

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

PETITIONER

V.

SMITH INTERFACE TECHNOLOGIES, LLC,

PATENT OWNER

INTER PARTES REVIEW NO. IPR2024-01087
PATENT 10,656,755 B1

DECLARATION OF DR. MARK P. MAHON

TABLE OF CONTENTS

	Page
I. INTRODUCTION.....	4
II. BACKGROUND AND QUALIFICATIONS.....	4
III. COMPENSATION	12
IV. LEGAL CONSIDERATIONS	13
V. TASK SUMMARY	14
VI. OVERVIEW OF THE '755 PATENT	16
A. Gesture-Related Magnitude and Threshold	17
B. Dynamic Response to Selection.....	18
C. Independent Claims 1 and 23	20
VII. LEVEL OF ORDINARY SKILL IN THE ART	21
VIII. OVERVIEW OF THE PRIOR ART.....	22
A. Hackborn	22
B. Westerman.....	25
C. Townsend	28
D. Jobs	31
IX. THE '755 PATENT'S CLAIMS ARE NOT OBVIOUS.....	33
A. Ground 1A: Hackborn-Westerman (Claims 1–3, 7, 10, 11, 13, 15, 17, 20, 22–25, 29, 32, 33, 35, 37, 38, 41, and 42)	33
1. A POSITA Would Not Have Been Motivated To Combine Hackborn and Westerman 33	
2. Independent Claims 1 and 23	38
3. Dependent Claims 7 and 29	41
4. Dependent Claims 17, 37, and 38	42
5. Dependent Claim 22.....	45
6. Dependent Claims 2, 3, 7–11, 13, 15, 17, 20, 22, 24, 25, 32, 33, 35, 37, 38, 41, and 42 46	
B. Ground 1B: Hackborn-Westerman-Townsend (Claims 4, 5, 8, 9, 21, 26, 27, 30, 31, and 43) 46	
1. A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Townsend	46

2.	Dependent Claims 5 and 27	48
3.	Dependent Claims 8 and 30	51
4.	Dependent Claims 9 and 31	51
5.	Dependent Claims 21 and 43	53
6.	Dependent Claims 4, 5, 8, 9, 21, 26, 27, 30, 31 and 43	54
C.	Ground 1C: Hackborn-Westerman-Jablonski (Claim 16)	55
D.	Ground 1D: Hackborn-Westerman-Jobs (Claims 18, 19, 39, and 40).....	55
1.	A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Jobs.....	55
2.	Dependent Claims 18 and 39	57
3.	Dependent Claims 19 and 40	59
E.	Ground 2: Hackborn-Westerman-Jobs (Claims 1, 4–8, 10–12, 15, 17–20, 22, 23, 26–30, 32, 34, and 37–42)	60
1.	A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Jobs.....	60
2.	Independent Claims 1 and 23	69
3.	Dependent Claims 7 and 29	70
4.	Dependent Claims 18, 19, 39, and 40	71
5.	Dependent Claim 22.....	72
6.	Dependent Claim 28.....	73
7.	Dependent Claims 4–8, 10–12, 15, 17–20, 22, 26–30, 32, 34, and 37–42	74
X.	CONCLUSION.....	75

I. INTRODUCTION

1. My name is Mark Mahon. I am over the age of twenty-one (21) years, of sound mind, and capable of making the statements set forth in this Declaration. I am competent to testify about the matters set forth herein. All the facts and statements contained herein are with my personal knowledge, and they are true and correct to the best of my knowledge.

2. I have been asked by Smith Interface Technologies, LLC (“Smith” or “Patent Owner”) to submit this declaration in response to the challenge of the validity of claims 1–13, 15–35, and 37–43 (“Challenged Claims”) of U.S. Patent No. 10,656,755 (the “’755 Patent”) by Petitioner Apple Inc. (“Apple” or “Petitioner”).

II. BACKGROUND AND QUALIFICATIONS

3. Exhibit 2006 is a true and correct copy of my curriculum vitae (“CV”), containing my complete qualifications and professional experience. The following is a brief summary of my relevant qualifications and professional experience.

4. I am a Teaching Professor in the School of Electrical Engineering and Computer Science at Pennsylvania State University, University Park, PA (“Penn State” or “PSU”). I have worked on telecommunications and wireless networks, including Z-Wave, Bluetooth, Zigbee, Wi-Fi, NFC, AMPS, IS-95, CDMA2000, GSM, EDGE, UMTS/WCDMA, LTE, and 5G cellular systems since 1988.

5. I received my B.S. in Electronics Engineering from the University of

Scranton in 1987. I received my M.S. in Electrical Engineering and Ph.D. in Acoustics from Penn State in 1991 and 2001, respectively.

6. In 1988, after I received my bachelor's degree, I joined the Central Intelligence Agency (CIA) while pursuing my M.S. degree at Penn State part-time. My first job at the CIA involved designing and testing systems to automatically capture and characterize telecommunication signals and emissions from various wireless and computer networking devices.

7. I returned to Penn State in early 1990 to pursue graduate research full-time and complete my M.S. degree. My graduate research work focused on wideband beamforming and adaptive signal processing. After completing my M.S. degree in EE in 1991, I accepted a full-time faculty research position at the Applied Research Lab at PSU, primarily working on classified programs, and began working on diverse radio frequency and acoustic sensor systems including wireless communications and small wireless networks for acoustic tracking, source localization, and feature extraction.

8. I began pursuing my Ph.D. part-time in 1993 while continuing my faculty research position. In 1997, as part of my faculty research position, I began working on classified programs focused on mathematical analytical modeling of cellular communication networks and the development of hardware and software systems to test against cellular networks. My role was to develop algorithms and

write the code running on a specially developed embedded system. For this work, I received a letter of recognition as the “genius behind the VELA software algorithms” from the Director of National Reconnaissance Office (NRO) Systems Engineering and Technology Office. As part of this same work, I was extensively involved in protocol and signaling analysis as well as researching model-specific performance and unique functional characteristics associated with individual mobile devices. The work involved testing dozens of handsets from many manufacturers in controlled and real-world environments against network simulators and live operational networks for each research project.

9. In 2000 my research extended into utilizing non-orthogonal wavelets for improving detection and localization of cellular handsets from high altitude sensor systems. In 2001, I completed my Ph.D. and my research focused on the utilization of advanced communication signals for wideband characterization and remote sensing of propagation channels.

10. Beginning in 1997 my cellular communications research work focused on CDMA, GSM, EDGE, UMTS, LTE, and 5G cellular systems primarily under grants sponsored principally by the Department of Defense. This classified research work required 3GPP protocol analysis and development of real-time embedded hardware and software systems capable of interacting with cellular networks and cellular handsets. A large portion of my work was directed at architectures,

protocols, software, and signaling.

11. I have been working on classified projects since 1988. Before 1998, because the work was not deemed highly classified, I was able to publish eight journal and conference papers prior to 2000. Between 1999 and 2015, however, I was allowed to publish only one article in an unclassified symposium and published and presented about a dozen articles in classified settings. This is because during this period, the vast majority of my research was highly classified. As a result, nearly all of my research results were summarized in classified reports and not available to the general public. Further, because the U.S. government owns any intellectual property resulting from the sponsored research work, I did not pursue or file patent applications.

12. Beginning in 2003, I was co-principal investigator and technical lead on a 3 year multi-million-dollar research effort for developing the Global Information Grid (GIG). This project was sponsored by the Secretary of Defense's Office with a goal of developing a real-time, multi-intelligence (multi-Int) network for collecting, processing, storing, disseminating, and managing information on demand for decision makers including the warfighter, combatant command centers, policy makers, and support personnel and was the largest network-centric warfare project in development at the time. My research team (Ubiquitous Automated Information Manager) focused on building and deploying a scalable application to

perform real-time, multi-int data fusion to support every user in the system. This software application was deployed in Combat Operation Centers, Joint Interagency Task Force locations, and on various platforms (mobile and small computing environments) used by various warfighters. The fused data sources included various content management systems, supply chain logistic reports, GPS-based reports, news feeds, backend databases, sensor system reports, and various other broad data sources.

13. Beginning in 1994, I worked on various projects that involved the implementation and design of user interfaces to support the use of the research, design, analysis tools and signal processing systems for the end user. User platforms comprised a broad array of footprints including small handheld devices with screens or visual displays and those limited to audio-only inputs, medium sized laptops and small desktop systems, and also large, heavy devices, such as servers and clusters in operational environments (including combat operations centers and 3D immersive environments).

14. Specifically, for the GIG research effort, I led a team of software engineers to deploy our inferencing tool for a disparate range of end users, e.g. dismounted combat soldiers with only a microphone as an interface, soldiers in mules with smart devices (such as tablets and laptops with multiple visual display interaction capabilities), to field command centers with more computational

capability (such as medium sized clients with significant video displays, processing power, and touch/stylus interfaces) to combat operation centers with high-powered processing and complex user-interface capabilities/modalities (such as 3D immersive environments).

15. In 2015, I transferred to the School of Electrical Engineering and Computer Science at Penn State as a teaching faculty member. In that role, I have continued teaching graduate and undergraduate courses, guiding Ph.D. and M.S. students in communication, mobile (including LTE and 5G cellular networks), and neural networks, and pursuing research in these and related areas. Since 2015, I have been an author on nine refereed papers as listed in my curriculum vitae (CV).

16. Because of my decades of research and my continuing work at Penn State, I have intimate knowledge of telecommunication networks, including the technology involved in the patents in this case. I have been highly recognized as an expert in such systems within the research community. I was recognized twice by the National Reconnaissance Office with commendation letters for work dealing with detecting cellular signals in low signal to noise ratio environments. The U.S. government awarded me over \$12M in grants between 2003 and 2015 for projects focused on mobile communication devices and networks, in which I served as a Principal Investigator (PI), Co-PI, and/or technical lead.

17. Additionally, during my research career, I interacted extensively with

computer scientists and engineers responsible for the design, development, and testing of telephony and data networking systems and testbeds. As a research faculty member, I oversaw engineers and computer scientists that executed many joint projects with development organizations. These interactions exposed me to a wide range of computer scientists and engineers working on telecommunication network technologies. Since 2011, I have been teaching undergraduate and graduate classes in communication and mobile networking and am familiar with the curricula being taught to electrical engineers and computer scientists. The interactions with a wide range of computer scientists and engineers working on telecommunication network technologies and the familiarity with the classes taught to electrical engineers and computer scientists have allowed me to have a good understanding of the level of skills possessed by a person of ordinary skill in the field of cellular technology.

18. I have extensive experience with mobile networks in general and LTE and 5G specifically. While most of my research efforts between 1998 and 2015 were highly classified, I can state that they included detailed investigation of network architectures, signaling, and functional behavior. A typical research effort would involve studying 3GPP, 3GPP2, IEEE, and other protocol standards to fully comprehend all aspects of L1, L2, and L3 requirements including timing, bit-level construction of the control and user plane messages, and timing characteristics for a given standard as well as functional behavior of network components and user

equipment.

19. From 2006 through 2015 my research focused specifically on LTE. My research continues to this day, although I am no longer operating in a classified environment. During this time, I investigated the performance and functional differences of many varied network and handset devices to see how differing signaling and hardware configurations (including MIMO) and environmental factors influenced the behavior of user equipment in a given network environment. This included how diversity techniques (transmit and receive), synchronization, timing, and signal to interference plus noise ratio (SINR) for a given device would affect specific functional aspects including elements of the receiver structure, decoding and demodulation performance, calculation of parameters used by the device for making decisions and deriving parameters reported to the network.

20. As part of my research work, I built several custom CDMA, GSM, UMTS, and LTE platforms that implemented specific network-side and user equipment-side functionality including custom signal generation and processing structures, particularly the signal processing chains on both the transmit and receive sides. This equipment was developed using network simulation hardware in a laboratory environment and was later tested with corresponding networks in both controlled and fully operational environments. Implementing the transmit and receive chains for custom built protocol-enabled equipment required me to gain an

intimate understanding of the relevant 3GPP protocol specifications and the underlying structures. Since 2015, I have been primarily focused on guiding graduate students in pursuing research in using code domain non-orthogonal multiple access (NOMA) combined with MIMO sparse coding multiple access to minimize latency and maximize user density in grant free Internet of Things (IoT) environments. Additionally, I am guiding my graduate students in pursuing research in optimized distributed processing algorithms, implementation of block chain coding techniques to improve handover security, and edge computing resource allocation in 4G (LTE)/5G (NR) networks.

21. Much of the classified research work I performed also led to similar approaches for other wireless protocols including IEEE 802.11 and 802.15 (e.g., Zigbee, Bluetooth, and UWB), HART, and other short-range standards as well as HF radio and Wi-MAX.

22. Throughout my career, I have accumulated significant expertise in the area of user interface design and the development of software and software tools for implementing and facilitating efficient user interaction, dissemination of complex information, and simple, intuitive user interfaces for screen displays.

