresponding to a touch key currently being approached by the detected object.” EX1015, ¶ [0076].



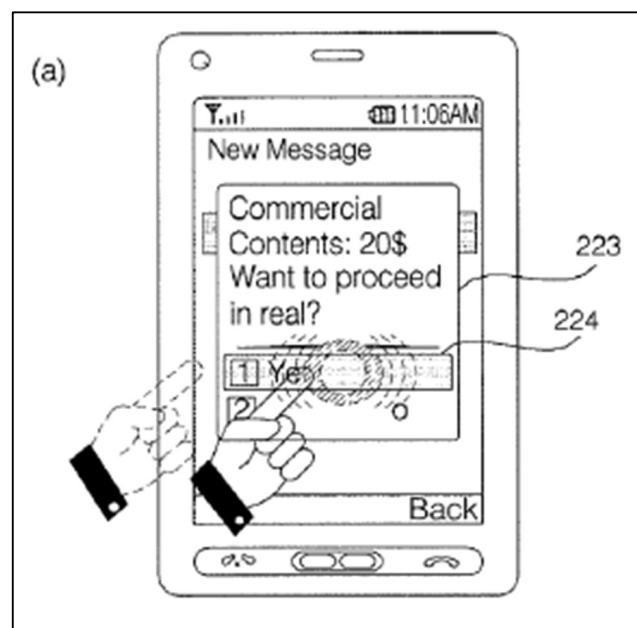
EX1015, Fig. 4

58. During prosecution, Applicant argued that the cited section “makes clear that the haptic effect is determined based only on proximity.” EX1002, 159. Applicant pointed out that the haptic effect was generated based on the signals from one or more proximity sensors and that the haptic effect was generated before the user touched the screen. EX1002, 159.

59. On November 13, 2018, the Examiner issued a Final Office Action that restated the rejection based on Choe and added citations to Figures 16(a)-16(c) and the corresponding paragraphs [0136]-[0138]. EX1002, 171-181. The examiner

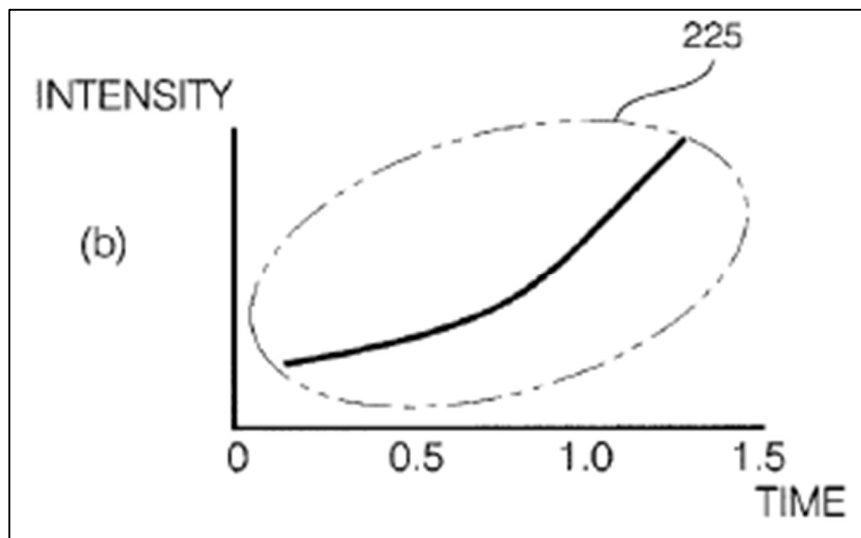
stated that these cited paragraphs “detail an example of providing a haptic effect using the sensing signals of both the proximity sensor 141 and the touch sensor 130. Examiner argued that “[a]s the user’s finger approaches the touchscreen surface the haptic feedback effect changes to indicate the current displacement between the user’s finger and the touchscreen surface. Once the user’s finger contacts the key 224 of the touchscreen surface the haptic feedback effect changes to provide confirmation to the user that a command was issued.” EX1002, 172-173.

60. In Figures 16(a)-(c) and paragraphs [0136]-[0138] Choe discloses an embodiment where the screen 223 displays a region 224 that the user needs to press in order to “pay charges.” EX1015, ¶ [0137].



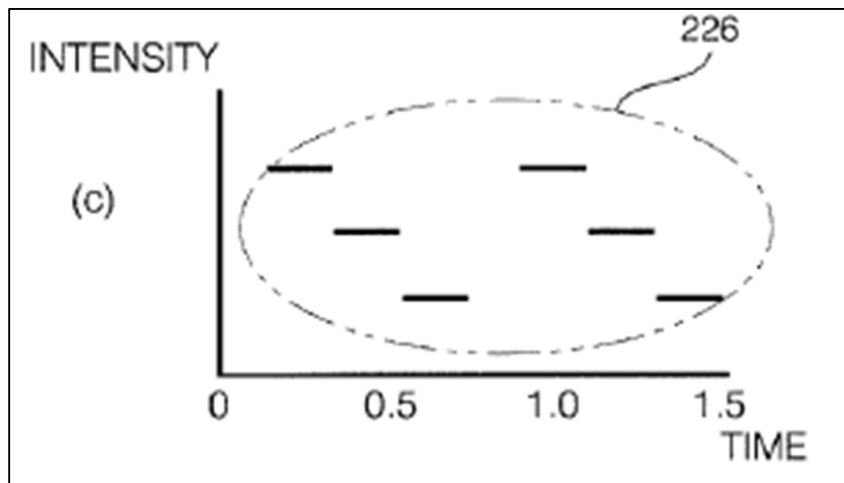
EX1015, Fig. 16(a)

61. The mobile terminal, e.g. smartphone, receives one of two signals: a touch signal or a proximity signal. EX1015, ¶ [0137]. Haptic effect 225 is generated if the mobile terminal detects that the user's finger is in proximity to the screen but has not touched it. "[I]f it is determined that the distance between the user's finger and the key 224 has gradually decreased, the controller 180 may control the haptic module 157 to generate a haptic effect 225 in order to alert the user to the approach of the user's finger to the key 224." EX1015, ¶ [0137].



EX1015, Fig. 16(b)

62. Haptic effect 226 is generated if the mobile terminal detects that the user's finger has touched region 224. "Referring to FIG. 16(c), once the key 224 is touched or approached by the user's finger, the controller 180 may control the haptic module 157 to generate a haptic effect 226 in order to alert the user to the payment of charges." EX1015, ¶ [0138].



EX1015, Fig. 16(c)

63. On January 16, 2019, Applicant filed a response to the Final Office Action and argued that the newly cited paragraphs of Choe still did not disclose generating a haptic output signal based at least in part on both the proximity and touch signals. EX1002, 182-190. Specifically, Applicant argued that those paragraphs of Choe disclose generating a first haptic effect 225 based on a proximity signal and a second haptic effect 226 based on a touch signal. EX1002, 187. Applicant argued that the distinct nature of the two haptic effects is underscored by the fact that the specification uses two different numerals for the haptic effects. EX1002, 187.

64. Also on January 16, 2019¹, Applicant filed a Supplemental IDS which included the Ku Application (EX2001) previously cited by the Examiner. EX1002, 193, 991. On January 18, 2019, the Examiner issued an Advisory Action. EX1002, 995. This included the Examiner's signature on the IDS listing 17 references and the Examiner's initials next to the statement, "All references considered except where lined through." EX1002, 997-1001. None of the references was lined through.

65. On March 25, 2019, Applicant filed a Pre-Appeal Brief and Conference Request. EX1002, 1003-1007. In the Pre-Appeal Brief Applicant explained that "the [proposed] claim requires determining a haptic effect based on signals from two sensors (the claimed "proximity sensor and the claimed "touch sensor")" but that Choe ¶ [0076] "makes clear that the haptic effect is determined based only on proximity." EX1002, 1004. Applicant emphasized the following text from paragraph [0076]:

"it may be determined what part of the display module 151 is being approached by the detected object and whether the detected object is being moved within the close vicinity of the display module 15 by determining *which of the plurality of proximity sensors 141 is*

¹ The date typed on the Information Disclosure Statement is January 16, 2018, but the year is a typo.

outputting a proximity sensor controller 180 may control the haptic module 157 to generate a haptic-effect signal corresponding to a touch key currently being approached by the detected object.”

