

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD, AND
SAMSUNG ELECTRONICS AMERICA, INC.,

Petitioners

v.

KEYLESS LICENSING LLC,

Patent Owner.

Cases IPR2025-00529 & IPR2025-00528
Patent No. 11,503,144

**DECLARATION OF BENJAMIN B. BEDERSON, PH.D.,
IN SUPPORT OF
PETITIONS FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,503,144**

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- c. 9[b]: “wherein the length of the front surface of the mobile phone corresponds to the distance between the ear and the mouth of a user and” 200
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 - e. 9[d]: “wherein said body has a thin thickness;” 200
 - f. 9[e]: “a touch sensitive display unit;” 200
 - g. 9[f]: “a virtual keyboard to enter text; and” 201
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- 4. Claim 10: “The mobile phone of claim 9, wherein the distance between said microphone and said speaker corresponds to the distance between the ear and the mouth of a user.” 205
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I, Benjamin B. Bederson, Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (collectively, “Samsung” or “Petitioners”), as an independent expert consultant in the following proceedings before the United States Patent and Trademark Office: IPR2025-00529 and IPR2025-00528.

2. I am over 21 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein.

3. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of any proceeding.

4. I understand that this proceeding involves U.S. Patent No. 11,503,144 (“the ’144 patent,” Ex. 1001). The application for the ’144 patent was filed January 22, 2017, and claims priority to U.S. Application Nos. 14/146,125 and 10/553,575 (both abandoned); and International Application No. PCT/US2004/012082. The ’144 patent also claims priority to the following 14 U.S. provisional applications:

- U.S. Provisional Patent Application No. 60/557,140, filed March 26, 2004.
- U.S. Provisional Patent Application No. 60/552,968, filed March 11, 2004.

- U.S. Provisional Patent Application No. 60/536,564, filed January 14, 2004.
- U.S. Provisional Patent Application No. 60/510,885, filed October 14, 2003.
- U.S. Provisional Patent Application No. 60/504,331, filed September 19, 2003.
- U.S. Provisional Patent Application No. 60/500,602, filed September 5, 2003.
- U.S. Provisional Patent Application No. 60/496,702, filed August 20, 2003.
- U.S. Provisional Patent Application No. 60/482,998, filed June 27, 2003.
- U.S. Provisional Patent Application No. 60/482,706, filed June 26, 2003.
- U.S. Provisional Patent Application No. 60/475,533, filed June 3, 2003.
- U.S. Provisional Patent Application No. 60/474,447, filed May 30, 2003.

- U.S. Provisional Patent Application No. 60/468,028, filed May 5, 2003.
- U.S. Provisional Patent Application No. 60/466,594, filed April 30, 2003.
- U.S. Provisional Patent Application No. 60/463,844, filed April 18, 2003.

5. I have been asked by Petitioners to provide my opinion whether the claims of the '144 patent would have been anticipated and/or obvious to a person of ordinary skill in the art ("POSITA") at the time of the earliest effective priority date of the '144 patent. I understand that different claims of the '144 patent may have different effective priority dates.

6. As part of my analysis, I have been asked by Petitioners to opine on whether the claims of the '144 patent would have been obvious to a POSITA at the time of the earliest claimed priority date of the '144 patent, April 18, 2003. Namely, in Sections IX-XI (Grounds 1A-5A),¹ I provide my opinion using the claimed priority date of April 18, 2003.

¹ Except Section XI.A.5.a, in which I performed additional analysis as to claim 8 using the '144 patent's filing date, January 22, 2017.

7. In addition, I have been asked by Petitioners to consider whether the claimed priority applications of the '144 patent disclose the subject matter of the patent claims, which I understand is a requirement for the '144 patent to be entitled to its claimed priority date. As discussed below in Section VII.C, it is my opinion that not all the claimed priority applications of the '144 patent disclose the subject matter of the claims sufficiently to demonstrate to a POSITA that the '144 patent's inventor was in possession of the claimed invention at the relevant time.

Accordingly, in Sections XI.A.5.a (claim 8 in Ground 1A) and XII-XIV (Grounds 1B-4B), I have also been instructed to assume priority dates later than the earliest claimed priority date of the '144 patent. Namely, in these sections, I have been instructed to assume that the priority date for claims 1, 2, 6, 7, 9-11, and 14 is March 11, 2004, and the priority date for claims 3, 4, 8, 12, 13, and 15-20 is January 22, 2017.

8. My opinions are set forth below. Throughout this declaration, I refer to specific pages, paragraphs, figures, and/or line numbers of various exhibits. These citations are illustrative and are not intended to suggest that they are the only support for the propositions for which they are cited.

II. SUMMARY OF OPINIONS

9. This declaration considers claims 1-5 and 7-20 of the '144 patent. Below, I set forth the opinions I have formed, the conclusions I have reached, and

the bases for these opinions and conclusions. I believe the statements contained in this declaration to be true and correct to the best of my knowledge.

10. Based on my experience and knowledge of the art at the time of the applicable priority date, it is my opinion that claims 1-5 and 7-20 of the '144 patent would have been obvious to a POSITA based on the asserted grounds discussed below.

11. I provide below some common introductory discussion regarding my background, relevant legal standards, the state of the prior art, and a discussion of the '144 patent.