III. COMPENSATION

23. In consideration for my services, my work on this matter is being billed at my customary rate of \$550 an hour, independent of the outcome of this

proceeding. I also am being reimbursed for any reasonable expenses I incur in relation to my services. I have no pecuniary interest in the outcome of this proceeding.

IV. LEGAL CONSIDERATIONS

24. I am not an attorney and have not been asked to offer my opinion on the law. However, as an expert offering an opinion on whether the claims of the '755 Patent are patentable, I have been told that I am obliged to follow existing law. My understanding of the law is based on information provided by counsel.

25. I understand that in an *inter partes* review proceeding, a patent claim is unpatentable if it is shown by a preponderance of the evidence that the claim is anticipated or obvious. I also understand that the anticipation or obviousness determination is viewed from the perspective of a person of ordinary skill in the art ("POSITA").

26. For a claim to be anticipated, I understand that every limitation of the claim must be disclosed by a single prior art reference, as viewed from the perspective of a POSITA.

27. For a claim to be obvious, I understand that every limitation of the claim must be disclosed in a combination of prior art references, as viewed from the perspective of a POSITA. I understand that a POSITA is presumed to know the relevant prior art.

28. I understand that while there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references, some motivation to combine or modify prior art references must exist in the references or the knowledge generally available to a POSITA, otherwise the challenged claims would not have been obvious. I also understand that the “teaching, suggestion, or motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. In addition, I have been informed and I understand that there must be a reasonable expectation of success in combining prior art teachings to arrive at the claimed invention.

29. I understand that the relevant time for considering whether a claim would have been obvious to a POSITA is the time of the effective filing of the '755 Patent.

V. TASK SUMMARY

30. I have been asked to review the challenged U.S. patent: the '755 Patent. I have been asked to provide my opinions from the perspective of a POSITA, having knowledge of the relevant art, as of August 5, 2011, and the opinions stated in this declaration are from that perspective. The qualifications and abilities of such a person are described in Section VII below.

31. In preparing this declaration, I have considered this patent in its entirety and the general knowledge of those familiar with the field of graphical user

interfaces, as of August 5, 2011. My opinions are based on my education, training, and experience, as well as the references that form the basis for Petitioner's challenge to the '755 Patent, which I have reviewed in their entirety, including the publications listed in the following table:

Exhibit	Short Title	Description
1001	'755 Patent	U.S. Patent No. 10,656,755
1002		U.S. Patent No. 10,656,755 File History
1003	Cockburn Decl.	Declaration of Dr. Andrew Cockburn
1004	Hackborn	U.S. Patent Publication No. 2011/0119610 to Hackborn et al.
1005	Westerman	U.S. Patent Publication No. 2008/0316183 to Westerman et al.
1006	Townsend	U.S. Patent Publication No. 2010/0103118 to Townsend et al.
1007		U.S. Patent Publication No. 2012/0319959 to Saponas et al.
1008	Jablonski	U.S. Patent No. 6,920,606 to Jablonski et al.
1009	Jobs	U.S. Patent Publication No. 2008/0122796 to Jobs et al.
1010	Chaudhri	U.S. Patent Publication No. 2007/0150842 to Chaudhri et al.
1011		U.S. Patent No. 6,061,695 to Slivka et al.
1012		U.S. Patent No. 6,202,083 to Chrabaszcz
1013		U.S. Patent Publication No. 2005/0209923 to Jablonski et al.
1014		"Facebook Completes Rollout Of Haystack To Stem Losses From Massive Photo Uploads," TechCrunch, April 6, 2009, https://techcrunch.com/2009/04/06/facebook-completes-rollout-of-haystack-to-stem-losses-from-massive-photo-uploads
1015		U.S. Patent Publication No. 2006/0048059A1 to Etkin
1016		U.S. Patent Publication No. 2012/0246184A1 to Rothschild

1017		U.S. Patent Publication No. 2008/0168404A1 to Ording
1018		U.S. Patent Publication No. 2008/0062141A1 to Chandhri
1019		U.S. Patent Publication No. 2011/0074699A1 to Marr
1020		U.S. Patent Publication No. 2014/0232671A1 to Chandhri
1021		U.S. Patent No. 6,323,846 to Westerman et al.
1022		Hargrave's Communications Dictionary, 1st Edition (2001)
1023		Dictionary of Computer and Internet Terms, Tenth Edition (2009)
1024		Van Nostrand's Scientific Encyclopedia, Tenth Edition, Volume 2 (2008)
1025		Microsoft Computer Dictionary, 5th Edition (2002)
1026		U.S. Patent No. 6,061,532 to Bell
1027		U.S. Patent Publication No. 2008/0122796A1 to Jobs et al.

VI. OVERVIEW OF THE '755 PATENT

32. The '755 Patent "generally relate[s] to touch screens." EX1001, 1:37–38. Specifically, the '755 Patent focuses on improving user interfaces for increasingly complex touchscreen devices. EX1001, Abstract. By August 2011, the priority date of the '755 Patent, touch screen mobile devices were becoming increasingly capable of handling more complex tasks, necessitating more advanced control methods than basic input methods could provide. Due to limited screen space, input and output techniques that had been used on desktop computers were not feasible for use on these new mobile devices. EX1001, Abstract. The '755 Patent

addressed this issue by enabling users to operate the mobile devices and feature-rich applications through multi-part gestures, allowing for successive user actions and feedback at each stage. EX1001, Abstract.

A. Gesture-Related Magnitude and Threshold

33. The claims of the '755 Patent are directed to dynamically changing the appearance of a background—without changing the appearance of foreground objects—in response to detecting the first input by the first contact, in accordance with a determination that the first contact has a magnitude (e.g., swipe length or contact pressure) is above a threshold. EX1001, cl. 1, 23. “Gesture magnitude refers to the magnitude of the associated gesture dynamics. For example, in one embodiment, the gesture magnitude of a swipe gesture may include the length of the swipe and/or the contact pressure exerted during the swipe.” EX1001, 67:1–5. “[T]he operations associated with a gesture may be carried out as a function of the associated gesture dynamics,” which “are aspects of a gesture that may vary without changing the identity of the gesture.” EX1001, 65:18–22. Examples of such aspects include “contact point velocity, contact point acceleration, contact pressure velocity, contact pressure acceleration, time to complete gesture, and/or any other aspect which may be associated with a gesture.” EX1001, 65:22–27.

34. The magnitude threshold to be satisfied before any dynamic change occurs is an “activation threshold,” which is “a threshold signal below which

interaction is ignored” and “may be set for different types of user interaction (e.g., pressure, contact, proximity, etc.).” EX1001, 48:54–58. “For example, in one embodiment, an interaction surface may have a pressure activation threshold of P, below which all pressure interactions are ignored.” EX1001, 48:58–60.

B. Dynamic Response to Selection

35. Following a determination that the magnitude of the gesture exceeds the threshold, the resulting dynamic change in the appearance of the background includes sequentially displaying images based at least in part on the magnitude of the gesture. EX1001, cl. 1, 23. For example, with reference to Figure 4 (shown below), the ’755 Patent describes displaying a selection area using one or more selection functions. “A selection function may determine one or more presentation properties of a selection,” “vary one or more presentation properties as a function of contact pressure,” or “determine one or more fundamental properties of a selection.” EX1001, 29:30–59. “[P]ossible presentation properties may include, but are not limited to, shading, color, contrast, brightness, line style, animation routine, transparency, pattern, border style, area style, and/or any other visual property that may describe an object on a display.” EX1001, 29:31–36.

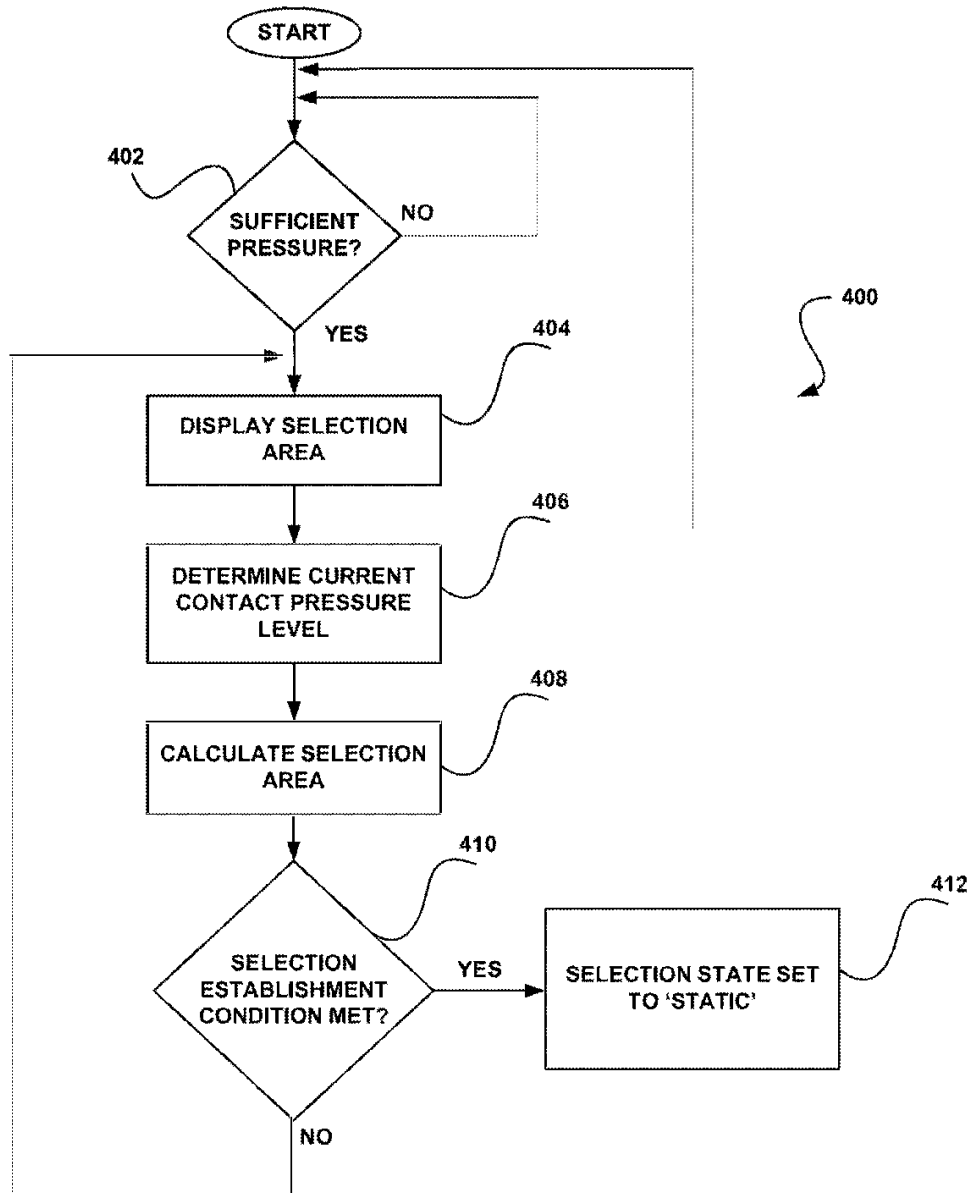


FIGURE 4

EX1001, 22:12–14; 28:60–63; FIG. 4.

36. For example, the selection (*e.g.*, background of the first user interface) can dynamically change as a function of user input based on that input exceeding a threshold (*e.g.*, pressure exerted on the device exceeds a threshold). EX1001, Abstract, 29:43–46. Figure 22 (shown below) depicts such as a configuration, in

which the user can “dynamically chang[e] an appearance of a background [blurring] based at least in part on a magnitude of a contact [pressure]”:

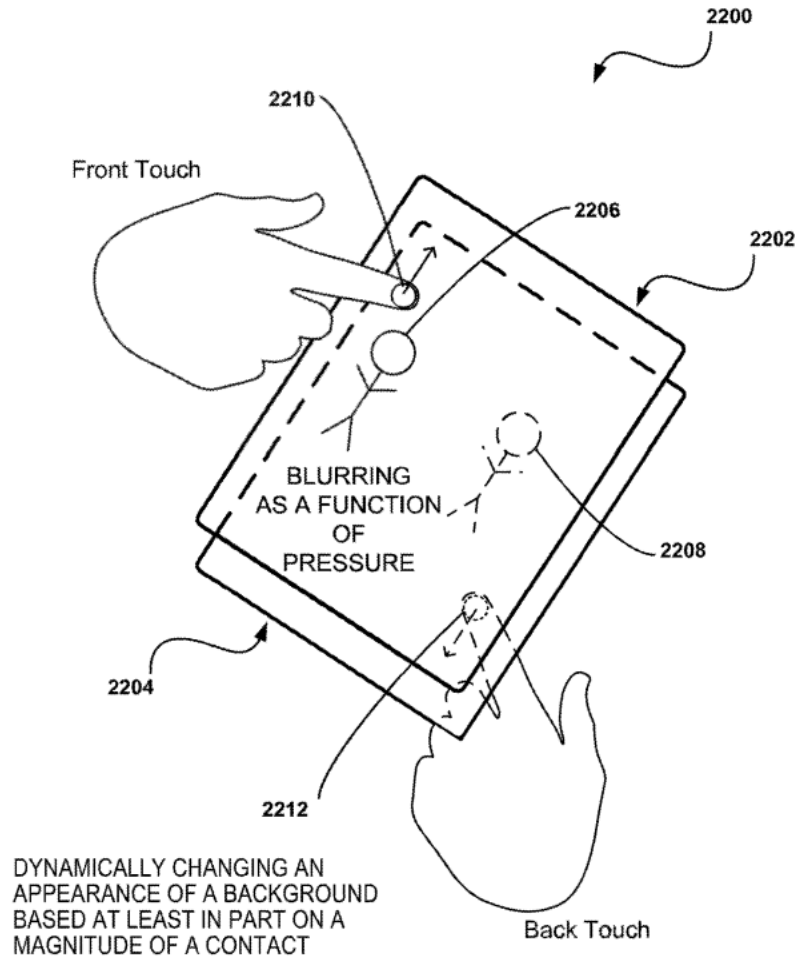


FIGURE 22

EX1001, Figure 22.