66. Applicant then addressed the additional citations to Choe made by the Examiner, namely Figures 16(a)-16(c) and paragraphs [0136]-[0138]. With respect to those disclosures Applicant argued that these do not disclose “generat[ing] a haptic output signal based at least in part on the first and second sensor signals” because haptic effect 225 and haptic effect 226 are “two distinct haptic effects” with 225 being based solely on proximity and 226 being based solely on touch. EX1002, 1005. Applicant noted that the Choe reference uses two separate numerals to refer to these haptic effects and that under 37 C.F.R. § 1.84(p)(4) this meant that they were separate haptic effects. EX1002, 1005. With respect to the Examiner’s argument that the haptic effects disclosed in Choe ¶ [0052] (“The haptic module 157 may synthesize different vibration effects and may output the result of the synthesization.”) and Figures 16-17 could be “combined,” Applicant made two arguments in response. First, since this was an anticipation rejection it was inappropriate to combine the disclosures from two different embodiments. EX1002, 1005-1006. Second, ¶ [0052] “at most [discloses] synthesizing vibrations” but does not disclose outputting a single haptic effect based at least in part on first and second sensor signals.” EX1002, 1006.

67. On March 25, 2019, Applicant filed a Petition for Extension of Time. EX1002, 1008. On March 25, 2019, Applicant filed the Notice of Appeal. EX1002, 1015. The Notice of Panel Decision from Pre-Appeal Brief Review on April 9, 2019, recommended that the claims proceed to the Board of Patent Appeals and Interferences. EX1002, 1018.

68. In the May 23, 2019 Appeal Brief, Applicant reiterated its position that Choe does not disclose “determin[ing] a haptic effect based on signals received from *both* ‘a proximity sensor capable of detecting a non-contact interaction with a touch-sensitive device’ *and* ‘a touch sensor capable of detecting a touch with the touch-sensitive device.’” EX1002, 1019-1040, 1032 (emphasis in original). In the Answer the Examiner “agree[d] with Applicant in that the first haptic effect 225 is based on a proximity input and the second haptic effect 226 is based on a contact input.” EX1002, 1057. However, Examiner argued that this disclosed the claimed generation of a haptic effect because the “[Choe] haptic effects are combinable as disclosed in paragraph [0052] and at Figures 16-17 of Choe. A first signal output from the proximity sensor 141 and a second signal output from the touchscreen 130 are supplied as input to the haptic module 157 which synthesizes different vibration effects and outputs a result of the synthetization (paragraph [0052]).” EX1002, 1057.

69. On December 3, 2019, Applicant filed its Reply Brief. EX1002, 1074-1077. On Reply Applicant pointed out that “the specification is explicit that these

are different effects that are not output at overlapping times,” and also argued that it was improper to draw from separate embodiments to discuss combining admittedly separate haptic effects in an anticipation rejection. EX1002, 1075-1076.

70. In its Appeal Decision, the Board noted that “We agree with both the Examiner and Appellant that the broadest reasonable interpretation of the argued limitation requires that both touch and proximity signals be used to generate each haptic effect.” EX1002, 1089. With respect to the earlier cited paragraphs in Choe—[0076]-[0078]—the Board held that in the embodiment disclosed in those paragraphs there was no description of using a touch signal to generate the haptic signal. EX1002, 1089. With respect to the later cited paragraphs in Choe—[0136]-[0138] and Figures 16(a)-(c)—the Board agreed with the Applicant that the first haptic effect is based only on a proximity signal and the second haptic effect is based only on a touch signal. EX1002, 1089-1091. The Board concluded that “we agree with Appellant that the Examiner’s determination that Choe discloses that haptic signals may be combined is insufficient to support a finding of anticipation.” EX1002, 1091. Following the Board’s decision the ’738 patent was issued.

VII. GROUND 1: PRATT

A. Overview of Pratt (EX 1006)

71. U.S. Patent Application Publication No. 2012/0249474 to Pratt et al. (“Pratt”) discloses an apparatus and a method for generating haptic effects: “a device

including a haptic driver to drive a coupled actuator causing the actuator to generate a vibratory haptic effect.” EX1006, Abstract. Pratt explains that these haptic effects can be based on a non-touch, i.e. proximity interaction, a touch interaction, or a touch interaction where the haptic effect depends on the force of the touch. EX1006, ¶ [0005].

72. One of the stated goals of Pratt is to increase user acceptance of haptic effects by reducing the latency in the haptic response, “which is the delay between the moment of user interaction and the corresponding haptics response.” EX1006, ¶ [0004]. According to Pratt, if the latency exceeds about 250ms, then the user will perceive the haptic effect as a device error rather than feedback. EX1006, ¶ [0004]. This in turn results in a poor user experience. EX1006, ¶ [0004].

73. Another of the stated goals in Pratt is to have different haptic effects to complement different types of user interactions with the touch-sensitive screen. EX1006, ¶ [0005]. Pratt gives three examples of interactions with the user interface: a user’s finger hovering above the screen, the touch of the user’s finger on the screen, and the force of the user’s touch. EX1006, ¶ [0005].

74. “The processor 112 in the UI controller 110 may include a proximity classification module 112.1, a touch classification module 112.2, a force classification module 112.3 and a haptics response search module 112.4.” EX1006, ¶ [0020]. The input to these modules is the output of TS sensor 142, and the different

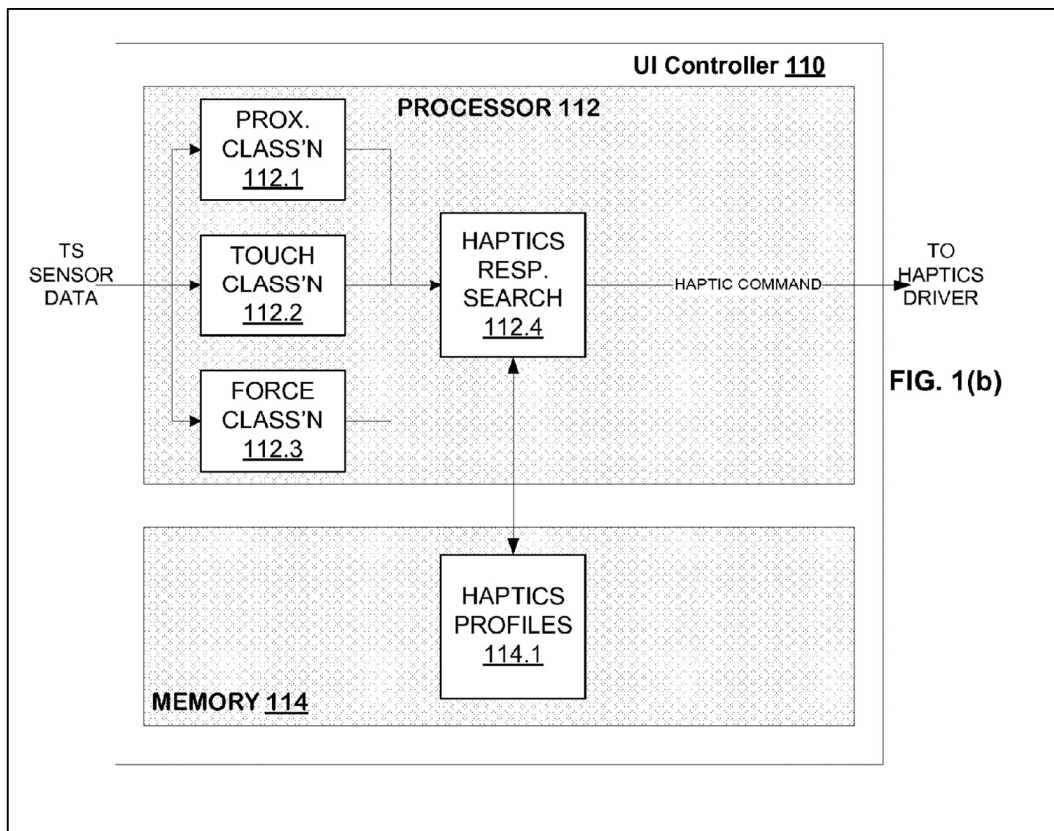
classification modules are used to distinguish between the types of user interactions with the touch sensitive screen.

75. Pratt describes the ways in which these classification modules determine, for any given signal from TS sensor 142, which of the three it is: proximity, touch, or force. EX1006, ¶ [0021]-[0023].

76. The results of the classification of the sensor data into proximity, touch, or force are used as inputs to the haptic response search module 112.4. It is this module that generates a haptic command based on the haptics profile data. Pratt describes the haptic response search module as follows:

The haptic response search module 112.4 may receive proximity, touch, and/or force events as calculated by the modules 112.1-112.3, and may generate a haptic command based on the haptics profile data 114.1. For example, the haptic response search module 112.4 may match the calculated proximity, touch, and/or force event data to a stored haptic profile and may generate a haptic command associated with the matched haptic profile.