12. After this discussion, I organize my declaration in two parts. The first part addresses Grounds 1A-5A and relies upon *Pensjo* as the primary reference. I understand this part relates to Petitioners' positions set forth in IPR2025-00529. And the second part addresses Grounds 1B-4B and relies upon *Bast* as the primary reference. I understand this part relates to Petitioners' positions set forth in IPR2025-00528. I append the designations "A" and "B" to the respective Grounds to avoid confusion about which Ground I am referencing.

III. QUALIFICATIONS AND BACKGROUND

13. I believe that I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below. A copy of my curriculum vitae is included as Exhibit 1003.

14. I am competent to prepare this declaration.

15. I received a Bachelor of Science degree in Computer Science with a minor in Electrical Engineering from Rensselaer Polytechnic Institute (“RPI”) in 1986. I received a Master of Science degree and a Ph.D. in Computer Science from New York University (“NYU”) in 1989 and 1992, respectively.

16. Since 1998, I have been a Professor of Computer Science at the University of Maryland (“UMD”), where I have had joint appointments at the Institute for Advanced Computer Studies and the College of Information Studies (Maryland’s “iSchool”) and am currently Professor Emeritus. I was also Associate Provost of Learning Initiatives and Executive Director of the Teaching and Learning Transformation Center from 2014 to 2018. I am a member and previous director of the Human-Computer Interaction Lab (“HCIL”), the oldest and one of the best-known Human-Computer Interaction research groups in the country.

17. I am also co-founder and co-director of the International Children’s Digital Library (“ICDL”), a web site launched in 2002 that provides the world’s largest collection of freely available online children’s books from around the world with an interface aimed to make it easy for children and adults to search and read children’s books online. I was also co-founder and Chief Scientist of Zumobi, Inc., from 2006 to 2014, a Seattle-based startup that is a publisher of content applications and advertising platforms for smart phones. I was also co-founder and

prior Chief Technology Officer of Hazel Analytics, a data analytics company whose product sends alerts in warranted circumstances. In addition, I have for more than 25 years consulted for numerous companies in the area of mobile device user interfaces, including those with touchscreens, including EPAM, Logitech, Microsoft, the Palo Alto Research Center, Sony, Lockheed Martin, and NASA Goddard Space Flight Center.

18. For more than 30 years, I have studied, designed, and worked in the field of computer science and human-computer interaction. My experience includes 30 years of teaching and research, with research interests in human-computer interaction and the software and technology underlying today's interactive computing systems. This includes the design and implementation of user interfaces and software applications using a wide range of technologies, including web servers and websites, databases, embedded systems, and mobile devices, including smart phones and PDAs. I have combined my hardware and software skills throughout my career in Human-Computer Interface research, building various interactive electrical and mechanical systems that couple with software to provide an innovative user experience.

19. At UMD, my research has been in the area of Human-Computer Interaction ("HCI"), a field that relates to the development and understanding of computing systems to serve users' needs. Researchers in this field are focused on

making universally usable, useful, efficient, and appealing systems to support people in their wide range of activities. My approach is to balance the development of innovative technology that serves people's practical needs. Example systems following this approach that I have built include Pad++ (1994 software for zoomable user interfaces), KidPad (1997 software to support children collaboratively writing stories), PadPrints (1998 software to graphically show interactive web browsing histories), PhotoMesa (2001 software for end users to browse personal photos), Pocket PhotoMesa (2004 software for browsing of personal photos on a mobile device), DateLens (2002 software for end users to use their mobile devices to efficiently access their calendar information), LaunchTile (2005 "home screen" software for mobile devices to allow users to navigate apps in a zoomable environment), SpaceTree (2001 software for end users to efficiently browse very large hierarchies), ICDL (as described above), and StoryKit (a 2009 iPhone app for children to create stories).

20. I have designed, created, and integrated numerous hardware systems. For example, my dissertation work included the development of a portable custom-made computer vision processing computer including a microprocessor and digital

signal processor as well as a custom two degree-of-freedom motor. I published this work in numerous places including a 1995 paper² and as US Patent 5,204,573.

21. In 1995, I designed and built a museum tour guide³. The system included infrared transmitters in the ceiling above art pieces and infrared receivers in the headphones that people wore. I also built a custom microcontroller that identified what art piece the person was standing in front of and automatically played relevant audio from a customized Sony mini-disc player.

² Bederson, B.B., Wallace, R.S. & Schwartz, E. *A miniaturized space-variant active vision system: Cortex-I*, Machine Vis. Apps. 8, 101–109 (1995).

<https://doi.org/10.1007/BF01213475>.

³ Benjamin B. Bederson, *Audio augmented reality: a prototype automated tour guide*. In Conference Companion on Human Factors in Computing Systems (CHI '95). Association for Computing Machinery, New York, NY, USA, 210–211.

<https://doi.org/10.1145/223355.223526>.