C. Independent Claims 1 and 23

37. Independent claims 1 and 23 of the '755 Patent are directed to an electronic device that is programmed to perform certain functions. EX1001.

Specifically, claims 1 and 23 include “in response to detecting the first input by the first contact, in accordance with a *determination that the first contact has a magnitude that is above a threshold*, dynamically changing the appearance of the background of the first user interface without changing an appearance of the one or more foreground objects in the first user interface.” EX1001, cl. 1, 23.¹ Additionally, “the dynamic change in the appearance of the background of the first user interface is based at least in part on the *magnitude of the first contact*” and “the dynamic change in the appearance of the background of the first user interface includes displaying in sequence at least some of a plurality of images based at least in part on the magnitude of the first contact.” EX1001, cl. 1, 23.

VII. LEVEL OF ORDINARY SKILL IN THE ART

38. At the time of the invention of the '755 Patent, a POSITA would have had at least a bachelor's degree in computer science, computer engineering, electrical engineering, or a related field, and would have had at least two years of relevant work experience in the design and development of graphical user interfaces (GUIs) or equivalents thereof. Less work experience may be compensated by a higher level of education and vice versa.

39. I have reviewed the proposed level of ordinary skill in the art by

¹ All emphasis added unless otherwise stated.

Petitioner's expert, Dr. Cockburn. EX1003, ¶¶ 26–27. I disagree with Dr. Cockburn's definition of a POSITA to the extent it includes work experience in the design and development of human-computer interfaces, which is a broad field that includes physical interfaces, such as computer accessories, ergonomics, etc., that are not relevant to the graphical user interfaces at issue. Nonetheless, I would have at least been a POSITA as of the priority date under either definition and can opinion on the perspective of a POSITA at that time. *See* § II; EX2006.

VIII. OVERVIEW OF THE PRIOR ART

A. Hackborn

40. Hackborn is titled “Live Wallpaper” and “relates to components of computer operating systems, including background desktop components commonly referred to as computer wallpaper.” EX1004, [0002]. Hackborn is directed to systems and methods for “animating” a traditional wallpaper on the home screen of a mobile computer device to produce a “live wallpaper.” EX1004, [0009] (“method further includes producing an animated moving display of the graphical wallpaper representation”).

41. Hackborn accomplishes this by making the traditional wallpaper “an object that includes executable code” which is executed in response to input and “cause[s] the wallpaper 104 to change in appearance.” EX1004, [0026].

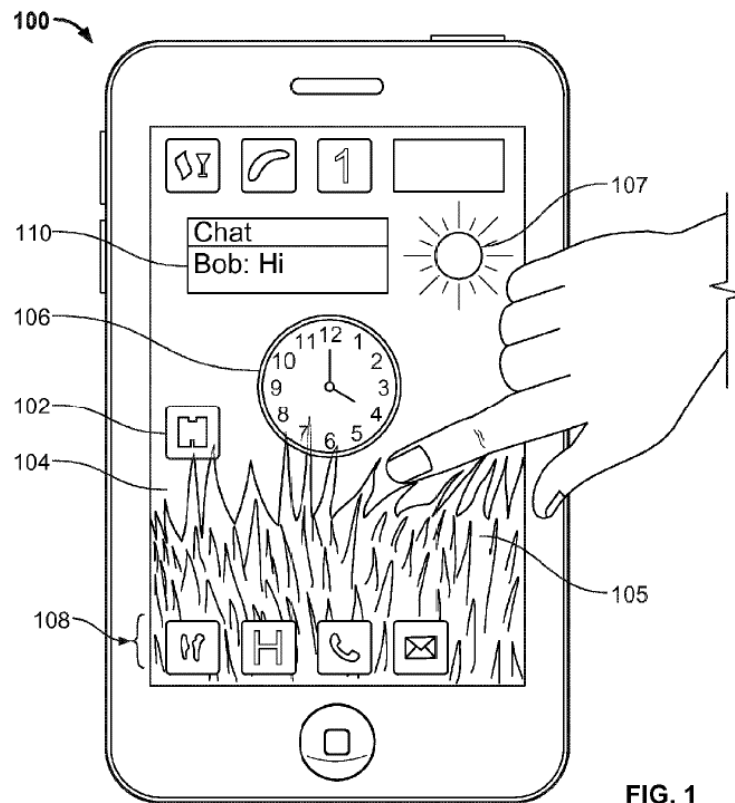


FIG. 1

Hackborn's Figure 1 shows a "general home screen layout," that includes "icon 102," "wallpaper 104," "gadget 106," and "icons 108." EX1004, [0026], [0029], [0030], FIG. 1.

42. Hackborn explains that "the wallpaper shows grass 105" and "may ordinarily look like a traditional wallpaper in the form of a static image." EX1004, [0026]. However, this "wallpaper may be active, and in this example may *respond to inputs* from a user of the computing device." EX1004, [0026]. "In the *example* shown in FIG. 1, a user is swiping her finger across a touch-sensitive display screen of the computing device" and "[i]n response, the blades of grass 105 displayed in

the area of the screen swiped by the user are caused to bend or sway as if contacted by the user's finger during the swipe.” EX1004, [0028]. Hackborn specifies that whether to move the grass is based on a *spatial* determination “that the user’s finger *contacted items* on the wallpaper—here, the grass 105.” EX1004, [0033]. Importantly, Hackborn already receives swipes and taps (EX1004, [0028]), but does not disclose or suggest animating or not animating its wallpaper based on whether a particular input is a tap or a swipe.

43. Hackborn also offers details of the “touch-sensitive display screen,” in that “[a] touch interface 706 may take a familiar form and may interpret input by a user on a touchscreen” by “coordinat[ing] with the display controller 704 to *identify what item or items on a display a user is selecting by touching at a particular location.*” EX1004, [0054]. Thus, the location of the user input on the screen determines what the Hackborn’s display controller recognizes as the target of the user’s selection or touch.

44. Hackborn does not disclose two different functions being initiated by two different inputs in the same place. To the contrary, to address the possibility of neglecting inputs on its background, Hackborn includes an alternate embodiment in which its device must enter a specific mode before any inputs animate its grass. EX1004, [0028].

B. Westerman

45. Westerman is titled “Swipe Gestures For Touch Screen Keyboards” and “relates generally to input systems, methods, and devices, and more particularly, to systems, methods, and devices for interpreting manual swipe gestures as input in connection with touch-screen keyboards.” EX1005, [0011]. “These allow for a user entering text using the virtual keyboard to perform certain functions using swipes *across the key area* rather than tapping particular keys.” EX1005, Abstract. Westerman developed its “textual input on virtual keyboards” techniques to address challenges with “[c]onventional touch-typing techniques” that are “difficult to use on touch-screen based small form factor devices” and force users to resort to “‘hunt and peck’ typing techniques.” EX1005, [0017]. Westerman discloses “a method for interpreting swipe gesture input to a device” using “a virtual keyboard area, in which taps of a touch object generate text input.” EX1005, [0018].

46. Westerman’s focus is virtual keyboards, for which taps were already conventionally detected; as such, Westerman’s approach to swipe detection (and distinguishing taps) is specific to the context of virtual keyboards where swipes occur across the same virtual keys that also receive taps. In particular, Westerman describes that “[d]etecting a swipe gesture can include acquiring touch image data from the touch-sensitive device, processing the image to generate one or more finger path events, determining a displacement of the one or more finger path events, and

detecting a swipe gesture if the displacement exceeds a predetermined threshold.” EX1005, [0019]. Westerman further discloses that the performance of its predetermined functions is “determined by the direction of the swipe gesture.” EX1005, [0018], [0020]. Westerman must determine swipe direction for its teachings to be usable precisely because Westerman distinguishes between taps and swipes in the *same screen area*. If Westerman did not both identify a swipe and a direction, then it could have only a single function for a single alternate gesture (directionless swipe). Thus, Westerman teaches determining the direction—not the location—of a swipe to determine which predetermined function (*e.g.*, inserting a space, backspacing, shifting, or inserting a new line) to initiate.

47. That Westerman distinguishes between taps and swipes in the *same area* is emphasized by the fact that some long swipes in Westerman are considered as taps. Even if displacement exceeds a threshold, the gesture may still be interpreted as a “tap” if the duration of the gesture exceeds “a maximum swipe gesture timeout threshold.” EX1005, [0019]. This timeout threshold “can be used to allow slower motions to permit a user to fine tune key selection *e.g.*, using the displayed top hats [corresponding to letter ‘keys’].” EX1005, [0062]. Specifically, “[i]f the time of the motion is greater than the swipe gesture timeout threshold, *i.e.*, took too long to be a swipe gesture, the event is interpreted as a key tap, and the system updates the key choice that corresponds to the location of the finger (block 1008).” EX1005, [0062].

Westerman does not address using its input determination in any other context other than virtual keyboards.

48. Westerman also does suggest distinguishing between taps and swipes where gestures are instead distinguished spatially—i.e., where Westerman’s approach is unnecessary to determine a user’s intended input. Rather, Westerman differentiates between swipe and taps occurring in the *same area* (the virtual keyboard crowded with virtual keys), where different targets of different gestures cannot be distinguished based on their respective locations.

49. For example, Westerman’s Figure 1A shows “a user typing” using a “virtual keyboard 116” by employing “directional swipes (also referred to herein as ‘swipe gestures’) over the alphabetic keys” “as an alternative to striking certain key.” EX1005, [0028], [0043], [0045], FIG. 1A. “[T]he user is entering the text ‘ok’ in response to a query received through a chat application. By tapping finger 124 on the area corresponding to the letter ‘o’ on virtual keyboard 116 the letter ‘o’ is entered in text field 114. A tophat 118 with a representation of the letter ‘o’ is displayed providing feedback to the user. As shown in FIG. 1B, the user then attempts to tap the letter ‘k’ using finger 124. EX1005, FIG. 1B. However, the user inadvertently taps the letter ‘j’ as indicated by top hat 125. Although this typographical error could be corrected through the use of virtual backspace key 123, the backspace function can also be invoked by the rightward [sic] swipe illustrated

in FIGS. 2A through 2C.” EX1005, [0047], FIGS. 2A–2C.