EX1006, ¶ [0024].



EX1006, Fig. 1

77. Figure 3 of Pratt shows user interaction detection by the sensors. Figure 3(a) shows the UI map of the touch-sensitive screen and Figure 3(b) shows how the sensors detection may become more localized as the finger approaches and touches the screen. EX1006, ¶ [0036]-[0037].

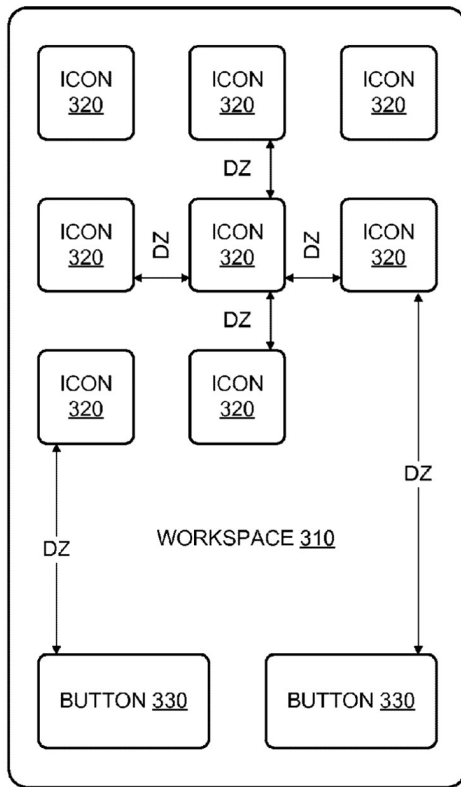


FIG. 3(a)

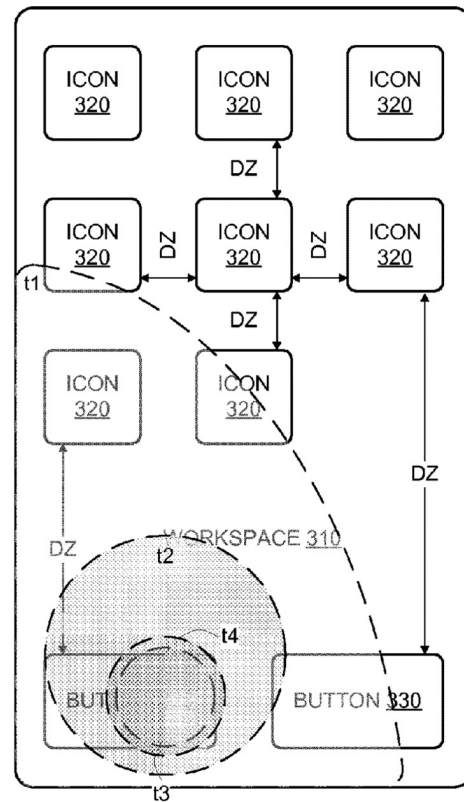


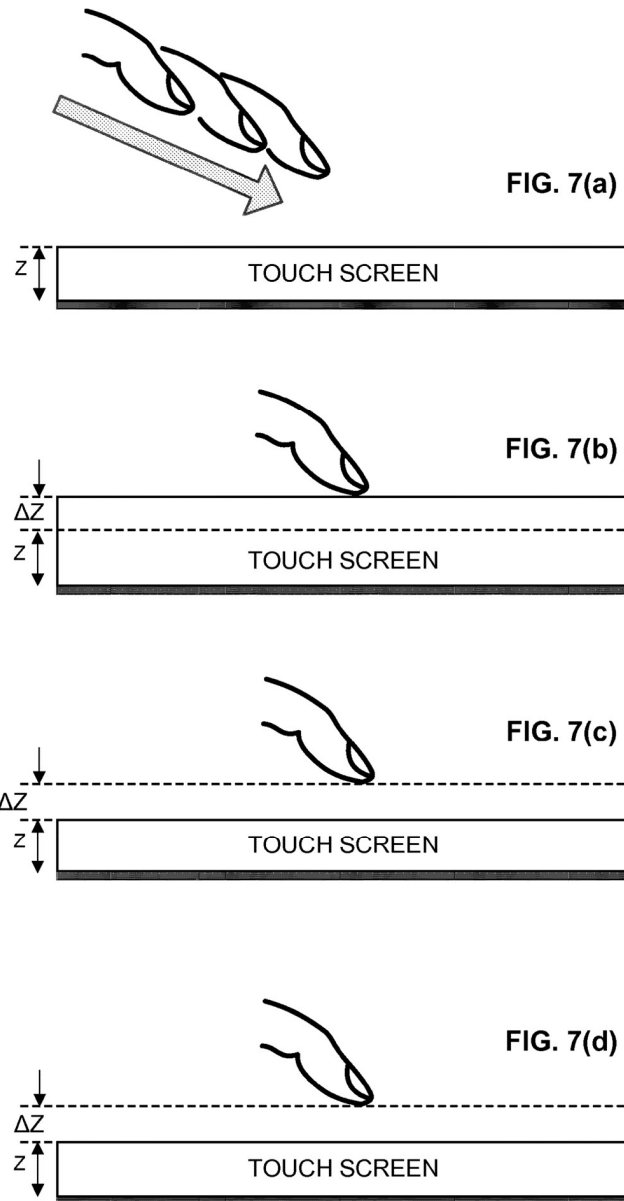
FIG. 3(b)

78. The TS sensor signal is classified into proximity, touch, or force: “At time t2, the user finger may be slightly above the button 330. At time t3, the user finger may touch the screen at button 320. And at time t4, the detection area may increase detecting a larger amount of force as compared to time t3 touch.” EX1006, ¶ [0037].

79. Each generated haptic effect is based on a haptic profile stored by the UI controller. EX1006, ¶ [0025]. “The UI controller 110 may be coupled to the haptic driver 120. Based on the haptic command from the UI controller 110, the haptic driver 120 may generate a corresponding drive signal.” EX1006, ¶ [0025].

Pratt discloses different embodiments illustrating how the haptic effect is generated based on the classification of the TS sensor data.

80. In one embodiment Pratt discloses pre-charging the haptic actuator in order to create a “bubble” effect which simulates clicking when the user touches the screen. EX1006, ¶ [0049]-[0050]. This is accomplished by deflecting the touch screen by a predetermined amount towards the user as their finger approaches the screen. Then, when the user’s finger makes contact the pre-charge effect is removed, causing the screen to return to its default level, shown as “Z” on Figure 7. EX1006, ¶ [0049]-[0050], Figs. 7(a)-(d).