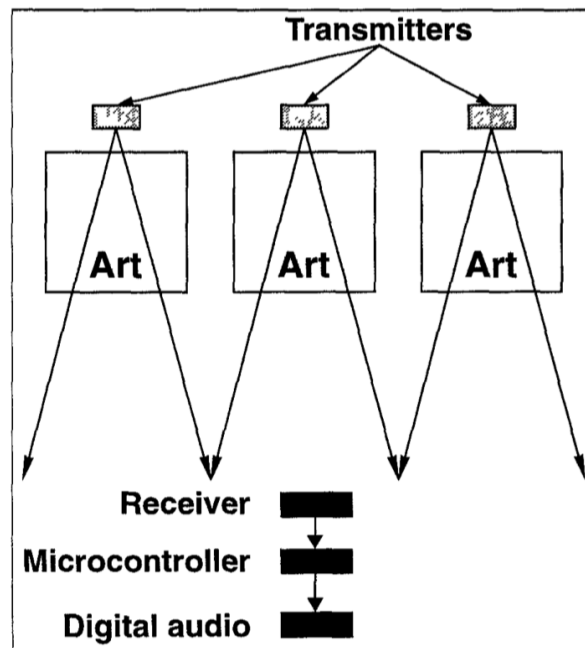


Figure 1: Schematic of automated tour guide prototype.

22. In 2004, I wrote a paper⁴ describing a custom linear input device designed to control scrolling of long documents. It integrated a linear potentiometer with interface circuitry and software to control document navigation.

23. Many of my projects involved processing user inputs and interpreting them to determine what command they controlled. For example, in 2001, I wrote a

⁴ Leslie E. Chipman, Benjamin B. Bederson, and Jennifer A. Golbeck, *SlideBar: analysis of a linear input device*. Behav. Inf. Technol. 23, 1 (January-February 2004), 1–9. <https://doi.org/10.1080/01449290310001638487>.

paper⁵ that describes PhotoMesa, a zoomable image browser using a novel 2D layout algorithm I called “quantum treemaps” to position the images on the screen in a way that attempted to fill the screen while keeping groups of related images together. As indicated in the figure below, PhotoMesa had a number of interactions that controlled the display of many hundreds of images at a time. Users could zoom in and out, pan from side to side, and show larger thumbnails through a combination of mouse clicks, drags, and hovers.

⁵ Benjamin B. Bederson, *PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps*, UIST '01: Proceedings of the 14th Annual ACM Symposium on User Interface Software and Technology (Nov. 2001), pp. 71-80, <https://doi.org/10.1145/502348.502359>.

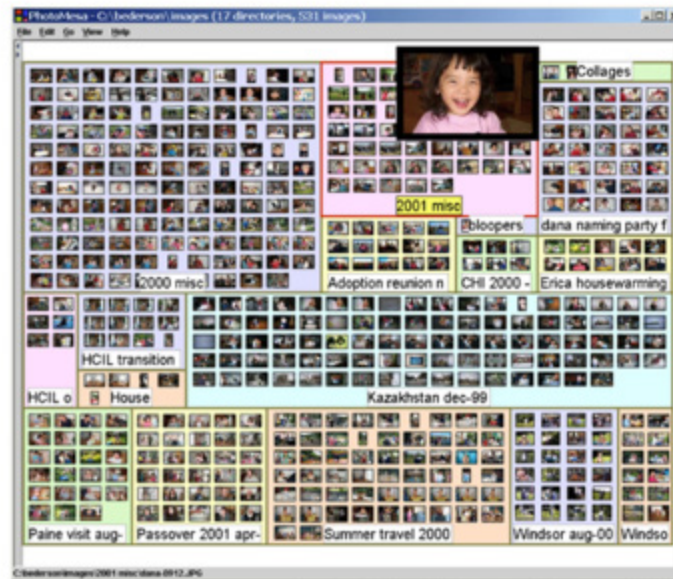


Figure 1: Screen snapshot of PhotoMesa with over 500 images in 17 groups.

24. I worked on a wide range of touchscreen Graphical User Interfaces for mobile devices. In 2004, I wrote a paper⁶ describing an adaptation of PhotoMesa to a touchscreen mobile device called “Pocket PhotoMesa.”

⁶ Amir Khella and Benjamin B. Bederson, *Pocket PhotoMesa: a Zoomable Image Browser for PDAs*, MUM '04: Proceedings of the 3rd International Conference on Mobile and Ubiquitous Multimedia (Oct. 2004), pp. 19-24, <https://doi.org/10.1145/1052380.1052384>.



Figure 3: Three views of Pocket PhotoMesa at different zoom levels (www.photomesa.com).

25. I continued developing interfaces for touch screen mobile devices. For example, in 2004-2005, I wrote software called LaunchTile, which included a Graphical User Interface for touchscreen mobile devices designed for one-handed use. LaunchTile, described in a 2005 paper,⁷ allowed zooming and scrolling of multiple applications on a handheld touchscreen PDA. The interface offered a grid of applications that could be zoomed and scrolled. It included several different methods of navigating, including gestures as shown in the following figure from

⁷ Amy K. Karlson, Benjamin B. Bederson, and John SanGiovanni, *AppLens and LaunchTile: two designs for one-handed thumb use on small devices*, CHI '05: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (2005), Association for Computing Machinery, New York, NY, USA, pp. 201-210, <https://doi.org/10.1145/1054972.1055001>.

that paper where scrolling continued after a finger was lifted from the touchscreen, and then slowed to a stop.

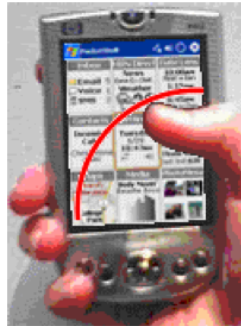


Figure 2. Screen area accessible with one hand.