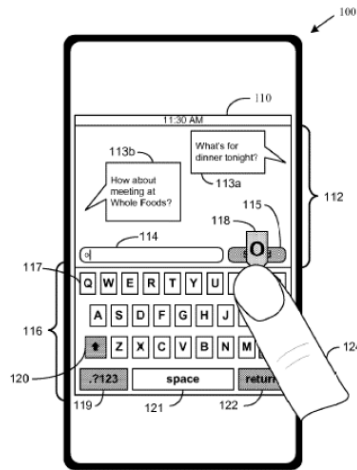


FIG. 1A

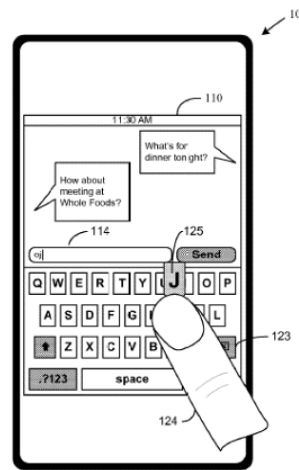


FIG. 1B

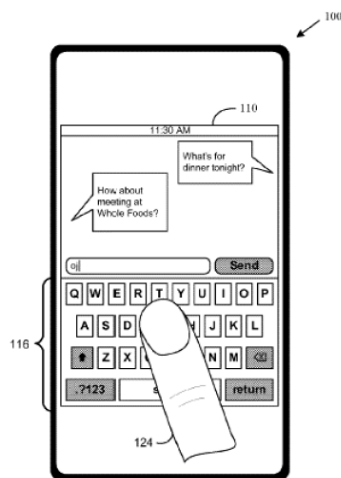


FIG. 2A

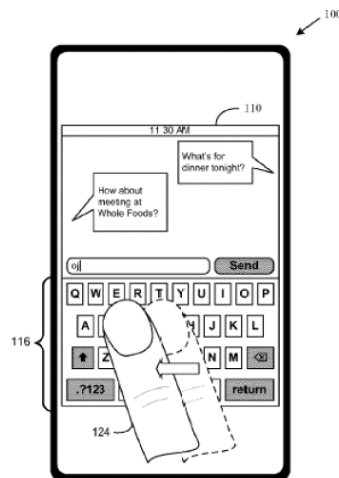


FIG. 2B

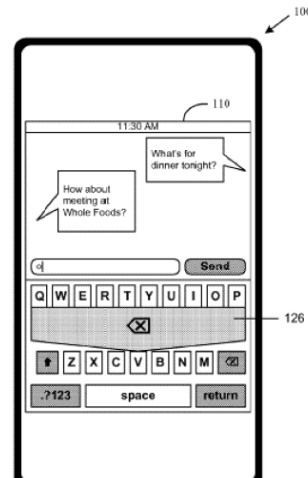


FIG. 2C

C. Townsend

50. Townsend is titled “Multi-Touch Object Inertia Simulation” and describes an “inertia systems [that] provides a common platform and application-programming interface (API) for applications to extend the input received from various multi-touch hardware devices to simulate real-world behavior of application objects.” EX1006, [0005].

51. Townsend explains that the inertia system receives manipulations that “only describe the movement of an object based on the movement of contacts with the multi-touch hardware.” EX1006, [0016]. In Townsend’s inertia system, “when a user lifts all contacts from an object, the inertia system provides additional manipulation events to the application so that the application can handle the events as if the user was still moving the object with touch.” EX1006, [0016]. For example, “if the user lifted the contacts while the object had a velocity in a particular direction, then inertia system continues sending events that indicate that the object is moving in that direction, slowing down over time as the object decelerates.” EX1006, [0016]. This is illustrated in Figure 3, where a “document object 320” is touched at a “first manipulation location 340” and the contact is maintained until “third manipulation location 360,” at which point the user lifts his/her fingers from the screen:

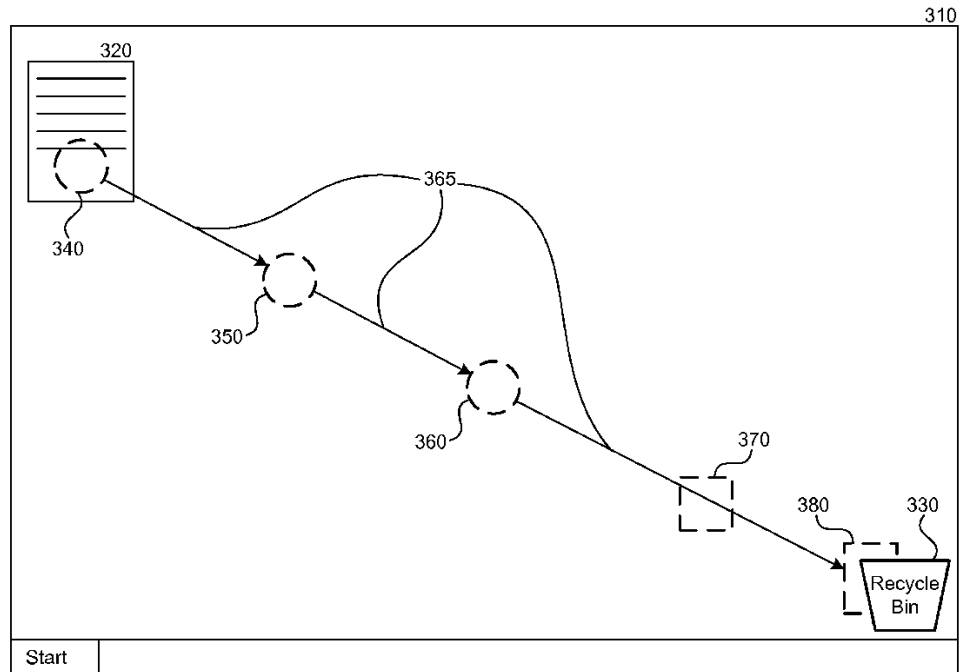


Figure 3

EX1006, [0029]–[0030], FIG. 3. Townsend’s inertia system “provides additional manipulation locations to the application as if the user was still touching and moving document object 320 based on the document object’s 320 velocity when the user releases the document object 320,” slowing the object down as the object decelerates based on a friction coefficient. EX1006, [0030], [0041].

52. Furthermore, Townsend explains that “[i]f the user moves an object into another object, the inertia system sends manipulation events based on the boundary characteristics of the objects.” EX1006, [0016]. For example, in the context of Figure 3, this detected contact between two objects, the document object 320 and recycle bin 33, results in “placing the document object 320 in the recycle bin 330.”

EX1006, [0030], FIG. 3. In some instances, “if an application author defines two objects as being elastic, then the two objects may bounce off each other when a user moves the objects into each other.” EX1006, [0030].

53. Townsend discloses an inertia system that addresses the movement of objects across a screen and colliding into each other after a user removes contact from the object. Townsend does not describe its inertia system as simulating the movement, flexibility, or internal and external friction of an object that is fixed in position, like grass.

D. Jobs

54. Jobs is titled “Touch Screen Device, Method, and Graphical User Interface for Determining Commands by Applying Heuristics” and broadly relates “to electronic devices that apply heuristics to detected user gestures on a touch screen display to determine commands.” EX1009, [0003]. Jobs describes that “there is a need for touch-screen-display electronic devices with more transparent and intuitive user interfaces for translating imprecise user gestures into precise, intended commands that are easy to use, configure, and/or adapt.” EX1009, [0007].

55. In one aspect, Jobs describes the user interface for a lock screen which “may disengage a lock of the touch screen 112 or begin a process that uses gestures on the touch screen to unlock the device.” EX1009, [0102]. Figure 3A illustrates an exemplary user interface for unlocking a portable electronic device, which includes

interface 300A, unlock image 302, arrow 304, channel 306 “that provides additional clues to the unlock gesture,” and wallpaper image 314:

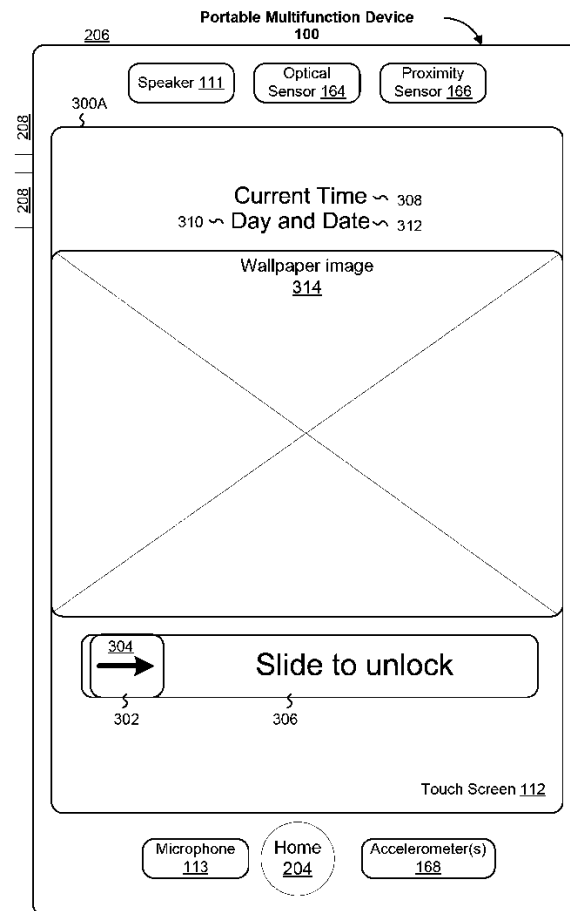


Figure 3A

EX1009, [0168], FIG. 3A.

56. Jobs explains that “the device maintains the user-interface lock state if the detected contact does not correspond to the predefined gesture,” “such as moving the unlock image across channel 306. EX1009, [0177]. Jobs further explains that maintaining the lock state unless the predefined unlock gesture is performed “saves battery power by ensuring that the device is not accidentally awakened.” EX1009,

[0177]. Jobs does not discuss or describe performing other gestures for other functions on its lock screen beyond the predefined unlock gesture.

57. In another aspect, Jobs describes a user interface for inputting text in an instant messaging application, which includes instant messages 604 and 606, a letter keyboard 616 for entering text in box 612, and a send icon 614. EX1009, [0228]–[0242]. Jobs explains that “a user can scroll through the message conversation (comprised of messages 604 and 606) by applying a vertical swipe gesture 610 to the area displaying the conversation. EX1009, [0243]. In some embodiments, “scrolling the list is in accordance with a simulation of an equation of motion having friction.” EX1009, [1138].

IX. THE '755 PATENT'S CLAIMS ARE NOT OBVIOUS

A. Ground 1A: Hackborn-Westerman (Claims 1–3, 7, 10, 11, 13, 15, 17, 20, 22–25, 29, 32, 33, 35, 37, 38, 41, and 42)

1. A POSITA Would Not Have Been Motivated To Combine Hackborn and Westerman

58. In my opinion, the Petition fails to explain why a POSITA would have been motivated to combine Hackborn and Westerman. Petitioner asserts “[t]o the extent Hackborn lacks details on how to distinguish tap from swipe inputs [for its live wallpaper], a POSITA would have naturally looked to other prior art teachings that discuss ‘interpreting manual swipe gestures as input in connection with touch-screen keyboards,’ such as Westerman.” Pet., 11–12; EX1003, ¶50. I disagree. The

Petition does not identify any actual problem in Hackborn’s live grass wallpaper that would cause a POSITA to look to other prior art teachings to address—particularly a reference directed towards virtual keyboards. For example, the Petition fails to point to any disclosure in Hackborn that discloses or suggests distinguishing between taps and swipes on its wallpaper.

59. Westerman is directed to using swipes over virtual keyboard keys that can also be tapped, and distinguishes between taps and directional swipes to determine which discrete function should result from a given input. In contrast, Hackborn is directed towards live wallpapers that broadly respond to user contact, and distinguishes between the intended result of different inputs by determining whether a given input contacts the wallpaper or an icon displayed above the wallpaper. Petitioner does not identify any shortcoming in Hackborn that would have led a POSITA to Westerman’s keyboard input system for distinguishing tap from swipe inputs on Hackborn’s live wallpaper when Hackborn’s system could already spatially distinguish inputs.

60. Hackborn and Westerman also address substantially different technical problems, and their respective teachings do not complement each other. Hackborn describes making a device’s wallpaper “live” by responding visually to “a user’s input” to “provide updated information, altered aesthetics, a change of theme, environment or pace, or a diversion from the status quo.” EX1004, [0026]. Hackborn

never indicates that its wallpaper animation faces problems with erroneously interpreting input types on its background wallpaper necessitating specific distinctions between gestures. Nor does Hackborn suggest any need to perform additional, different functions based on directional swipes.

61. In contrast, Westerman focuses on differentiating “tap” versus “swipe” inputs solely on a virtual keyboard—precisely because swipes necessarily spatially overlap the keys in that virtual keyboard—for functional command triggers (*e.g.*, insertion of special characters or text deletion). EX1005, [0018]–[0019], [0060]–[0064]. Nothing in Hackborn suggests a need to classify gestures, nor does Westerman claim to solve any aesthetic display challenge. The disclosures of each reference are aimed at completely unrelated functionality, and a POSITA would not naturally seek out Westerman to “solve” a non-existent problem from Hackborn.

62. Petitioner argues that “[a] POSITA reviewing Hackborn would have naturally looked to Westerman to better understand how to implement Hackborn’s teachings, for example, how to discern between different user inputs (*e.g.*, tap or swipe)” and that “a POSITA would have found it obvious to implement Hackborn with methods such as those disclosed or rendered obvious by Westerman for distinguishing between tap and swipe gestures (*e.g.*, using ‘predetermined thresholds’).” Pet., 12–13; EX1003, ¶52. However, I disagree because Hackborn has no need to distinguish between taps and swipes to cause the grass animation.