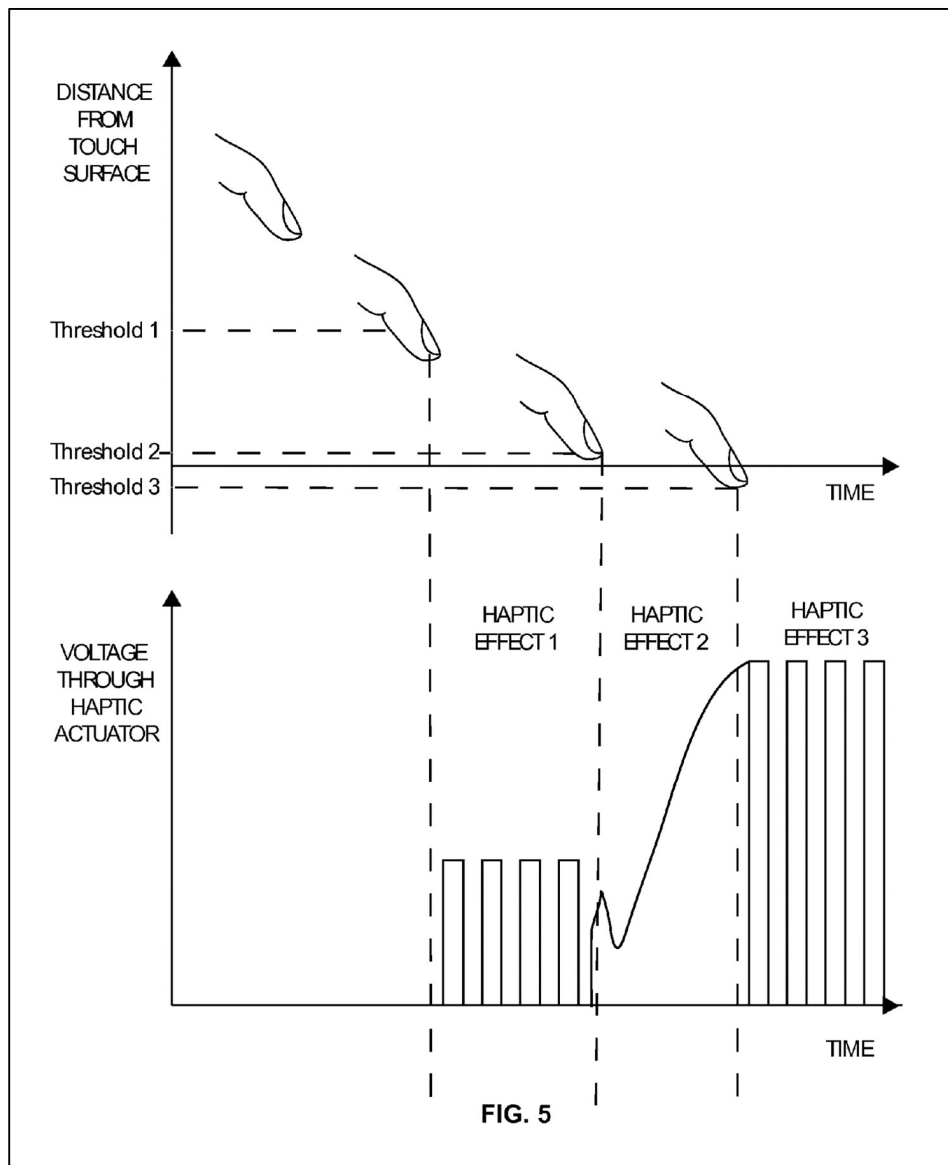


81. This means that there are two mechanical haptic effects. First, based on the proximity signal, the screen is deflected upwards by pre-charging the actuator. Second, based on the touch signal, the pre-charge effect is removed and the screen returns to its regular state.

82. In another embodiment, Pratt discloses different haptic effects based on separate user interactions. Specifically, the embodiment illustrated by Figure 5 shows three separate interactions that generate three separate haptic effects.

FIG. 5 includes two plots. The top plot shows a user finger approaching the touch surface in a distance versus time graph, and the bottom plot shows a corresponding voltage through the haptic actuator versus time graph. FIG. 5 illustrates different haptic effect generation based on different user interaction events as detected by the sensor(s) via thresholds.

EX1006, ¶ [0042].



EX1006, Fig. 5

B. Petitioner Has Not Shown That Pratt Discloses “generat[ing] a haptic output signal based at least in part on the first and second sensor signals”

1. Pratt's "bubble effect" embodiment does not teach, suggest, or disclose Challenged Claims 1-3, 5-6, 14-15, and 19 of the '738 Patent

83. The "bubble effect" embodiment disclosed by Pratt is the result of two separate haptic effects that are created in sequence to simulate a clicking effect when the user touches the screen. As detailed in paragraphs [0049]-[0050] and Fig. 7 of Pratt these are two separate haptic effects that occur sequentially, not a single haptic effect based in part on both proximity and touch signals.

84. The first haptic effect in the "bubble" effect embodiment is based on the proximity signal. When the user's finger approaches the touchscreen the actuator is pre-charged causing the touchscreen to be deflected towards the user's finger.

As the user's finger approaches the touch screen, it enters the "field of view" of the touch screen and is identified by the proximity sensor. In response, a haptics driver may pre-charge a haptics actuator to cause the touch screen to deflect toward the user's finger by a predetermined amount, shown as ΔZ in FIGS. 7(a)-(d). Thus, the touch screen may be deflected toward the user's finger by the time it makes contact with the touch screen as shown in FIG. 7(b).

EX1006, ¶ [0050] (emphasis added)

85. The second haptic effect in the "bubble" effect embodiment occurs when the user's finger makes contact with the touchscreen. When contact is made,

and the TS sensor data is classified as a touch signal, the touchscreen moves down to its default position.

When the touch sensor determines that the user's finger has made contact, it may initiate the haptic effect. As shown in FIG. 7(c), a mechanical button click may be simulated, for example, by removing the pre-charge effect and *inducing the touch screen to return to its default level* (shown as "Z").

EX1006, ¶ [0050] (emphasis added)

86. According to Pratt, when these two haptic effects occur in quick sequence the user experiences those haptic effects as a clicking sensation.

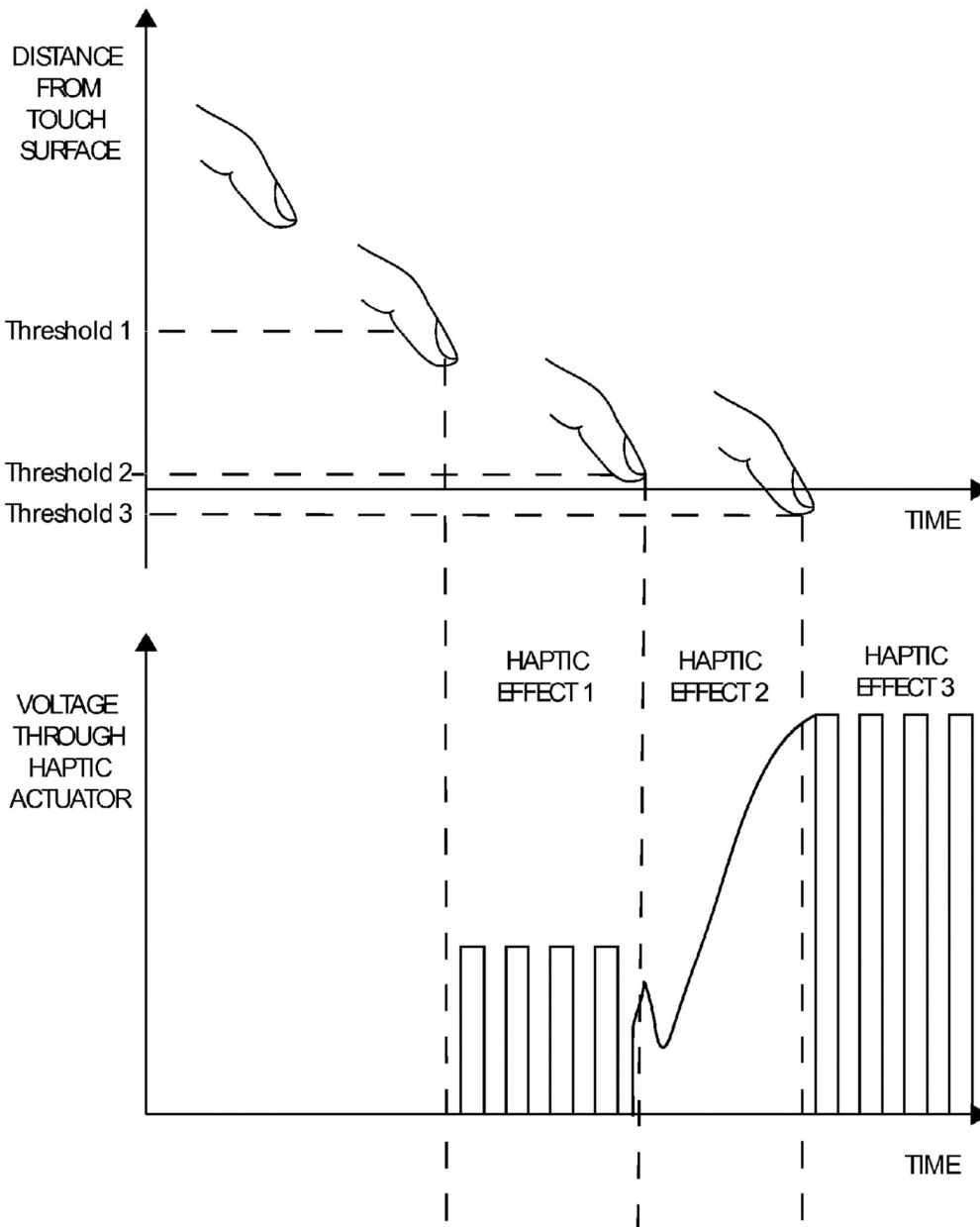
The click effect may be induced by the user feeling mechanical resistance at the first point of contact with the screen deflected forward (FIG. 7(b)) and then at the second point of contact with the screen at the rest position (FIG. 7(d)). This effect simulates a mechanical compression effect (i.e., the bubble effect).

Id.