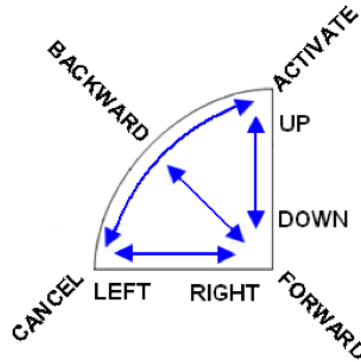


Figure 3. The gesture set.

26. LaunchTile led to my creation of Zumobi in 2006, where I was responsible for investigating new software platforms and developing new user interface designs that provide efficient and engaging interfaces to permit end users to access a wide range of content on mobile platforms (including the iPhone and Android-based devices). For example, I designed and implemented software called “Ziibii,” a “river” of news for iPhone; software called “ZoomCanvas,” a zoomable user interface for several iPhone apps; and iPhone apps including “Inside Xbox” for Microsoft and Snow Report for REI.

27. In 2006, I wrote a paper⁸ studying the speed and accuracy of people touching different locations on a mobile touchscreen device. That showed which portions of the screen people could most accurately tap when holding the device with one hand and tapping with their thumb of that hand. The following figure shows results showing targets that are about 1cm square that offer a good trade-off in terms of size and speed.

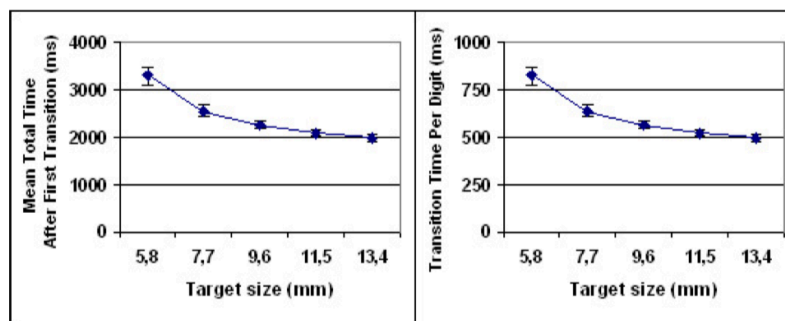


Figure 7. (a) Mean total time between the release of the first digit in the sequence and ‘END’ key for each key size in serial tap study. (b) Mean transition time between taps after the first transition.

⁸ Pekka Parhi, Amy K. Karlson, and Benjamin B. Bederson, *Target size study for one-handed thumb use on small touchscreen devices*, MobileHCI '06: Proceedings of the 8th Conference on Human-Computer Interaction with Mobile Devices and Services (2006), Association for Computing Machinery, New York, NY, USA, pp. 203-210, <https://doi.org/10.1145/1152215.1152260>.

28. In 2007, I authored a book chapter⁹ regarding how users held and interacted with phones. I characterized four form factors of the phones as “small,” “flip,” “large,” and “PDA.” Figure 4 from that book chapter (below) shows exemplary phones with those form factors and the prototypes that I built of each of those phone styles that we tested.

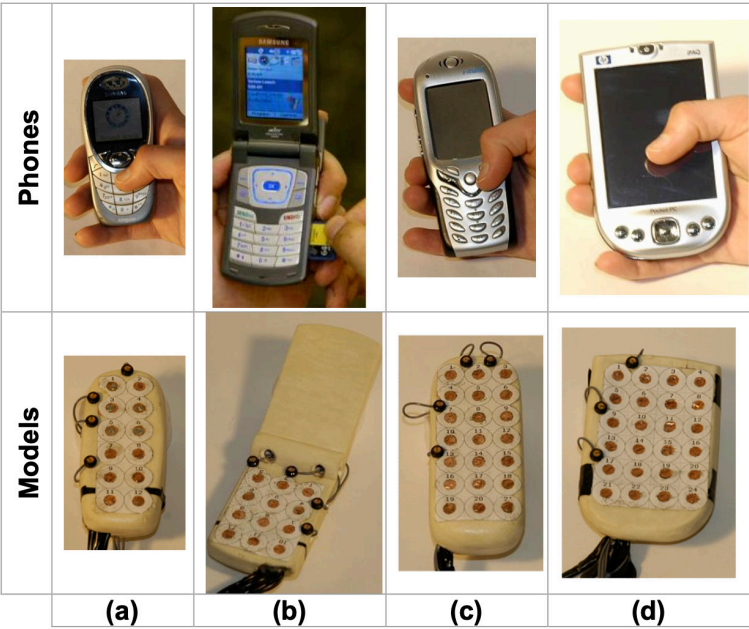


Figure 4. Devices we chose to represent a range of sizes and forms (top row) together with their study-ready models (bottom row): (a) SMALL, (b) FLIP, (c) LARGE, and (d) PDA.

⁹ Karlson, A., Bederson, B. B. (2007), *Understanding One Handed Use of Mobile Devices*, Lumsden, Jo (Ed.), Handbook of Research on User Interface Design and Evaluation for Mobile Technology, Idea Group Reference, 86-101.

29. In a 2008 paper,¹⁰ I described an approach to allow unmodified legacy touchscreen applications to run on large touchscreen mobile devices while improving the ability for users to use them with one hand. This figure from that paper illustrates the basic approach.