63. Hackborn broadly discloses that its live wallpaper “responds to inputs from a user.” EX1004, [0026]. As one *example* of such a user input and response, Hackborn describes grass “bend[ing] or sway[ing] as if contacted by the user’s finger during [a] swipe.” EX1004, [0028]. Based on that example, Petitioner asserts that Hackborn’s live grass wallpaper needs to determine whether a tap or a swipe has been performed. But, Hackborn does not suggest that the live wallpaper treats inputs on the grass differently depending on the type of contact, let alone prevents the grass from moving in response to a tap. Hackborn repeatedly states that it is the “contact” of a user’s finger with the grass that determines movement. EX1004, [0028], [0033]. Dr. Cockburn also contends that a POSITA would have been motivated to implement Hackborn’s animation in a way that would “simulate real-world behavior.” Pet., 46; EX1003, ¶117. And Dr. Cockburn concedes that real-world grass moves whether poked or swiped: “[i]n the physical real world,” “if you poke a blade of grass ..., it’s going to bend away from you.” EX2007, 63:21–64:2. Indeed, Hackborn’s disclosure that “tapping on the display screen a predetermined number of times within a predetermined time period” confirms that a single tap would—just like a swipe or any other input on the wallpaper—move the grass. EX1004, [0028]. If Hackborn treated taps differently than swipes and other inputs for its wallpaper, a single tap would have been sufficient to switch modes.

64. Given that real-world grass moves whether poked or swiped, Hackborn

does not need a threshold determination between taps and swipes to initiate movement of the grass because the grass already moves based on the magnitude of a contact. And that movement, regardless of input type, already achieves the desired result of visually perceptible grass movement. Hackborn discloses that user input on the live grass wallpaper generates vector data representing the position, direction, and speed of the contact. EX1004, [0033]. This information is then used to determine whether the user's finger contacts the grass and to generate the "animation that makes the grass blades look as if the finger is actually contacting them." EX1004, [0033]. Dr. Cockburn further acknowledged that Hackborn's animation of the grass "would be towards the higher end of fidelity" which would "suggest dynamic generation of the images." EX2007, 108:18–109:9. A POSITA would understand that the magnitude of the vector data is what determines the magnitude of the visual effect of the dynamically generated grass animation. Thus, a POSITA would understand that there is no need for a threshold determination between swipes and taps in Hackborn because less contact movement on the grass already results in less apparent movement of the grass—it is a continuum.

65. Conversely, Westerman requires a threshold determination between taps and swipes because movement of a displayed object is not the desired result—the virtual keyboard does not move, nor is it intended to move, in response to the movement of the user input. Instead, the goal of Westerman is "to perform certain

functions [,such as backspacing or shifting,] using swipes across the key area rather than tapping particular keys.” EX1005, Abstract. This is a binary determination with a binary result—i.e., if a swipe in a certain direction is detected, execute a predetermined function. Westerman does not disclose that the magnitude of a swipe determines the magnitude of the resulting function—the function either executes or it does not. A POSITA would recognize this binary, threshold determination is functionally different and incompatible with Hackborn’s high-fidelity dynamic animation based on the magnitude of contact.

66. Neither Hackborn nor Petitioner explain why Hackborn’s live grass wallpaper would seek to prevent taps on the wallpaper from causing the grass to move. The animation is merely an aesthetic effect with no functional significance. Hackborn does not disclose any problem with allowing the grass to move whenever it is contacted, thus a POSITA would not be motivated to look to Westerman’s threshold determination to patch a non-issue in Hackborn.

2. Independent Claims 1 and 23

- a) Hackborn-Westerman does not disclose “dynamically changing the appearance of the background” “in accordance with a determination that the first contact has a magnitude that is above a threshold”*

67. In Hackborn, the live grass wallpaper is active and “may *respond to inputs* from a user”, one “*example*” of which is “bend[ing] or sway[ing] as if contacted by the user’s finger during [a] swipe.” EX1004, [0026], [0028]. Hackborn

explains that the information it collects from an input “may be used by the process executing the wallpaper 104 to determine that the user’s finger *contacted* items on the wallpaper—here, the grass 105.” EX1004, [0033]. Thus, a POSITA would understand that Hackborn’s only disclosed criteria for causing a change to the grass is contact with a finger, not path length or velocity. Hackborn’s reference to specific functions like a swipe “are meant to be exemplary only, and are not meant to limit implementations.” EX1004, [0061].

68. Hackborn does not indicate that taps would be excluded from the inputs that animate the grass, nor does Hackborn suggest such a distinction is necessary or desired. The goal of Hackborn’s moving grass is to generate an animation to make it seem like “the user’s finger contacted items on the wallpaper,” as if in real life. EX1004, [0033]. A POSITA would therefore understand that Hackborn’s live grass wallpaper is intended to simulate the real world effect of touching grass. And, as Dr. Cockburn acknowledged, “[i]n the physical real world,” “if you poke a blade of grass ..., it’s going to bend away from you.” EX2007, 63:21–64:2.

69. There is also no disclosure in Westerman that only a swipe results in a change. Instead, Westerman’s teachings are focused on differentiating swipes from taps on a virtual keyboard, where each gesture performs a function—pressing a key or executing another typing function, such as backspacing or inserting a new line. EX1005, [0018] (“The touch-sensitive input can include a virtual keyboard area, in

which taps of a touch object generate text input.”). Neither Hackborn nor Westerman disclose or suggest that a tap should be ignored while a swipe initiates an action. As such, the asserted combination does not meet claim 1’s (and claim 23’s) limitation of “dynamically changing the appearance of the background” “in accordance with a determination that the first contact has a magnitude that is above a threshold.”

b) Hackborn does not disclose or suggest Petitioner’s manufactured composite wallpapers

70. In its argument for claim 1, and relied upon throughout the Petition, Petitioner generates composite wallpapers comprising multiple wallpaper embodiments in Hackborn. Pet., 25–27 (claim 1); Pet., 32–41 (claims 11, 15, and 17); EX1003, ¶¶70–73, 80–81, 83–85, 87. For example, Petitioner argues that a composite wallpaper could include the swaying grass as the “at least some of a plurality of images” and other images from other wallpapers (e.g., photographs from the camera; social media images) as the “plurality of images.” Pet., 26; EX1003, ¶72. Petitioner argues that such composites are taught because Hackborn states that “live wallpaper can include a combination of the described wallpaper examples.” Pet., 25 (quoting EX1004, [0050]); EX1003, ¶70. I do not see any reason why a POSITA would have made these particular combinations of embodiments as proposed by Petitioner.

3. Dependent Claims 7 and 29

- a) *Hackborn-Westerman does not disclose “maintaining the appearance of the background” when an input is below a threshold*

71. Petitioner contends that under Westerman’s swipe-detection logic, a “tap” would leave Hackborn’s wallpaper unchanged, thereby satisfying Claim 7. Pet., 31; EX1003, ¶¶77–78. I disagree. Petitioner’s argument relies on the mistaken premise that Hackborn’s wallpaper only responds to movement-based gestures (*e.g.*, swiping). In fact, Hackborn repeatedly emphasizes that the grass responds to user *contact*—not necessarily movement. EX1004, [0026], [0028]. For example, Hackborn states the “wallpaper . . . may respond to inputs from a user,” referencing “contact” with the grass itself. EX1004, [0026], [0028]. Nothing in the proposed Hackborn-Westerman combination suggests that determination of a tap necessarily results in no change in the wallpaper. In fact, Westerman discloses that something still happens when a swipe is not detected. EX1005, [0058] (“Keyboard tap recognizer 904 can serve to translate taps on the virtual keyboard surface in to key tap events 906. These key tap events are submitted to keyboard input manager 907. Keyboard input manager 907 interprets key tap events 906 and generates text events 908 . . .”).

72. At base, Petitioner plucks a single aspect—threshold, divorced from direction—from Westerman’s approach and attempts to graft that threshold onto

Hackborn’s broad disclosure of responding to *any* contact. But that still would not lead a POSITA to a system that “maintains the appearance of the background” when a user’s input is below a threshold—i.e., ignores taps for purposes of animating the grass. If anything, Hackborn indicates that its grass moves whenever it is touched—i.e., contact is made—regardless of swipe length or force. Dr. Cockburn acknowledges that Hackborn’s live grass wallpaper performs “an animation that makes the grass blades look as if the finger is actually contacting them” and that “[i]n the physical real world,” if you poke a blade of grass, it is going to bend away from you.” EX2007, 62:15–17, 63:21–64:2. A POSITA would understand that nothing in Westerman’s determination of taps versus swipes would have supplanted Hackborn’s broad teaching that contact causes movement. Hence, the Hackborn-Westerman combination fails to disclose or suggest an arrangement in which Hackborn’s grass would remain stationary even when tapped.

73. Accordingly, Hackborn-Westerman does not disclose the “maintaining the appearance of the background” limitation of claims 7 and 29 when the input does not exceed a threshold.

4. Dependent Claims 17, 37, and 38

a) Hackborn-Westerman does not disclose “automatically moving, one-by-one, through the at least some of the plurality of images”

74. For claim 17, Petitioner relies on a composite of different types of live

wallpaper, particularly a composite of the live grass wallpaper shown in Figure 1 and the social media feed with images shown in Figure 6. Pet., 26, 39–40; EX1003, ¶¶72, 86–87. Petitioner contends that when the social media feed receives new information—not through touch input by the user—the already displayed posts are scrolled downward, “thus the images in the posts are displayed in sequence by automatically moving one-by-one through them as new posts are received.” Pet., 39; EX1003, ¶86. I disagree. Petitioner’s argument fails to show how the automatically moving images in the social media feed are part of “*the at least some* of the plurality of images” that are displayed in sequence based on the “*magnitude of the first contact*,” as required by claim 17.

75. Claim 1, from which claim 17 depends, requires that “the dynamic change in appearance,” which includes the sequential display of “*at least some* of a plurality of images,” must be “based at least in part on the *magnitude of the first contact*.” EX1001, cl. 1. A POSITA would understand that the “*at least some* of a plurality of images” are sequentially displayed in response to a contact of sufficient magnitude that causes a dynamic change in appearance. For claim 1, Petitioner mapped Hackborn’s animated sequence of grass caused by contact with a finger on the live wallpaper to the “at least some of a plurality of images” limitation of claim 1. Pet., 24; EX1003, ¶69.

76. Claim 17 further requires that the same “*at least some* of a plurality of

images is displayed, in sequence, by automatically moving, one-by-one, through *the at least some* of the plurality of images.” EX1001, cl. 17. However, for claim 17, Petitioner does not point to the animating blades of grass for images “automatically moving, one-by-one.” Instead, Petitioner describes a composite of live wallpapers that includes a social media feed, shown in Figure 6, and the bending grass wallpaper. Pet., 40–41; EX1003, ¶87. Petitioner does not provide any reason why a POSITA would have created this composite, nor does Petitioner provide any example of how such a composite would operate or be displayed.

77. Petitioner argues that “a POSITA would have understood that the automatically scrolled social media posts could form only part of the background wallpaper display, where the wallpaper includes both the swaying grass from Hackborn’s Figure 1 and images from a social networking website.” Pet., 40–41; EX1003, ¶87. I disagree. Unlike Hackborn’s animated grass that moves in response to contact, Hackborn’s scrolling of the social media feed is not based on or caused by any contact or gesture by a user—it occurs “as new information is received” from the social media site. EX1004, [0047]. Thus, the scrolling images in the social media feed cannot be the “*at least some* of the plurality of images” that must display sequentially by “automatically moving, one-by-one” in response to a user’s contact of sufficient magnitude.

78. Furthermore, as discussed in Section IX.A.2 above, Petitioner provides

no rationale for why a POSITA would have been motivated to graft a part of a social media feed that spans the entire background of Figure 6 into the live grass wallpaper, or how it would be done. Petitioner merely states that Hackborn can display wallpaper with a combination of different types of wallpaper.

79. Accordingly, Hackborn-Westerman does not disclose or suggest the limitation of “automatically moving, one-by-one, through the at least some of the plurality of images” of claim 17 (and claims 37 and 38).

5. Dependent Claim 22

a) Hackborn-Westerman does not disclose the limitations of claim 21, upon which claim 22 is dependent

80. Petitioner argues that the Hackborn-Westerman combination renders claim 22 obvious because it discloses that “the background includes a background image” and that “the one or more foreground objects includes one or more application icons.” Pet., 42; EX1003, ¶92. I disagree. Claim 22 depends from claim 21, and thus necessarily incorporates all limitations of claim 21. Petitioner did not challenge claim 21 under Ground 1A. The only ground in which Petitioner addresses claim 21 is Ground 1B, which explicitly relies on Townsend to disclose a “realistic deceleration or elasticity behavior for application objections set in motion by user touch input” to meet the limitations of claim 21. Pet., 51–52; EX1003, ¶125. Petitioner offers no separate argument or evidence demonstrating that the Hackborn-Westerman combination alone meets claim 21’s limitations. Thus, Hackborn-

Westerman does not disclose all of the limitations of claim 22.