87. The two haptic effects that make up the bubble effect are each based on different input signals. When the TS sensor data is classified as a proximity signal, the touchscreen is deflected upwards. When the TS sensor data is classified as a

touch signal, the touchscreen is returned to its default, flat state. The haptic effect that occurs upon touch is based on a pre-stored profile. EX1006, ¶ [0025] (“Returning to FIG. 1(a), the UI controller 110 may receive the TS sensor results and may generate corresponding haptic commands accordingly based on stored haptic profiles.”). Since Pratt discloses generating the second haptic effect based entirely on the touch signal and the first haptic effect based only on the proximity signal, neither haptic output signal is based at least in part on both the first and second signals.

88. The “bubble effect” embodiment is described at paragraphs [0049]-[0050]. Paragraphs [0042]-[0045] of Pratt refer to Figure 5 and describe a different embodiment: the “multi-haptic effect” embodiment. In this embodiment 3 separate haptic effects occur sequentially, each one based on proximity, touch, and force. One haptic effect occurs when the TS sensor data is classified as a proximity signal. A second haptic effect occurs when the TS sensor data is classified as a touch signal. And a third haptic effect occurs when the TS sensor data is classified as a touch signal with force.



89. In context, the phrase “proximity, touch, and/or force events” refers to the multi-haptic effect embodiment in Figure 5 which does not disclose generating a single haptic effect based in part on two signals.

2. Pratt’s “rate of approach” embodiment does not render obvious Challenged Claims 1-3, 5-6, 14-15, and 19 of the ’738 Patent

90. Petitioner is incorrect that a POSA would have understood that Pratt’s “rate of approach” embodiment could be modified to produce the haptic effect only upon touch.

91. First, Petitioner’s argument does not make sense in the context of Pratt’s disclosure. The haptic effect disclosed in paragraph [0041] is designed to deliver information about the rate of approach of the user’s finger.

In an embodiment, haptic selection may also be based on sensor measurements. For example, haptic effect types may be selected based on the rate of approach of the user’s finger as it moves toward a touch screen—a first haptic effect may be selected in response to a relatively “fast” velocity and a second haptic effect may be selected in response to a relatively “slow” velocity.

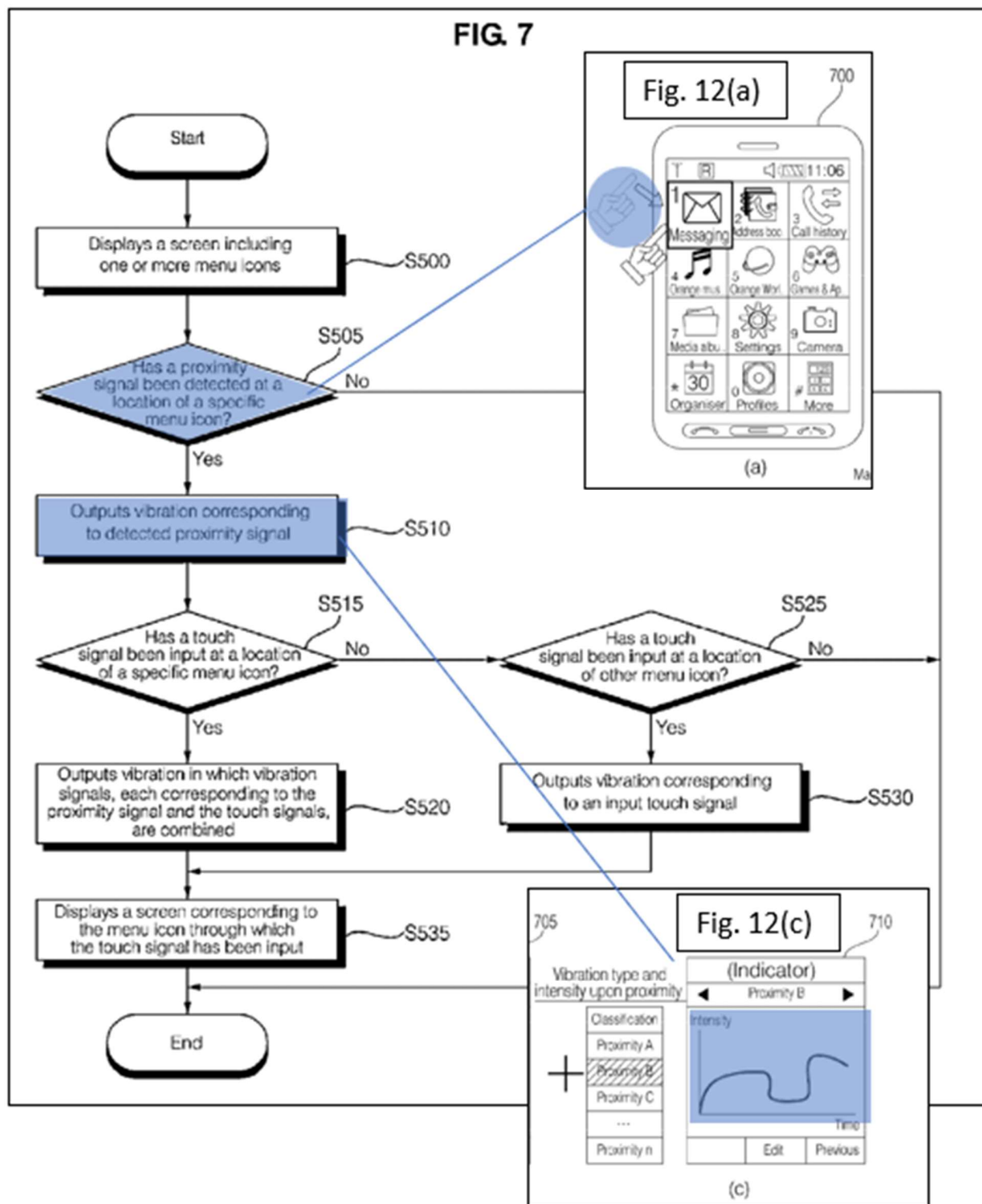
EX1006, ¶ [0041]. This means that the haptic effect is based solely on proximity. When the TS sensor data is classified as a proximity signal the haptic effect is generated to convey information about that proximity signal, namely how fast the user’s finger is approaching the screen. Touch is in no way involved in the generation of the haptic effect. The purpose of the haptic effect disclosed in this embodiment is to convey information *before* the user touches the touch screen and the menu icon.

VIII. GROUND 2: PRATT IN VIEW OF KU

A. Overview of Ku (EX 1008)

92. The Ku Application that was considered by the Examiner during prosecution of the '738 patent is the application that led to US 8,531,319 ("Ku"). The disclosures are essentially identical. Like Pratt, Ku discloses generating certain haptic effects based on a proximity signal and other haptic effects based on a touch signal. According to Ku, a goal of the invention is to distinguish between different types of proximity signals and touch signals. EX1008, 1:32-34.

93. "If Ku detects the proximity of a user's finger to the location of a particular icon (step S505), Ku's processor causes a vibration signal (step S510)." EX1008, 11:54-64. Thus, if a user's finger hovers over menu item 1, S510 is the output of a vibration signal based entirely on the proximity of the user's finger to menu item 1.



EX1008, Fig. 7 overlaid with Figures 12(a) and 12(c)

94. Ku discloses generating the vibration signal shown in Figure 12(c) when the user's finger is in proximity with the touch screen. This haptic effect is generated based entirely on proximity; it is generated irrespective of whether the user's finger touches the screen.

Next, the controller 180 determines whether a proximity signal has been detected at the location of a specific one of the one or more menu icons through the proximity sensor 141 (S505). ... [I]f, as a result of the determination in S505, the proximity signal has been detected at the location of a specific menu icon, the controller 180 outputs a vibration signal, corresponding to the detected proximity signal, through the haptic module 157 (S510). Here, a single vibration signal corresponding to the detected proximity signal is output as vibration.