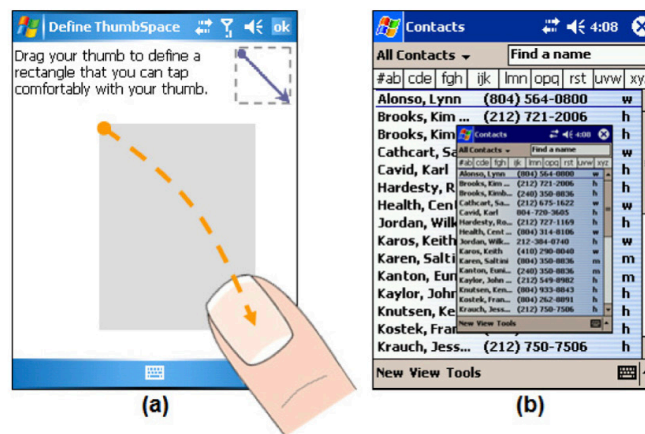


Figure 1. (a) Defining a ThumbSpace. (b) ThumbSpace in use.

30. I also wrote a 2010 paper¹¹ describing multi-modal text entry and selection on a touchscreen mobile device. In particular, the paper describes text

¹⁰ Amy K. Karlson and Benjamin B. Bederson, *One-handed touchscreen input for legacy applications*, CHI '08: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (2008), Association for Computing Machinery, New York, NY, USA, pp. 1399-1408, <https://doi.org/10.1145/1357054.1357274>.

¹¹ David Dearman, Amy Karlson, Brian Meyers, and Ben Bederson, *Multi-modal text entry and selection on a mobile device*, GI '10: Proceedings of Graphics

entry using touch on a touchscreen, tilting the device, voice recognition of speech, and foot tap. It goes on to describe the results of a study of people using these four input techniques to compare their speed and accuracy.

31. My work has been published extensively in more than 160 technical publications, and I have given about 100 invited talks, including 9 keynote lectures. I have won a number of awards, including the Janet Fabri Memorial Award for Outstanding Doctoral Dissertation for my Ph.D. work in robotics and computer vision as well as the Brian Shackel Award for “outstanding contribution with international impact in the field of HCI” in 2007, and the Social Impact Award in 2010 from the Association for Computing Machinery’s (“ACM”) Special Interest Group on Computer Human Interaction (“SIGCHI”). ACM is the primary international professional community of computer scientists, and SIGCHI is the primary international professional HCI community. I have been honored by both professional organizations. I am an “ACM Distinguished Scientist,” which “recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field.” I am

Interface 2010 (2010), Canadian Information Processing Society, CAN, pp. 19-26, <https://dl.acm.org/doi/10.5555/1839214.1839219>.

a member of the “CHI Academy,” which is described as follows: “The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. These are the principal leaders of the field, whose efforts have shaped the disciplines and/or industry, and led the research and/or innovation in human-computer interaction.” The criteria for election to the CHI Academy are: (1) cumulative contributions to the field; (2) impact on the field through development of new research directions and/or innovations; and (3) influence on the work of others. I have received two “Test of Time” awards from IEEE InfoVis for my 2001 and 2002 work on visualizing hierarchies, including those containing digital photos.¹²

32. I have appeared on radio shows numerous times to discuss issues relating to user interface design and people’s use and frustration with common technologies, web sites, and mobile devices. My work has been discussed and I have been quoted by mainstream media around the world over 120 times, including by the NEW YORK TIMES, the WALL STREET JOURNAL, the WASHINGTON POST, NEWSWEEK, the SEATTLE POST-INTELLIGENCER, the INDEPENDENT, LE MONDE,

¹² <https://ieevis.org/year/2021/info/awards/test-of-time-awards>;

<https://ieevis.org/year/2022/info/awards/test-of-time-awards>.

NPR's *All Things Considered*, NEW SCIENTIST MAGAZINE, and MIT's
TECHNOLOGY REVIEW.

33. I have designed, programmed, and publicly deployed dozens of user-facing software products that have cumulatively had millions of users. I am the co-inventor of 14 U.S. patents and 20 U.S. patent applications.

IV. MATERIALS CONSIDERED

34. In forming my opinions, I have reviewed the following documents, and any other document cited in this declaration.¹³

Exhibit	Description
Ex. 1001	U.S. Patent No. 11,503,144 to Ghassabian (“’144 patent”)
Ex. 1004	Prosecution File History of the ’144 patent
Ex. 1005	Prosecution File History of U.S. Application No. 14/146,125
Ex. 1006	Prosecution File History of U.S. Application No. 10/553,575
Ex. 1007	U.S. Provisional Application No. 60/463,844
Ex. 1008	U.S. Provisional Application No. 60/466,594
Ex. 1009	U.S. Provisional Application No. 60/468,028
Ex. 1010	U.S. Provisional Application No. 60/474,447
Ex. 1011	U.S. Provisional Application No. 60/475,533

¹³ Citations to page numbers are to the exhibit page number in the bottom right-hand corners (e.g., “Page *x* of *y*”), not original page numbers.