6. Dependent Claims 2, 3, 7–11, 13, 15, 17, 20, 22, 24, 25, 32, 33, 35, 37, 38, 41, and 42

81. As discussed above in Section IX.A.2, the Hackborn-Westerman combination does not disclose all of the limitations of independent claims 1 and 23. Accordingly, Hackborn-Westerman also does not disclose all of the limitations of dependent claims 2, 3, 7–11, 13, 15, 17, 20, 22, 24, 25, 32, 33, 35, 37, 38, 41, and 42 for at least the same reasons.

B. Ground 1B: Hackborn-Westerman-Townsend (Claims 4, 5, 8, 9, 21, 26, 27, 30, 31, and 43)

1. A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Townsend

82. Petitioner contends that because Hackborn does not detail the technical means of animating grass, a POSITA “would have naturally looked to related prior art, such as Townsend, which teaches an API and simulation engine that enable applications ‘to simulate real-world behavior of objects’ using ‘techniques based on physics to simulate the behavior of the object’ in response to touch gestures (e.g., animating the movement of blades of grass)” and “would have understood that the device’s simulation engine would “perform[] calculations based on physics to determine the behavior of an object [grass] based on” parameters such as characteristics of the user input, per Townsend, including the physical length (e.g., displacement) of the touch (per Westerman), the duration of the touch (per

Westerman), direction of the touch (per Hackborn and Townsend), and/or the speed of the touch (per Hackborn), such that the wallpaper (grass blades) “look as if the finger is actually contacting them as it drags across the screen of the device,” per Hackborn. Pet., 46; EX1003, ¶¶117–118. I disagree. Townsend’s system would not be relevant for animating the swaying and bending of the anchored grass of Hackborn.

83. Townsend’s inertia system “receives manipulations that only describe the movement of an object based on the movement of contacts with the multi-touch hardware.” EX1006, [0016]. Using these manipulations, Townsend’s inertia system defines object boundaries, calculates deceleration of objects moving across a screen due to simulated friction, and handles object collisions, including the elasticity of the colliding objects. EX1006, [0016], [0041], [0050]–[0051]. A POSITA would understand that Townsend’s inertia system operates on the motion of whole objects moving across a screen, not a comprehensive physics engine that simulates the real world behavior of any object under any condition.

84. Hackborn’s grass is not a free-floating object traveling across the screen after finger release. EX1004, [0028]. Rather, the grass remains anchored at its base and merely “bends or sways as if contacted by the user’s finger.” EX1004, [0028]. A POSITA would see little relevance of Townsend to Hackborn’s grass animation because Townsend’s inertia engine does not model the deformation or bending of

flexible objects in response to a force being applied, nor does it teach or mention simulating the oscillation of that flexible, anchored object after the removal of an applied force. Additionally, there are no freely moving objects in Hackborn’s live grass wallpaper that would prompt a POSITA to look for a system like Townsend’s.

85. No evidence or reasoning in either reference suggests combining the two references. Therefore, a POSITA would not be motivated to look to Townsend’s API to model the animating grass in Hackborn-Westerman. Additionally, Townsend does not provide, any additional motivation to combine Hackborn with Westerman. Therefore, as discussed above in Section IX.A.1, a POSITA would not be motivated to combine Hackborn and Westerman.

2. Dependent Claims 5 and 27

- a) Hackborn-Westerman-Townsend does not disclose “a magnitude of the dynamic change in the appearance of the background of the first user interface decays following detection of a cessation of the first contact”*

86. Petitioner argues that Hackborn’s grass animation, combined with Townsend’s inertia-based physics system, necessarily exhibits “decay” once a user’s contact ends, meeting claim 5’s requirement that “the magnitude of the dynamic change in the appearance of the background decays.” Pet., 49–50; EX1003, ¶121. According to Petitioner, “[a] POSITA would have understood or found obvious that Hackborn’s “simulate[d] frictional dragging” of grass movement results in the ceasing of grass movement (e.g., due to friction) after cessation of the user input.”

Pet., 49; EX1003, ¶121. Petitioner argues that “by simulating ‘frictional dragging,’ the animating motion of the wallpaper representation (e.g., blades of grass) would appear to slow down, or decay, over time as a result of a force (e.g., simulated friction) that opposes the ‘force’ provided by the user input (e.g., simulated touching of grass).” Pet., 50; EX1003, ¶121. I disagree.

87. In Hackborn, “dragging across the display” results in an animation motion that “simulates frictional dragging of elements.” EX1004, [0008]. The example used by Hackborn is “bending one or more graphical elements in a direction of the dragging input.” EX1004, [0008]. Petitioner’s interpretation ignores the “dragging” portion of the phrase, and, instead, incorrectly interprets “frictional dragging” as disclosing a simulation of all friction. Nothing in Hackborn supports this expansive interpretation—Hackborn does not discuss the animation motion that occurs after the dragging finger is no longer touching the grass. A POSITA would understand the “frictional dragging” of Hackborn as simply describing the animation of the surface of the element dragging along the interpreted “surface” of the finger touching the element.

88. Hackborn also does not disclose that the purported “decay” due to friction occurs “*following* detection of a cessation of the first contact,” as required by claim 5. A POSITA would understand that cessation of a first contact occurs, for example, when the user lifts a finger from contacting the screen at the end of a

gesture. However, whether contact with the screen has ended is not a determination considered anywhere in Hackborn’s disclosure. Instead, Hackborn discloses that the animation is based on the determination “that the user’s finger contacted items on the wallpaper—here, the grass.” EX1004, [0033]. In other words, Hackborn’s animation of grass is based on whether a finger is touching the grass, not whether the finger is still touching the screen. A POSITA would not expect that the animation of the blades of grass would delay until the finger is lifted from the screen instead of not touching the grass because any delay in performing the grass animation following the contact with the grass would not make “the grass blades look as if the finger is actually contacting them.” EX1004, [0033]. Thus, a POSITA would not understand Hackborn as disclosing an alleged “decay” animation that begins *after* a determination that the user’s finger has been lifted from the screen.

89. Petitioner also relies on Townsend to assert that “[a] POSITA would have recognized that the motion of grass decays (decelerates) once the swipe ceases.” Pet., 50; EX1003, ¶121. But Townsend’s inertia system addresses the movement of whole objects across the screen once user contact is lifted and does not address localized deformation of an anchored object—like a blade of grass bending near its base. EX1006, [0016], [0041]. The concepts of friction and elasticity in Townsend focus on object boundaries and collisions, not modeling how a portion of a single anchored object moves after being contacted by a finger. EX1006, [0041].

Neither Hackborn nor Townsend provides instructions or examples for simulating oscillatory motion in a localized region of an anchored, partially elastic object, such as the grass, and a POSITA would not expect that Townsend's inertia system is modeling the motion of the grass, let alone a "decay" in the motion of the grass.

90. Accordingly, the Hackborn-Westerman-Townsend combination does not disclose or teach "a magnitude of the dynamic change in the appearance of the background of the first user interface decays," as required by claims 5 and 27.

3. Dependent Claims 8 and 30

91. For the same reasons discussed above in Section IX.B.2, Hackborn-Westerman-Townsend does not disclose that the animation stops as a result of detecting that a finger is no longer on the screen, as Petitioner contends. Pet., 50–51; EX1003, ¶¶122–123. Thus, Hackborn-Westerman-Townsend does not disclose or teach the "in response to detecting a cessation of the first input, ceasing the dynamically changing of the appearance of the background" limitation required by dependent claims 8 and 30.

4. Dependent Claims 9 and 31

a) Hackborn-Westerman-Townsend does not disclose "reverting to the display of the first user interface" "in response to detecting a cessation of the first input"

92. Petitioner relies on Townsend to argue that when user contact ceases, Hackborn's grass "reverts to its original state." Pet., 51; EX1003, ¶124. I disagree.

Townsend's primary function is to continue moving an object—in its entirety—via simulated inertia after all touchpoints are released. EX1006, [0016]. In Townsend's model, the object can travel or collide with other objects or boundaries until its velocity dissipates, which does not apply to Hackborn's scenario where the grass remains anchored to a position on the background.

93. Hackborn's disclosure does not describe the grass "reverting" once contact ends. EX1004, [0028]. It simply states that when a user touches the wallpaper, the grass will "bend or sway as if contacted by the user's finger." EX1004, [0028]. I disagree with Petitioner's speculation that blades of grass "would return to their initial positions upon cessation of contact." Pet., 51; EX1003, ¶124. Townsend's inertia engine is similarly silent on the ability of partially elastic and anchored objects to spontaneously return to an un-deformed shape.

94. Neither Hackborn nor Townsend discusses elasticity modeling for living plant matter, and neither suggests that once the contact with the screen stops, the grass (or any object) must return to the precise original image. But claim 9 requires a reversion "to the display of the first user interface, including the background." EX1001, cl. 9. Accordingly, the Hackborn-Westerman-Townsend does not disclose or teach the "reverting to the display of the first user interface" limitation of claims 9 and 31.

5. Dependent Claims 21 and 43

- a) *Hackborn-Westerman-Townsend does not disclose “revert[ing] to one of the plurality of images that is different from that which is displayed as the background prior to detecting the first input”*

95. Claim 21 contemplates a scenario where the background does not revert to the originally displayed image but instead reverts to “one of the plurality of images that is different from that which is displayed as the background prior to detecting the first input.” EX1001, cl. 21. Petitioner contends Townsend’s inertia engine could cause the grass to remain partially displaced after contact ends, meaning the “resting” wallpaper image would differ from the original. Pet., 52; EX1003, ¶125. But Townsend’s inertia relies on object-level momentum and boundary collisions, not on partially deformed anchored objects that subtly shift shape. EX1006, [0016], [0050]–[0051]. For instance, if a user flicks an on-screen object, Townsend simulates continued motion across the screen until friction slows it. EX1006, [0016], [0030], [0041]. None of that corresponds to Hackborn’s grass resting at a newly bent angle or final shape.

96. Hackborn never mentions the resting state of its grass—it simply states that the grass bends under user touch. EX1004, [0028]. Townsend is likewise silent on anchoring only part of an object while letting another part remain bent or out of place. Hence, the references do not describe a background that ends up in a different stable image, as distinct from the original image.

97. Petitioner also fails to identify any mechanism by which the grass “reverts” to a prior but not original image. Dr. Cockburn acknowledged that Hackborn’s depiction of animated grass is intended to have high fidelity and use dynamically generated images. EX2007, 98:11–14 (“Q. And so higher fidelity would suggest dynamic generation of the images? A. I think that's fair, as taught by the Hackborn, Westerman, and Townsend combination.”). A POSITA would therefore understand that, even if Hackborn-Westerman-Townsend could simulate the oscillation of partially elastic grass, the image of the grass would be dynamically generated from the calculations of the simulation and, thus, it has not been shown to *revert* to any image.

98. Accordingly, Hackborn-Westerman-Townsend does not disclose or teach the “revert[ing] to one of the plurality of images that is different from that which is displayed as the background prior to detecting the first input” limitation of claims 21 and 43.

6. Dependent Claims 4, 5, 8, 9, 21, 26, 27, 30, 31 and 43

99. As discussed above in Section IX.A.2, the Hackborn-Westerman combination does not disclose all of the limitations of independent claims 1 and 23. Accordingly, Hackborn-Westerman-Townsend also does not disclose all of the limitations of dependent claims 4, 5, 8, 9, 21, 26, 27, 30, 31 and 43 for at least the same reasons.

C. Ground 1C: Hackborn-Westerman-Jablonski (Claim 16)

100. As discussed above in Section IX.A.1, a POSITA would not be motivated to combine Hackborn and Westerman. Petitioner does not contend that Jablonski provides any additional motivation to combine Hackborn and Westerman. Pet., 53–54; EX1003, ¶¶132–133. Because a POSITA would not be motivated to combine Hackborn with Westerman, a POSITA would likewise not be motivated to combine Hackborn, Westerman, and Jablonski. Additionally, as discussed above in Section IX.A.2, the Hackborn-Westerman combination does not disclose all of the limitations of independent claim 1. Accordingly, Hackborn-Westerman-Jablonski also does not disclose all of the limitations of dependent claim 16 for at least the same reasons.

D. Ground 1D: Hackborn-Westerman-Jobs (Claims 18, 19, 39, and 40)

1. A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Jobs

101. Petitioner contends that “a POSITA to implement the HWJD to include a lock screen with live wallpaper, thereby improving the device by preventing ‘unintentional activation or deactivation of functions’ while still producing an ‘interesting and compelling user interface’ in the lock screen.” Pet., 58–59; EX1003, ¶¶139–140. I disagree.