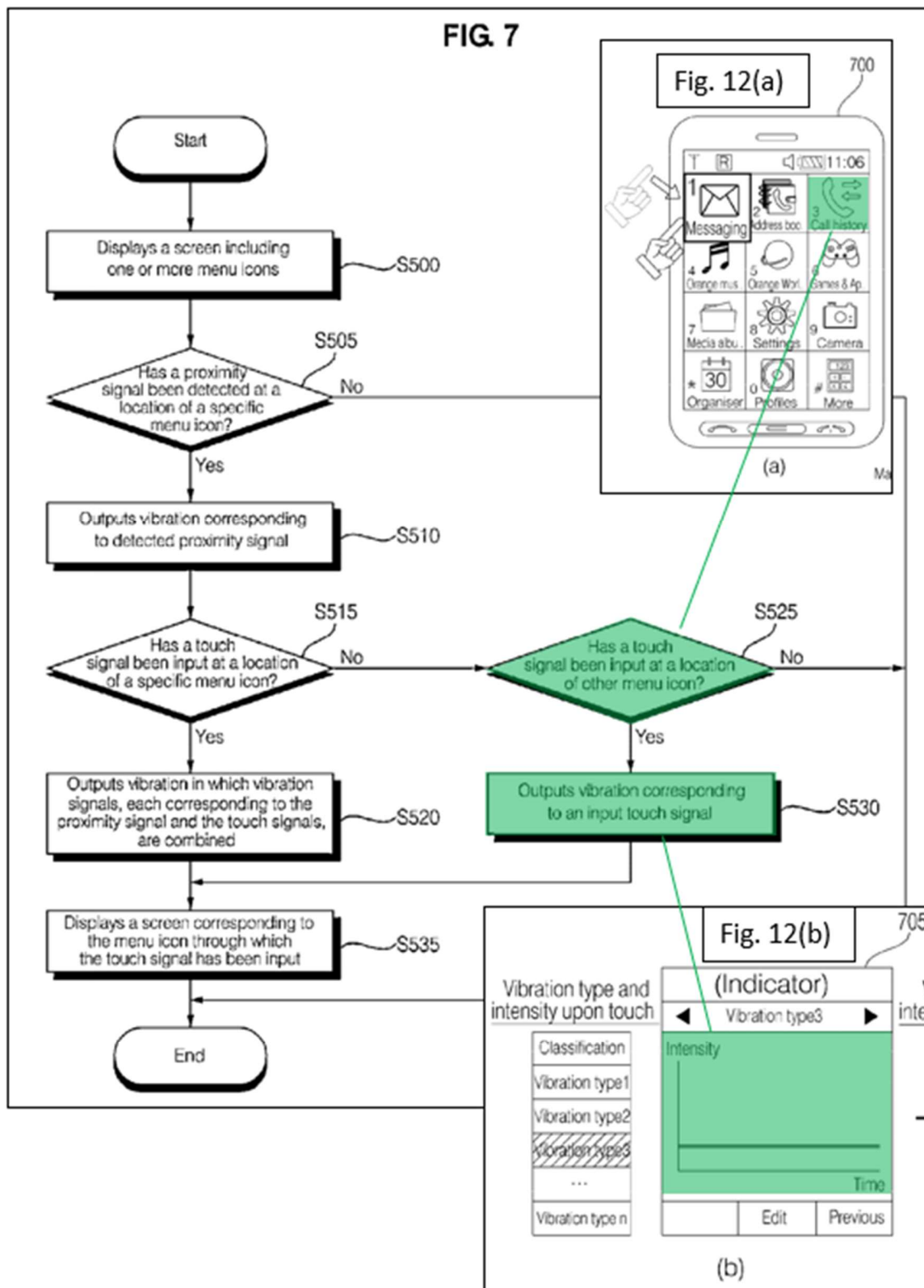
EX1008, 11:54-66.

95. As described in Ku, haptic effects are also generated based on a touch signal. The same haptic effect is generated by the touch signal regardless of whether the user touches the menu icon they were hovering over, or whether the user touches a different menu icon.

96. If the user hovers over one menu icon and then touches a *different* menu icon, for example menu item 3, a haptic effect is generated based solely on the touch signal:

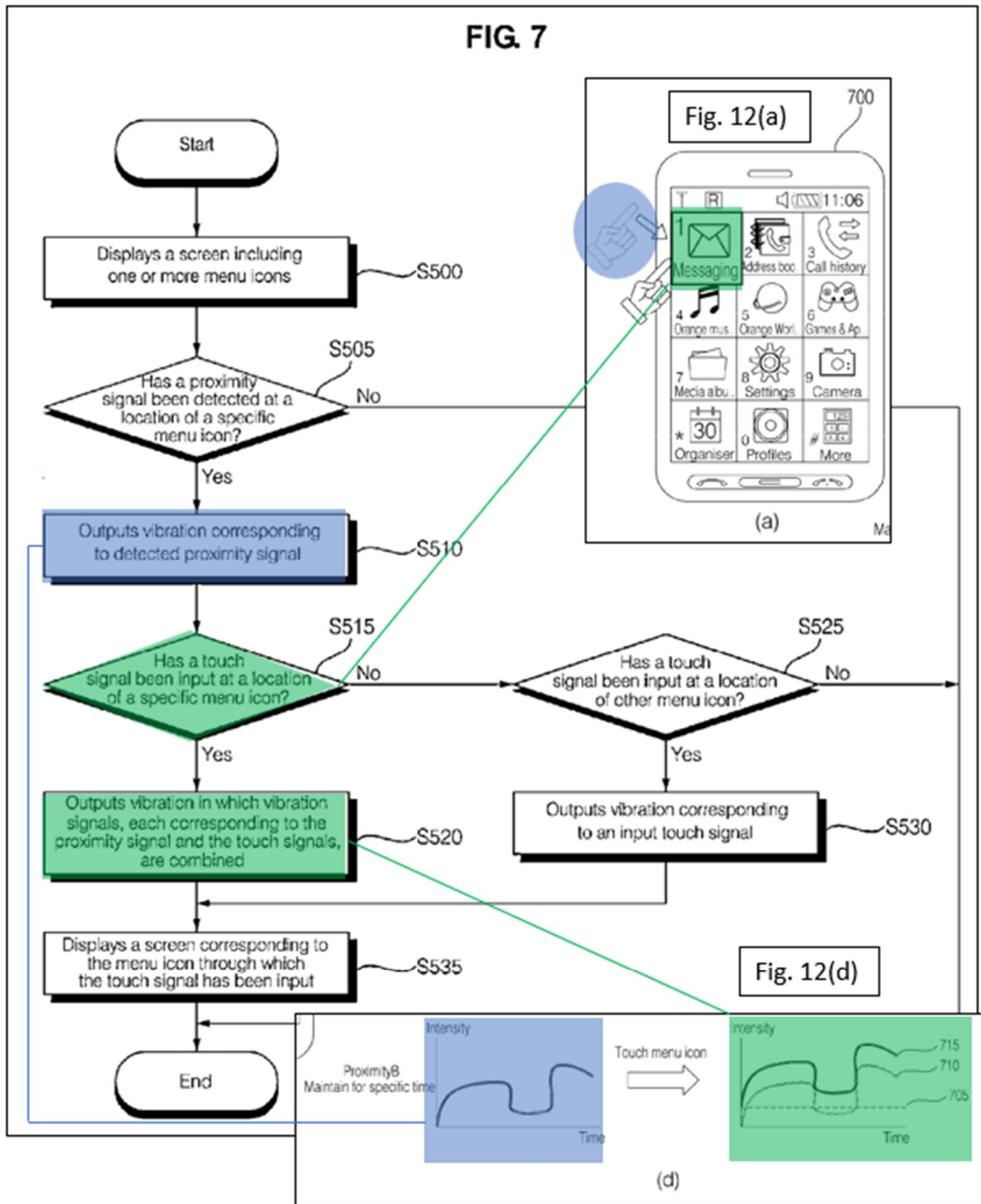
If, as a result of the determination in S515, the touch signal has not been input through the specific menu icon, the controller 180 determines whether the touch signal has been input through a menu icon different from the specific menu icon (S525). ... [I]f, as a result of the determination in step S525, the touch signal has been input through the different menu icon, the controller 180 outputs a vibration signal, corresponding to the input touch signal, through the haptic module 157 (S530).

EX1008, 12:4-15. This means that there is one haptic effect based on proximity when the user hovers over menu icon 1, and then a different haptic effect when the user touches menu icon 3. The result is two sequential haptic effects that occur at different times.



EX1008, Fig. 7 overlaid with Figures 12(a) and 12(b)

97. If the user hovers over menu icon 1, and then touches that *same* menu icon 1, the haptic effect is generated based solely on the touch signal. First there is a haptic effect based on the proximity of the user's finger to menu icon 1, and then there is haptic effect based on the touch of the user's finger on menu icon 1. EX1008, 16:17-21. In the case where *after* a proximity-based haptic signal is maintained for a period of time, menu icon 1 is then touched generating a touch-based haptic signal, such that the two haptic signals overlap in time, the haptic effects are summed. EX1008, Fig. 12(d), 16:22-27.