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Exhibit	Description
Ex. 1012	U.S. Provisional Application No. 60/482,706
Ex. 1013	U.S. Provisional Application No. 60/482,998
Ex. 1014	U.S. Provisional Application No. 60/496,702
Ex. 1015	U.S. Provisional Application No. 60/500,602
Ex. 1016	U.S. Provisional Application No. 60/504,331
Ex. 1017	U.S. Provisional Application No. 60/510,885
Ex. 1018	U.S. Provisional Application No. 60/536,564
Ex. 1019	U.S. Provisional Application No. 60/552,968
Ex. 1020	U.S. Provisional Application No. 60/557,140
Ex. 1021	European Patent Application Pub. No. 1229428 to Pensjo, filed on February 2, 2001, and published on July 8, 2002 (“ <i>Pensjo</i> ”)
Ex. 1022	European Patent Application Pub. No. 1336949 to Bast, filed on February 18, 2003, and published on August 20, 2003 (“ <i>Bast</i> ”), including certified English translation and certification
Ex. 1023	International Patent Application Pub. No. 2004/070871 to Wedel et al., filed on February 4, 2004, and published on August 19, 2004 (“ <i>Wedel</i> ”)
Ex. 1024	Japanese Patent Application Pub. No. 2000-151774 to Yamaguchi, filed on November 9, 1998, and published on May 30, 2000 (“ <i>Yamaguchi</i> ”), including certified English translation and certification
Ex. 1025	U.S. Patent No. 5,848,356 to Jambhekar et al., filed on October 2, 1995, and issued on December 8, 1998 (“ <i>Jambhekar</i> ”)
Ex. 1026	French Patent Application Pub. No. 2830093 to Benoit et al., filed on September 25, 2001, and published on March 28, 2003 (“ <i>Benoit</i> ”), including certified English translation and certification

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Exhibit	Description
Ex. 1027	United Kingdom Patent Application Pub. No. 2331204 to Kobayashi, filed on November 5, 1998, and published on May 12, 1999 (<i>“Kobayashi”</i>)
Ex. 1028	German Patent Application Pub. No. 10122229 to Dutta, filed on May 8, 2001, and published on December 13, 2001 (<i>“Dutta”</i>), including certified English translation and certification
Ex. 1029	U.S. Patent Application Pub. No. 2003/0022701 to Gupta, filed July 25, 2001, and published on January 30, 2003 (<i>“Gupta”</i>)
Ex. 1030	U.S. Patent No. 5,537,608 to Beatty et al., filed on June 2, 1995, and issued on July 16, 1996 (<i>“Beatty”</i>)
Ex. 1031	European Patent Application Pub. No. 0651544A2 to Allard et al., filed on October 28, 1994, and published on May 3, 1995 (<i>“Allard”</i>)
Ex. 1032	U.S. Patent Application Pub. No. 2002/0067346 to Mouton, filed on September 21, 2001, and published on June 6, 2002 (<i>“Mouton”</i>)
Ex. 1033	U.S. Patent No. 6,751,487 to Rydbeck et al., filed on February 8, 2000, and issued on June 15, 2004 (<i>“Rydbeck”</i>)
Ex. 1035	U.S. Design Patent No. D284,759 to Nagele, filed on October 25, 1983, and issued on July 22, 1986 (<i>“Nagele”</i>)
Ex. 1036	U.S. Patent Application Pub. No. 2003/0048257 to Mattila, filed on September 6, 2001, and published on March 13, 2003 (<i>“Mattila”</i>)
Ex. 1037	U.S. Patent Application Pub. No. 2001/0044281 to Peterzell et al., filed on June 15, 1998, and published on November 22, 2001 (<i>“Peterzell”</i>)
Ex. 1038	European Patent Application Pub. No. 1379101 to Erixon et al., filed on July 1, 2002, and published on January 7, 2004 (<i>“Erixon”</i>)
Ex. 1039	European Patent Application Pub. No. 0399176 to Tattari, filed on March 28, 1990, and published on November 28, 1990 (<i>“Tattari”</i>)
Ex. 1040	U.S. Patent Application No. 14/146,125 to Ghassabian, filed on January

IPR2025-00529 & IPR2025-00528
Declaration of Benjamin B. Bederson, Ph.D.

Exhibit	Description
	2, 2014
Ex. 1041	U.S. Patent Application No. 10/553,575 to Ghassabian, filed on October 17, 2005
Ex. 1042	International Patent Application No. PCT/US2004/012082 to Ghassabian, filed on April 19, 2004
Ex. 1043	<i>Keyless Licensing LLC v. Samsung Electronics Co., Ltd. et al.</i> , Case No. 2:24-cv-00464-JRG, Plaintiff’s Infringement Contentions Cover Pleading (E.D. Tex. Jan. 5, 2023)
Ex. 1044	<i>Keyless Licensing LLC v. Samsung Electronics Co., Ltd. et al.</i> , Case No. 2:24-cv-00464-JRG, Plaintiff’s Infringement Contentions Claim Chart for U.S. Patent No. 11,503,144 (E.D. Tex. Oct. 9, 2024)
Ex. 1045	“Sony Ericsson P800 User’s Manual,” Federal Communications Commission (FCC) ID: PY77130501 – Sony Ericsson’s Application for Equipment Authorization, Exhibit 8, published on October 15, 2002
Ex. 1046	“Microsoft Lumia 640 LTE – Full phone specifications,” first available on March 4, 2015, Wayback Machine URL: https://web.archive.org/web/20150304170913/https://www.gsmarena.com/microsoft_lumia_640_lte-7055.php
Ex. 1047	U.S. Patent Application No. 60/449,701, filed on February 24, 2003.
Ex. 1051	U.S. Patent Application Pub. No. 2004/0204125 to Messel et al., filed on March 13, 2002, and published on October 14, 2004 (“ <i>Messel</i> ”)
Ex. 1052	Bernhard Konrad and Martin Ashauer, <i>Demystifying Piezoresistive Pressure Sensors</i> , Sensors Magazine, July 1999, Vol. 16, No. 7: 12-25.