102. Hackborn’s live wallpaper is directed towards active use of the device,

where the user intentionally interacts with the display to experience improved aesthetics, such as the blades of grass that bend or sway in response to user contact. EX1004, [0028]. In contrast, Jobs' lock screen "maintains the user-interface lock state if the detected contact does not correspond to the predefined gesture" to unlock the phone. EX1009, [0177]. The primary purpose of maintaining this "lock state" is to minimize user input, thereby "saving battery life" and preventing "unintentional or unauthorized use of the device ... or activation or deactivation of functions." EX1009, [0177]; EX1010, [0049]. A POSITA would have recognized that Hackborn's "live" wallpaper—responding to user touches in real time, whether or not the user intends to or not—directly conflicts with the functionality and purpose of Jobs' lock screen because it permits unintended or unauthorized user input and processor activity that can drain battery or trigger unnecessary actions.

103. Petitioner's stated reasons for merging Hackborn, Westerman, and Jobs on a lock screen ignore the fundamental conflict between a power- and security-conscious UI intended for when a phone is not in use (Jobs) and a continuously interactive, user-contact-driven wallpaper (Hackborn). A POSITA would not be motivated to look to Job's lock screen to improve the Hackborn-Westerman live wallpaper.

2. Dependent Claims 18 and 39

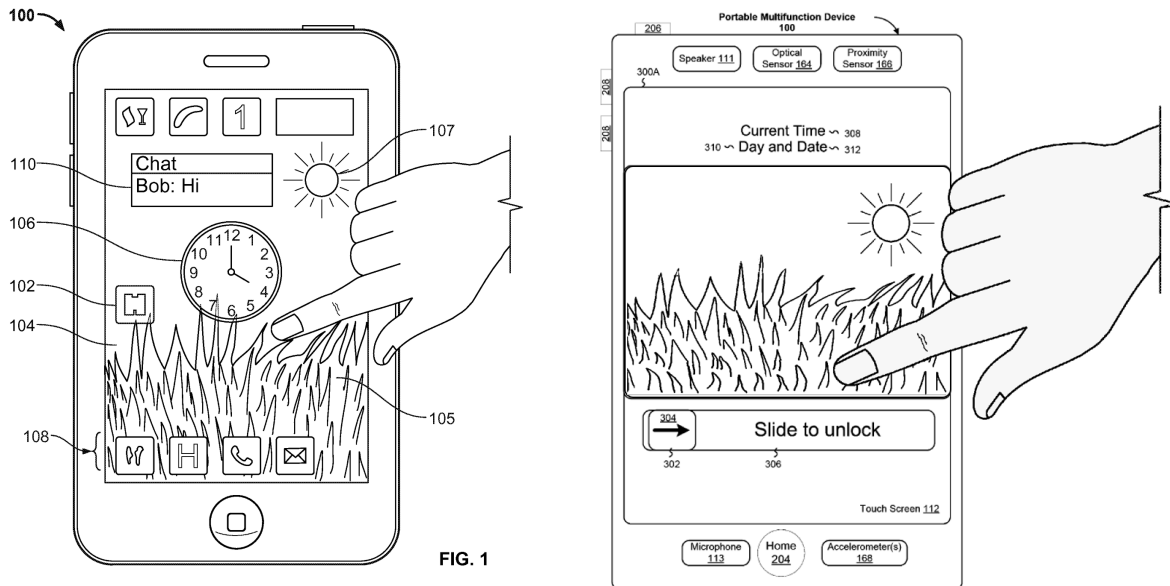
a) *Hackborn-Westerman-Jobs does not disclose “a background with an appearance” and “one or more foreground objects”*

104. Petitioner contends that the Hackborn-Westerman-Jobs combination “has a lock screen as a first interface and the lock screen includes a wallpaper, per Jobs, which is ‘live,’ per Hackborn.” Pet., 61; EX1003, ¶141. However, the Hackborn-Westerman-Jobs combination does not disclose all the required limitations of both claim 18 (and 39) and the claim from which it depends, claim 1 (and claim 23).

105. Claim 1 requires “one or more foreground objects.” In Ground 1A, Petitioner pointed to icon 102, gadget 106, icons 108, and application 110 of Hackborn as disclosing foreground objects because they “exist on a layer in front of the wallpaper 104. Pet., 18–19; EX1003, ¶62. Petitioner does not identify any foreground objects in the lock screen interface of Jobs, nor does Petitioner indicate that the foreground objects identified in Hackborn would exist in the lock screen interface of Jobs.

106. Additionally, Petitioner’s composite image of Jobs Figure 3A interface modified with Hackborn’s live grass wallpaper does not appear to show any objects that appear to be in front of the wallpaper. Pet., 60–61; EX1003, ¶¶140–141. In fact, as shown below, in creating this composite image, Petitioner appears to have

purposefully excluded the foreground objects of Hackborn from its composite. Compare EX1004, FIG. 1, with Pet., 60 (modified EX1009, FIG. 3A); EX1003, ¶140.



A POSITA would also understand that the foreground objects of Hackborn would not be present in a lock screen interface like that of Jobs because those objects had functions in Hackborn, such as launching applications that would be undesirable on a lock screen to avoid accidental activations. EX1009, [0177] (maintaining the lock state “saves battery power by ensuring that the device is not accidentally awakened”); EX1010, [0004] (“[A] problem associated with using touch screens on a portable device is the unintentional activation or deactivation of functions due to unintentional contact with the touch screen.”).

107. Additionally, though Hackborn uses the term background in connection with certain instances of its wallpaper as part of the home screen. EX1003, [0025]

(“The graphical objects in the example implementations are objects that are *displayed as part of a home screen* for an operating device—the screen that is shown behind applications that may be opened by a user, such as when a user has minimized all such applications.”). A POSITA would understand that the lock screen interface of Jobs is not a home screen. Nothing in Hackborn indicates that the wallpaper would be a background in the lock screen interface of Jobs where it would no longer be a home screen.

108. Accordingly, the Hackborn-Westerman-Jobs combination does not disclose “a background with an appearance” and “one or more foreground objects” limitations of claims 18 or 39.

3. Dependent Claims 19 and 40

109. Petitioner contends that in the Hackborn-Westerman-Jobs combination “the lock screen can be unlocked where the ‘device detects contact with the touch sensitive display ... while the device is in a user-interface lock state,’ and the ‘device moves the unlock image 302 in accordance with the contact.’” Pet., 61–62; EX1003, ¶142. However, as discussed in Section IX.D.2 for claims 18 and 39 above, the Hackborn-Westerman-Jobs combination does not disclose the required “background with an appearance” and “one or more foreground objects” required by claims 19 and 40.

E. **Ground 2: Hackborn-Westerman-Jobs (Claims 1, 4–8, 10–12, 15, 17–20, 22, 23, 26–30, 32, 34, and 37–42)**

1. **A POSITA Would Not Have Been Motivated To Combine Hackborn, Westerman, and Jobs**

a) *A POSITA would not have been motivated to implement manual scrolling in Hackborn’s background live wallpaper*

110. Petitioner contends that:

[A] POSITA reviewing Hackborn’s teaching of scrolling social media posts in relation to Figure 6 would have found it obvious to provide a way to view older posts (e.g., partially-displayed post 606e) that s/he may not have already read before the posts were moved downward and less (or not) visible. [APPLE-1003, ¶148.] Specifically, a POSITA would have found it obvious to allow for manual scrolling through the [social media] posts by the user.

Pet., 66; EX1003, ¶148. This purported obviousness of manual scrolling is the reason Petitioner proffers to look to Jobs, which coincidentally connects manual scrolling of the posts with a swipe gesture, which coincidentally is the only way Petitioner circles back to Westerman’s thresholds. Without a POSITA’s purported desire to manually scroll the social media posts 606a-606e in Hackborn’s alleged *background wallpaper*—the Petition offers no reason to look to Jobs, and therefore fails to connect scrolling those posts to any swipe or threshold. Petitioner’s argument is flawed for each of multiple reasons.

111. First, Petitioner’s two *manual-scrolling-was-obvious* sentences do not articulate a motivation to modify Hackborn to include manual scrolling *in*

Hackborn's wallpaper. Pet., 66; EX1003, ¶148. Instead, Petitioner simply recites in general terms what is today a ubiquitous smartphone function in the context of social media applications—manual scrolling of posts—without explaining why that would have been desirable in the context of Hackborn's *wallpaper*. I note that Dr. Cockburn contends that “[f]ailure to support manual scrolling would be infuriating to a user” (EX1003, ¶148), but that motivation (a) does not appear in the Petition, (b) fails to consider that manual scrolling of social media posts was already available in Hackborn's social media applications, and (c) to the extent applied to Hackborn's wallpaper, is belied by the fact that Hackborn did not provide such manual scrolling of its wallpaper.

112. Second, the Petition asserts that a POSITA would have found it obvious to provide a way to view older posts (*e.g.*, partially-displayed post 606e) that s/he may not have already read before the posts were moved downward and [became] less (or not) visible.” Pet., 66; EX1003, ¶148. But Petitioner and Dr. Cockburn do not address the fact that Hackborn already provides a way for a user to view past posts—i.e., by opening a social media application with which posts are associated. EX1004, [0048]. Hackborn explains that “selection of the wallpaper or a portion of the wallpaper ... may cause an application associated with the wallpaper or a portion of the wallpaper to launch or become active, and may allow the user to work with an aspect of the wallpaper or associated with the displayed wallpaper.” EX1004,

[0048]. And Hackborn offers the example that “if message 606 *c* represents a Facebook post, selection of message 606 *c* may launch a Facebook application on device 600, which may permit the user to respond to Donaldson’s post 606 *c*.” EX1004, [0048]. Thus, even to the extent a POSITA would have “found it obvious to” provide a way for a user to view past posts, Hackborn already answered that call—meaning a POSITA would have had no reason to look elsewhere, much less to Jobs. And, for the “partially-displayed post 606*e*” (Pet., 66), a user could have selected post 606*e* directly to launch the associated application to view and respond to that post.

113. Third, Petitioner asserts that “a POSITA would have found it obvious to allow for manual scrolling through the [social media] posts by the user.” Pet., 66; EX1003, ¶148. Petitioner does not provide any additional reasoning for this statement, and, here again, Hackborn already spoke to this functionality. For example, to manually scroll through Facebook posts, a user could simply “launch a Facebook application on device 600” to scroll through the posts. EX1004, [0048]. Thus, even to the extent a POSITA would have found it obvious to allow a user to manually scroll through social media posts, a POSITA had no need to look elsewhere.

114. Fourth, the Petition does not connect the purported obviousness of manual scrolling *in the abstract* to the specific context of Hackborn’s wallpaper.

Neither Petitioner nor Dr. Cockburn assert that any of the cited prior art references disclose manual scrolling of such posts *in a background or wallpaper layer*. Pet., 66; EX1003, ¶¶148–149. Petitioner’s examples of using swiping motions to scroll through lists in other references all involve interactive applications above a background, and do not discuss implementation in a background process like a wallpaper. Pet., 66–67; EX1003, ¶149. Nor do Petitioner or Dr. Cockburn address the fact that Hackborn itself explains that “[i]n general and with regard to *any of* the displayed examples of live wallpaper in the figures, the wallpaper or a portion of the wallpaper be selected ... to cause the wallpaper or a portion thereof to assume a more prominent display position or status.” EX1004, [0048]. Importantly, Hackborn further explains that “[*f*or example, display planes may be adjusted based on certain inputs or information received” EX1004, [0048]. This is critical because adjusting a display plane of the wallpaper to cause it to assume a more prominent display position or status means moving the wallpaper forward out of the lowermost layer. EX1004, [0031], FIG. 2. As can be seen in Figure 2 of Hackborn, this would mean moving the wallpaper ‘upward’ to a plane above that of the icons. EX1004, [0031], FIG. 2.

115. And, doing so in response to interaction with (e.g., scrolling) the wallpaper, as explicitly suggested by this passage of Hackborn, is fatal to Petitioner’s mapping of Limitation [1.j], which requires “changing the appearance of the

background of the first user interface *without changing an appearance of the one or more foreground objects.*” This is because moving the wallpaper (604) to a plane above the icons (608) would mean that the icons (608) would no longer be displayed—i.e., their appearance would change. Of course, if the purpose of manual scrolling is to allow a user to view the posts 606, then it would make sense to follow Hackborn’s suggestion to move wallpaper 604 upward to a plane above icons (608)—in which the icons (608) would not block the wallpaper (604). EX1004, [0047] (“While no application windows are shown in FIG. 6, it is understood that a user could launch an application and work in an application area on the display 602, where the application area would be displayed above the wallpaper layer and the icon layer, for example.”), FIG. 4 (chat application window 410), [0041] (describing same). But, despite acknowledging Hackborn’s teaching of “causing a portion of the background wallpaper to assume a more prominent display position” (Pet., 66), Petitioner does not explain why a POSITA would have left Hackborn’s wallpaper 604 in the background when manually scrolling to improve visibility of posts 606. This deficiency further illustrates the lack of support for Petitioner’s contention that a POSITA viewing Hackborn alone would have “found it obvious” to add manual scrolling in the context of wallpaper 604 when in a *background* layer.

b) Technical and functional limitations further discourage the implementation of Jobs’ manual scrolling and

***Westerman’s tap versus swipe determination in
Hackborn’s background live wallpaper***

116. Petitioner explains its alleged combination of Hackborn and Westerman as simply “applying Jobs’ disclosure of associating swipes with manual scrolling through images in Hackborn’s device” and contends that it would have “provid[ed] an intuitive method for allowing a user to interact with the live wallpaper and view new images when the user wishes to see them, or view older posts that may have been automatically scrolled out of view.” Pet., 70–71; EX1003, ¶155. Yet, Petitioner and Dr. Cockburn overlook both the technical and functional limitations of such a combination in the context of Hackborn’s system and objectives, and the distinct nature of Westerman’s tap versus swipe determination.