EX1008, Fig. 7 overlaid with Figures 12(a) and 12(d)

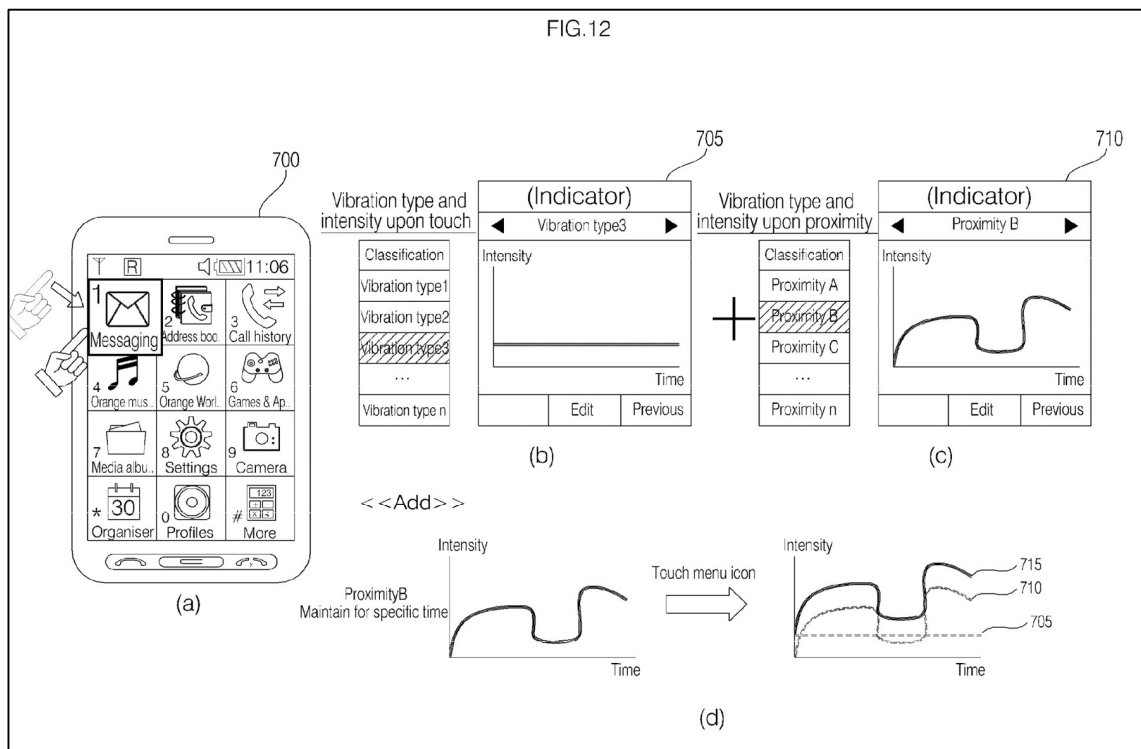
98. The fact that these are distinct haptic effects is confirmed by the fact that they begin at different times. As Figure 12 illustrates, they can be summed or subtracted but they are nevertheless separate. As also discussed earlier in ¶70 of this Declaration, I understand that the PTAB did not accept the argument that combining two separate haptic signals (one based on proximity and the other based on touch) was sufficient to satisfy this claimed limitation. *See* EX1002, 1091. I understand that the PTAB recognized the Choe reference as disclosing

two haptic effects, effects, neither of these haptics effects is generated based on both proximity signals and touch signals. Rather, the first haptic effect is based only on a proximity signal, and the second haptic effect is based only on a touch signal.

EX1002, 1090 (citing Choe US2010/0004033, ¶¶137-138).

99. Similarly, here, each of Ku's proximity-based haptic effect signal and touch-based haptic effect signal have their own vibration profile and are referred to by separate numerals, which underscores the distinct nature of the two separate haptic effects. EX1008, 16:16-21. In Figure 12, 705 is the "vibration type and intensity upon touch", and 710 is the "vibration type and intensity upon proximity." This disclosure regarding separate haptic effect signals, each based on a separate proximity signal and a touch signal respectively, is similar to the disclosure in Choe at ¶¶137-138. Yet, the Board did not find that the Examiner's determination that

Choe’s disclosure that the haptic effect signals can be combined was sufficient to show that the claimed limitation was met.

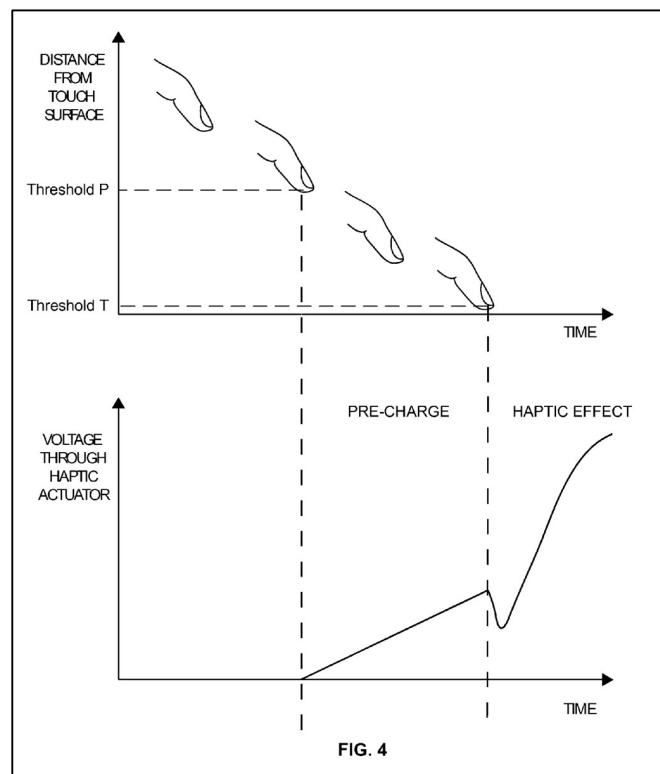


EX1008, Fig. 12

B. Petitioner Has Not Shown That Pratt in View of Ku Discloses “generat[ing] a haptic output signal based at least in part on the first and second sensor signals”

100. As detailed above, Pratt does not disclose a single haptic effect based on proximity and touch signals. The same is true for Ku: it discloses two separate haptic effects—one based on the proximity signal and one based on the touch signal—that occur sequentially and, in some cases, overlap in time. Therefore, the combination of Pratt and Ku does not disclose generating a single haptic effect based in part on both proximity and touch signals.

101. Petitioner is incorrect that it would have been obvious to combine the “pre-charging” embodiment disclosed in Pratt (EX1006, ¶ [0038]) with the haptic effects generation disclosed in Ku’s Figure 7 or 12. Pet. 46. The purpose of the “pre-charging” embodiment described in Pratt is to reduce latency between touching the screen and experiencing the haptic effect. “[L]atency may be improved by pre-charging the haptics actuator 130 based on detected proximity events such as location and/or rate of approach (i.e., velocity and/or acceleration). Therefore, a haptic effect may [sic] generated faster upon an actual touch detected because of the pre-charged actuator.” EX1006, ¶ [0016].