35. I have also relied on my education, experience, research, training, and knowledge in the relevant art, and my understanding of any applicable legal principles described in this declaration.

36. All of the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a POSITA would have understood the claims of the '144 patent at the time of the earliest claimed priority date.

37. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to me after the date of this declaration.

V. LEGAL STANDARDS

38. I am not a lawyer. My understanding of the legal standards to apply in reaching the conclusions in this declaration is based on discussions with counsel for Petitioners, my experience applying similar standards in other patent-related matters, and my reading of the documents submitted in this proceeding. In preparing this declaration, I have tried to faithfully apply these legal standards to the challenged claims.

39. I have been informed that there are two ways in which prior art may render a patent claim unpatentable. First, I have been informed that the prior art

can “anticipate” a claim. Second, I have been informed that the prior art can render a claim “obvious” to a POSITA. I understand that a claim is patentable if it was not anticipated and would not have been obvious by the prior art at the effective filing date of the patent.

40. I have been informed that a dependent claim is a patent claim that refers back to another patent claim. I have been informed that a dependent claim includes all of the limitations of the claim to which it refers.

41. I have been asked to provide my opinions as to whether the cited prior art teaches or renders obvious claims 1-5 and 7-20 of the '144 patent from the perspective of a POSITA at the '144 patent's earliest claimed priority date, as described in more detail below.

42. I have been informed that in *inter partes* review proceedings, such as this one, the party challenging the patent bears the burden of proving unpatentability by a preponderance of the evidence. I understand that a preponderance of the evidence means “more likely than not.”

43. For purposes of this declaration, I have been asked to provide my opinions on issues regarding unpatentability. I have been informed of the following legal standards, which I have applied in forming my opinions.

A. Level of Ordinary Skill

44. I have been informed that a POSITA is determined by considering several factors, including the (i) type of problems encountered in the art; (ii) prior-art solutions to those problems; (iii) rapidity with which innovations are made; (iv) sophistication of the technology; and (v) educational level of active workers in the field.

45. I have been instructed to assume a POSITA is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

B. Claim Construction

46. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention.

47. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand, however, that claim terms are generally not limited by the embodiments described in the specification.

48. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

C. Legal Standards for Determining Priority Date

49. I understand that the “priority date” or “effective filing date” of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed application.

50. I understand that in the patent application process, the applicant may keep the originally filed claims or change the claims between the time the patent application is first filed and the time a patent is issued. An applicant may amend the claims or add new claims. These changes may narrow or broaden the scope of the claims. I understand that a patent application is entitled to the benefit of the filing date of an earlier-filed application only if the disclosure of the earlier application provides support for the claims of the later application as required by the “written description” requirement of 35 U.S.C. § 112. I further understand that for a patent application to have an adequate written description of the invention, it

must show the inventor was in possession of the invention at the time the patent application was filed.

51. When determining whether a specification of a patent application contains adequate written description of the claimed invention, I understand that one must make an objective inquiry into the four corners of the specification from the perspective of a POSITA. Further, I understand that the standard for written description is stricter than the standard for determining whether or not a patent claim would have been obvious based on the prior art.

52. In particular, the question for purposes of written description is not merely whether the claimed invention is an obvious variant of what the specification discloses. Instead, the application itself must describe the invention, and do so in sufficient detail that a POSITA can clearly conclude that the inventor invented the claimed invention as of the date when the application was filed.

53. Similarly, I understand the issue of written description is separate from the question of “enablement” (i.e., whether a specification allows a POSITA to practice the claimed invention without undue experimentation). A specification may adequately enable a claimed invention, yet fail to provide written description support.

54. Finally, I understand that the standard for whether or not a disclosure is sufficient to provide written description support for a claim is different from the

standard for whether a disclosure anticipates a claim. To support a claim, the description must be sufficient to convey to a POSITA that the inventors were in possession of the full scope of the claimed subject matter. By contrast, a description anticipates a claim if it discloses even a single species within the scope of the claim. Thus, in the case of “genus” claims covering two or more different species, I understand that there can be situations in which a given disclosure is sufficient to anticipate the claim even though that same disclosure is not adequate to support the claim and entitle the inventors to an earlier priority date.

55. I understand that in order to claim priority to an application through a chain of applications, every single application in the chain (going back to the particular application on which the inventors want to rely) needs to support the claim as a matter of written description. In other words, each application in the chain must allow a POSITA to discern that the inventors were in possession of the claimed invention at the time of the application. It is not sufficient under this standard for the disclosure in the specification to render the claimed invention obvious.

D. Prior Art

56. I have been advised and understand that the information used to evaluate whether an invention was new and not obvious when made is generally referred to as “prior art.” I understand that prior art includes patents and printed

publications that existed before the earliest claimed priority date or the earliest filing date of the patent (which I have been informed is sometimes called the “effective filing date”). I have been informed and understand that a patent or published patent application is prior art if it was filed before the earliest filing date of the claimed invention and that a printed publication is prior art if it was publicly available before the earliest filing date.