117. First, Petitioner fails to address the technical limitations of Hackborn’s system that would have made manual scrolling unworkable for Hackborn’s wallpaper. Hackborn discloses that its live wallpaper is implemented in a distinct process. EX1004, Abstract, [0031] (“the term ‘process’ is intended by its ordinary usage to represent an environment, isolated from other such environments, in which one or more pieces of code may execute in such isolation”). Hackborn also explains that its wallpaper “may be updated independently of other displayed graphics.” EX1004, [0027]. Jobs, on the other hand, discloses a messaging application with a list-based interface capable of continuously scrolling instant messages. EX1009, [0243]. However, Hackborn’s wallpaper—when in a background layer—would be

at least partially covered by icons, widgets, or applications, leaving limited screen real estate for reading a manually scrollable feed. EX1004, FIG. 6. Additionally, a POSITA would understand that implementing Jobs' continuous scrolling in a background context would demand significant modification of Hackborn's wallpaper process to manage historical post data storage, collision with home-screen icons, and continuous input detection to allow up-or-down movement behind foreground objects. Nothing in the references or Petitioner's arguments explains why a POSITA would implement manual scrolling despite these complexities, much less do so with Hackborn's wallpaper remaining in a background layer during that scrolling.

118. Second, Petitioner does not provide any evidence of a purported advantage of a manually-scrollable background feed over a dedicated application optimized for reading or interaction. A wallpaper interface is typically not structured for in-depth navigation. Merely asserting that doing so would be "intuitive" to manually scroll a list does not overcome the practical design considerations or the absence of support in the references themselves for doing so in a background layer. A POSITA would have understood that typical social media applications like the Facebook application already disclosed in Hackborn would have provided more robust interaction (e.g., scrolling, commenting, liking), and that providing feed updates to the live wallpaper therefore would have needlessly increased UI

complexity while still being necessarily limited by the wallpaper form.

119. Finally, as discussed in Section IX.A.1 above for Ground 1A, Westerman’s threshold-based determination between swipes and taps for text entry is completely disconnected from both the feed-based wallpaper of Hackborn and scrolling messages list of Jobs. Petitioner states that “[a] POSITA would have found it obvious to modify live wallpaper 604 such that a user could scroll through the images/posts of the wallpaper ‘using vertically upward and/or vertically downward gestures’ (i.e., swipes, *detected per Westerman*) ‘on the touch screen,’ per Jobs.” Pet., 68–69; EX1003, ¶153. I disagree. Like the dynamic grass animation of Hackborn, the vertical scroll of Jobs is not a binary determination—it’s continuous. EX1009, [1138] (“In response to detecting the movement, the list of items displayed on the touch screen display is scrolled so that a new portion of the list is displayed.”); EX1009, [1138] (“In some embodiments, scrolling the list has an associated speed of translation that corresponds to a speed of movement of the object.”).

120. A POSITA would have understood that there is no need for a threshold determination between swipes and taps in Hackborn or Jobs because Jobs already discloses scrolling where less contact movement on the social media feed would result in less scrolling of the feed. Jobs teaches the receipt of “taps” but distinguishes them spatially rather than via thresholds. EX1009, [0232], [0237], [0239], [0240], [0241] (discussing multiple examples of “a finger tap” on various icons *outside* the

area displaying the conversation); EX1009, [0243] (discussing “swipe gesture 610 *to the area displaying the conversation*”). Nowhere does Petitioner explain why implementing manual scrolling in Hackborn’s virtual wallpaper requires receiving and distinguishing taps and swipes *in the same part of the screen*. Yet that is what Westerman teaches and, absent a need for that in Hackborn, a POSITA starting with Hackborn would have had no reason to turn to Westerman. In contrast, assuming that manual scrolling like that of Jobs were implemented in Hackborn, it would scroll with any moving input in a designated region, whereas another gesture in other designated areas would select corresponding posts. Any other result would interfere with continuous scrolling by, for example, awkwardly forcing a user to move its input for a threshold distance or above a threshold speed before the social media posts of the wallpaper would begin to move. Thus, Petitioner has not identified an actual problem in any combination of Hackborn and Jobs that would necessitate the binary determination of swipes versus taps of Westerman.

121. Overall, the asserted references do not indicate any interaction that would motivate a POSITA to implement a complicated, potentially cluttered scrolling feature *in the background*, particularly when the device already has a dedicated social-media application, nor implement an unnecessary binary tap-swipe determination to facilitate vertical scrolling. As a result, a POSITA would not have been motivated to combine Hackborn, Westerman, and Jobs.

2. Independent Claims 1 and 23

- a) *Hackborn-Westerman-Jobs does not disclose “dynamically changing the appearance of the background” “in accordance with a determination that the first contact has a magnitude that is above a threshold”*

122. Petitioner contends that “a POSITA would have found it obvious to implement the H2WJD such that a swiping gesture, as determined using the methods of Westerman, on the wallpaper 604 of Hackborn would cause the images/posts of the wallpaper 604 to scroll, per Jobs.” Pet., 74; EX1003, ¶168. I disagree. There is no indication in Hackborn, Jobs, or Westerman that the feed-based wallpaper will only update its display once a certain threshold is met.

123. Hackborn explains that social-media updates shift older posts when new content arrives; it does not discuss rejecting inputs below a threshold. EX1004, [0047]. Jobs discloses the ability to vertically scroll through messages in an instant messaging application. EX1009, [0243]. While this might conceptually overlap with Hackborn’s notion of a feed, neither reference suggests gating display changes in the feed behind a threshold. The vertical scroll of Jobs is not a binary determination—it’s continuous. EX1009, [1138] (“In response to detecting the movement, the list of items displayed on the touch screen display is scrolled so that a new portion of the list is displayed.”); EX1009, [1138] (“In some embodiments, scrolling the list has an associated speed of translation that corresponds to a speed

of movement of the object.”). A POSITA would understand that Jobs does not rely on the distinction between a swipe and a tap to initiate its vertical scroll because the amount of scrolling corresponds to the magnitude of the contact movement. In other words, Jobs already discloses scrolling where less or no contact movement on the social media feed would result in less or no scrolling of the feed. Westerman’s binary distinction between a “tap” and a “swipe” would have no role in Jobs’ vertical scrolling. Westerman does not teach scrolling.

124. Thus, the Hackborn-Westerman-Jobs combination does not disclose or teach the “dynamically changing the appearance of the background” “in accordance with a determination that the first contact has a magnitude that is above a threshold” limitation required by claims 1 and 23.

3. Dependent Claims 7 and 29

a) Hackborn-Westerman-Jobs does not disclose “maintaining the appearance of the background” when an input is below a threshold

125. Petitioner contends that “a POSITA would have found obvious that the responsive scrolling of images in the H2WJD is only in response to a swipe and not a tap, for example, which does not suggest the same scrolling output.” Pet., 79–80; EX1003, ¶176. I disagree.

126. First, as discussed in Section IX.E.2 for claim 1, Westerman’s binary distinction between a “tap” and a “swipe” has no role in initiating Jobs’ vertical

scrolling because the amount of scrolling corresponds to the magnitude of the contact movement. EX1009, [0243], [1138]. Second, none of the references indicate that “taps” do nothing. Westerman discloses that functions still execute when a tap is detected. EX1005, [0058] (“Keyboard tap recognizer 904 can serve to translate taps on the virtual keyboard surface in to key tap events 906. These key tap events are submitted to keyboard input manager 907. Keyboard input manager 907 interprets key tap events 906 and generates text events 908 . . .”). And Hackborn discloses that individual posts in the feed can be selected “to cause the wallpaper or portion thereof to assume a more prominent display position or status.” EX1004, [0048]. A POSITA would understand that is one possible way of selecting a post. Thus, none of the references disclose any clear mechanism that “maintains the appearance of the background” specifically because the contact is a tap.

127. Accordingly, the Hackborn-Westerman-Jobs combination does not disclose “maintaining the appearance of the background” “in accordance with a determination that the first input does not have a magnitude above the threshold” as required by claims 7 and 29.

4. Dependent Claims 18, 19, 39, and 40

128. For claims 18, 19, 39, and 40, Petitioner largely relies on its arguments outlined in Ground 1D. Pet., 84–87, 90; EX1003, ¶¶186–187, 211–212. The only difference is that Petitioner inserts the social media feed as the wallpaper on the lock

screen instead of the live grass wallpaper. For at least the same reasons outlined in Sections IX.D.2–3 for Ground 1D, the Hackborn-Westerman-Jobs combination does not disclose “a background with an appearance” and “one or more foreground objects” as required for claims 18, 19, 39, and 40.

5. Dependent Claim 22

a) Hackborn-Westerman-Jobs does not disclose the limitations of claim 21, from which claim 22 depends

129. Petitioner argues that the Hackborn-Westerman-Jobs combination renders claim 22 obvious because it discloses “the one or more foreground objects includes one or more application icons” because “Figure 6 [of Hackborn] shows foreground objects including application icons for contacts 608a, browser 608b, and maps 608c.” Pet., 87–88; EX1003, ¶189. I disagree. Claim 22 depends from claim 21, and thus necessarily incorporates all limitations of claim 21. Petitioner did not challenge claim 21 under Ground 2. The only ground in which Petitioner addresses claim 21 is Ground 1B, which relies on Townsend to disclose a “realistic deceleration or elasticity behavior for application objections set in motion by user touch input” to meet the limitations of claim 21. Pet., 51–52; EX1003, ¶125. Petitioner offers no separate argument or evidence demonstrating that the Hackborn-Westerman-Jobs combination alone meets claim 21’s limitations. Thus, the Hackborn-Westerman-Jobs combination does not disclose all of the limitations of claim 22.

6. Dependent Claim 28

- a) *Hackborn-Westerman-Jobs does not disclose a “dynamic change in the appearance of the background” that is “independent of the location that corresponds to the background”*

130. Petitioner points to its argument for claim 6, which contends that “a POSITA would have understood that the scrolling gesture 610 in Figure 6A of Jobs can occur at *any* location within the message list, and similarly that the scrolling gesture (or a ‘focus selector,’ to the extent one exists in the H2WJD) in the H2WJD can occur at any location on the live wallpaper.” Pet., 79, 89; EX1003, ¶¶175, 204. I disagree because Petitioner’s proposed combination of Hackborn-Westerman-Job shows that “the dynamic change of the background” is dependent on “the location that corresponds to the background.”

131. For claim 28 (and its parent, claim 23), Petitioner points to the manual scrolling of the list of messages, both posts and images, as representing the dynamic change of the background. Pet., 79 (“In response to detecting the movement, the list of items displayed on the touch screen display is scrolled.” (quoting EX1009, [1138])); Pet., 74 (“[A] swiping gesture, as determined using the methods of Westerman, on the wallpaper 604 of Hackborn would cause the images/posts of the wallpaper 604 to scroll, per Jobs.”); Pet., 75 (“[I]n response to the user input, the H2WJD dynamically changes the appearance of the wallpaper without changing the appearance of the icons displayed in the foreground”); EX1003, ¶¶168–169, 175.

However, Petitioner does not explain how the scrolling of the message list is *independent* of the location of the gesture, which Petitioner admits occurs “*within the message list.*” Pet., 79; EX1003, ¶175. Accordingly, the Hackborn-Westerman-Jobs combination does not disclose that the “dynamic change” is “independent of the location that corresponds to the background” as required by claim 28.

7. Dependent Claims 4–8, 10–12, 15, 17–20, 22, 26–30, 32, 34, and 37–42

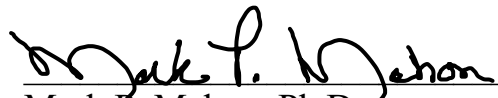
132. As discussed above in Section IX.A.2, the Hackborn-Westerman combination does not disclose all of the limitations of independent claims 1 and 23. Accordingly, Hackborn-Westerman-Jobs also does not disclose all of the limitations of dependent claims 4–8, 10–12, 15, 17–20, 22, 26–30, 32, 34, and 37–42 for at least the same reasons.

X. CONCLUSION

133. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: 4/14/25

Respectfully submitted,



Mark P. Mahon, Ph.D.