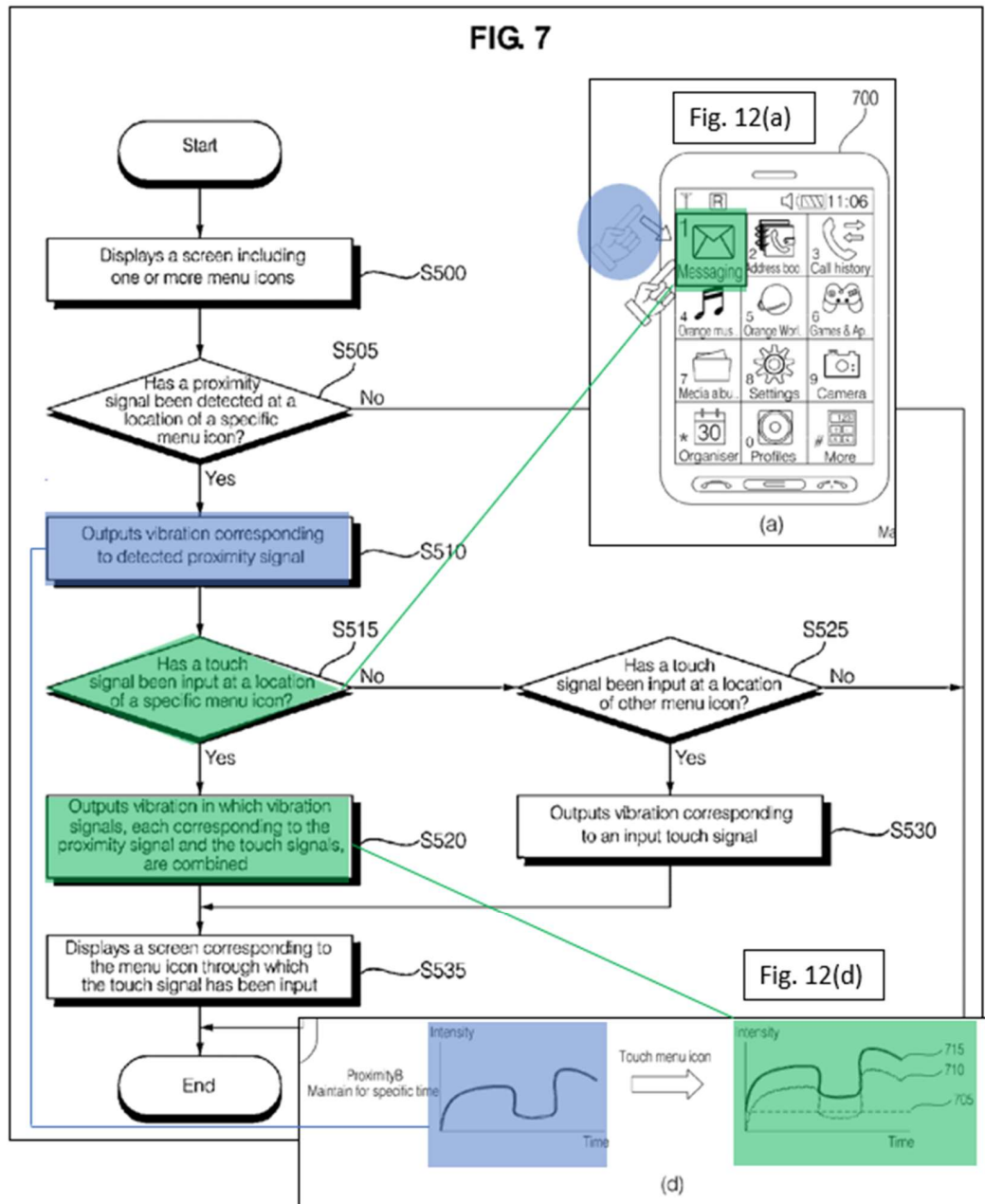


102. Petitioner argues that it would have been obvious to combine this embodiment with the disclosure in Ku of “distinguishing between different types of touch signals and proximity signals.” Pet. 47. However, a POSA would not have been motivated to make this combination. The pre-charging embodiment disclosed in Pratt is designed to reduce latency. By contrast, Ku’s disclosure does not relate to reducing latency at all. Since the disclosures address different problems with different solutions, a POSA would not have been motivated to combine Ku’s disclosure with the embodiment in Pratt that is directed solely to reducing latency. Moreover, there is no deficiency in Pratt that would lead a POSA to look outside the reference to combine with other disclosures.

103. Even putting aside the lack of motivation to combine, the combination still does not disclose generating a haptic output signal based at least in part on a proximity signal and a touch signal. Both Pratt and Ku disclose two separate haptic effects, each based on individual signals.

104. As detailed above, Ku discloses generating a first haptic effect based on proximity and a second haptic effect based on touch. In the event that the proximity-based haptic effect does not stop even after the device is touched, eventually, the haptic effects will overlap in time, at which point they are summed together. “The controller 180 may combine one or more vibration signals through

addition and subtraction.” EX1008, 11:39-40; *see also* EX1008, 16:16-21. Notwithstanding the fact that they can be summed or subtracted, they are separate haptic effects based on separate haptic signals that are generated at different points in time.



EX1008, Fig. 7 overlaid with Figures 12(a) and 12(d)

105. This is similar to the disclosure of sequential and separate haptic effects in the Choe reference, which the Board found to not disclose this claimed limitation during prosecution of the 738 patent. Similar to Choe’s disclosure in ¶¶ 137-138, the separate haptic or vibration signals shown above in Figure 12 have separate numerals, where 705 is the “vibration type and intensity upon touch”, and 710 is the “vibration type and intensity upon proximity.” Petitioner describes these separate haptic effects such that “Vibration 715 is the sum of two different vibrations signals—one (710) “set with respect to the proximity signal” and the other (705) “set with respect to the touch signal.” Pet., 45 (emphasis added).

106. As explained above in ¶70, I understand the Board already found the fact that haptic signals (each based on proximity and touch sensor signals, respectively) may be combined in the prior art is insufficient to show that this claim limitation is met. EX1002, 1091.

107. This is because the determination of the haptics effect output signal must be based at least in part on a proximity sensor signal and a touch sensor signal at the very least. I understand that the plain meaning of the claim limitation “a haptic output signal based at least in part on the first and second sensor signals” is that the determination of the haptic output signal must be based at least on the proximity and sensor signals—not some intermediate haptic signals that are associated with the proximity and sensor signals. By reciting that the haptic output signal is based at

least in part on the first and second sensor signals, the claim limitation means that there can be based on other factors such as an incoming message or notification, a press of a physical button, system status events such as low battery, or events in a game such as explosions, gunshots, etc. EX1001, 8:28-44.

IX. GROUND 3: KU

A. Petitioner Has Not Shown that Ku Discloses “generat[ing] a haptic output signal based at least in part on the first and second sensor signals”

108. As detailed above, Ku does not disclose a single haptic output signal based at least in part on both a proximity signal and a touch signal. What Ku discloses is two separate haptic output signals: one based solely on proximity and one based solely on touch. But Ku does not disclose a single signal based in part on two input sensor signals. The haptic effects are generated at different points in time. In one specific instance—where the user hovers over and then touches the same menu icon—the haptic effects can overlap in time, but they were generated sequentially. When the sequentially generated effects overlap in time, the vibration effects can be summed together.

109. Petitioner is incorrect that Ku refers to “a [single] command signal causing vibration 715.” Pet. 66. There is no such command signal disclosed in Ku. Instead, two separate command signals are output, causing two separate haptic effects.

A vibration signal set with respect to the touch signal is a vibration signal 705 with respect to vibration type3, as shown in (b) of FIG. 12, and a vibration signal set with respect to the proximity signal is a vibration signal 710 with respect to proximity B, as shown in (c) of FIG. 12.

Accordingly, in the case in which, after the proximity signal is maintained for a specific period of time, a menu icon is touched, vibration 715 in which *the vibration signal 705* with respect to the vibration type3 *and the vibration signal 710* with respect to the proximity B *have been added* is output, as shown in (d) of FIG. 12.

EX1008, 16:17-27.

110. This is the simple case of two vibration signals being added together, which the Board has already determined is insufficient to show that this claim limitation is met. EX1002, 1091. For this reason, Ku does not disclose a single haptic effect based at least in part on a proximity signal and a touch signal.

X. GROUND 4: KU IN VIEW OF JIANG

A. Petitioner Has Not Shown that Ku in view of Jiang Discloses “generat[ing] a haptic output signal based at least in part on the first and second sensor signals”

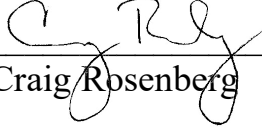
111. Ku does not disclose a single haptic output signal based at least in part on a proximity signal and a touch signal, and neither does Jiang. As a result, the combination of these two references also fails to disclose this element.

112. Separately, a POSA would not have been motivated to combine the disclosures in Ku and Jiang. Jiang discloses an EMP-based sensor. EX1010, ¶ [0002]. The focus of Jiang’s disclosure is how the waveform is generated in the actuator. “The present invention provides electromechanical polymer-based (EMP-based) sensors and actuators.” EX1010, ¶ [0023].

113. The disclosure in Jiang is simple: if the screen is touched, then a haptic effect may be generated. “When mobile device 801 senses that a key on the keypad is touched, as sensed by the sensor portion of the corresponding key (e.g., 802-1), the actuator portion of that key is activated to provide a haptic response.” EX1010, ¶ [0035]. Petitioner does not contend that Jiang by itself discloses generating a haptic output signal based at least in part on a proximity signal and a touch signal. Pet., 81. Petitioner does not rely on Jiang alone for this claim element and instead relies on Ku alone. *Id* (“Ku-Jiang includes elements [1D], [1E], [1F], and [1G] for the same reasons detailed in § VII.C concerning Ku”). Thus, the Ku-Jiang combination does not address the key disclosure that is missing from Ku.

114. I declare under penalty of perjury that the foregoing is true and correct. I acknowledge that willful false statements and the like are punishable by fine and/or imprisonment, that all statements made of my own knowledge are true, and that all statements made on information and belief are believed to be true.

Executed June 27, 2024, in Shoreline, Washington

By: 
Craig Rosenberg