E. Anticipation

57. I have been informed that under 35 U.S.C. § 102, a patent claim is unpatentable for anticipation if the claimed subject matter was patented or described in a printed publication before the effective filing date of the claimed invention. I have been informed that this is referred to as unpatentability by anticipation. I have been informed that a patent claim is anticipated under § 102 if a single prior-art reference discloses all limitations of the claimed invention.

F. Obviousness

58. I have been informed that for obviousness under 35 U.S.C. § 103, a patent claim is unpatentable if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a POSITA to which said subject matter pertains at the time the invention was made. I have been informed that this is referred to as unpatentability by obviousness.

59. I have been informed that a proper obviousness analysis includes the following:

- a. Determining the scope and content of the prior art;
- b. Ascertaining the differences between the prior art and the claims at issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Considering evidence of secondary indicia of nonobviousness (if available).

60. I have been informed that the relevant time for considering whether a claim would have been obvious to a person of ordinary skill in the art is the time of invention. For my obviousness analysis, counsel for Petitioners instructed me to assume that the date of invention for the challenged claims is as noted below in Sections IX-XIV.

61. I have been informed that a reference may be modified or combined with other references or with a POSITA's own knowledge if the POSITA would have found the modification or combination obvious. I have also been informed that a POSITA is presumed to know all the relevant prior art, and the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

62. I have been informed that whether a prior-art reference renders a patent claim obvious is determined from the perspective of a POSITA. I have also been informed that, while there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, and while a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually and may consider the inferences and creative steps a POSITA would employ, as filtered through the knowledge of one skilled in the art, obviousness grounds cannot be sustained by mere conclusory statements and must include some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

63. In determining whether a prior-art reference could have been combined with another prior-art reference or other information known to a POSITA, I have been informed that the following principles may be considered:

- a. A combination of familiar elements according to known methods is likely to be obvious if it yields predictable results;
- b. The substitution of one known element for another is likely to be obvious if it yields predictable results;
- c. The use of a known technique to improve similar items or methods in the same way is likely to be obvious if it yields predictable results;

- d. The application of a known technique to a prior-art reference that is ready for improvement to yield predictable results;
- e. Any need or problem known in the field and addressed by the reference can provide a reason for combining the elements in the manner claimed;
- f. A POSITA often will be able to fit the teachings of multiple references together like a puzzle; and
- g. The proper analysis of obviousness requires a determination of whether a POSITA would have a “reasonable expectation of success”—but not “absolute predictability” of success—in achieving the claimed invention by combining prior-art references.

64. I have been informed that, when a work is available in one field, design alternatives and other market forces can prompt variations of it, either in the same field or in another. I have been informed that if a POSITA could have implemented a predictable variation and would have seen the benefit of doing so, that variation is likely to have been obvious. I have been informed that, in many fields, there may be little discussion of obvious combinations, and in these fields, market demand—not scientific literature—may drive design trends. I have been informed that, when there was a design need or market pressure and there are a

finite number of predictable solutions, a POSITA would have had a good reason to pursue those known options.

65. I have been informed that the law permits the application of “common sense” in examining whether a claimed invention would have been obvious to a POSITA. For example, I have been informed that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. I understand, however, that a claim is not obvious merely because every claim element is disclosed in the prior art and that a party asserting obviousness must still provide a specific motivation to combine or modify the reference(s) as recited in the claims and explain why a POSITA would have reasonably expected to succeed in doing so.

66. I have been informed that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But 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. I have been informed that this test poses the question as to whether there is an express or implied teaching, suggestion, or motivation to combine prior-art elements in a way that realizes the claimed invention, and that it seeks to counter impermissible hindsight analysis.

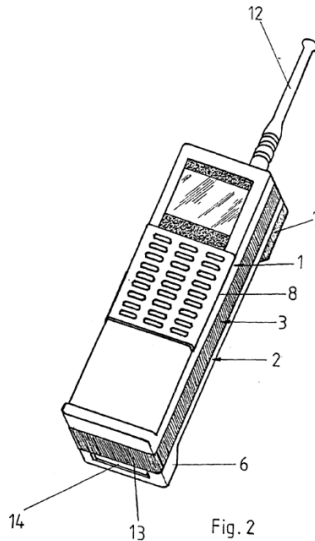
67. I am not aware of any evidence of secondary considerations that would support a determination of nonobviousness of the claimed subject matter in the '144 patent.

68. I have been informed that, in an obviousness analysis, prior art must be analogous prior art to the patent being considered. I have been informed that a prior-art reference is considered to be analogous, or in the same field of art, if the reference is either (1) in the same field of endeavor as the challenged patent, regardless of the problems the challenged patent and the prior art address; or (2) reasonably pertinent to a particular problem being solved by the challenged patent.

VI. TECHNOLOGY BACKGROUND AND STATE OF THE PRIOR ART

69. I provide below an overview of the technology background and the state of the prior art from the perspective of a POSITA at the time of the alleged invention. Early mobile phones (e.g., *Tattari*, below, dated 1990) were thick, bulky, and had small screens. It became common to refer to certain phones as brick-style phones. Long before the alleged invention of the '144 patent, phone makers realized the benefits of moving away from these bulky designs and creating phones that were “thin,” have “touch sensitive display unit[s]” that “practically occup[y] the entire front surface,” and lack “components ... noticeably extended

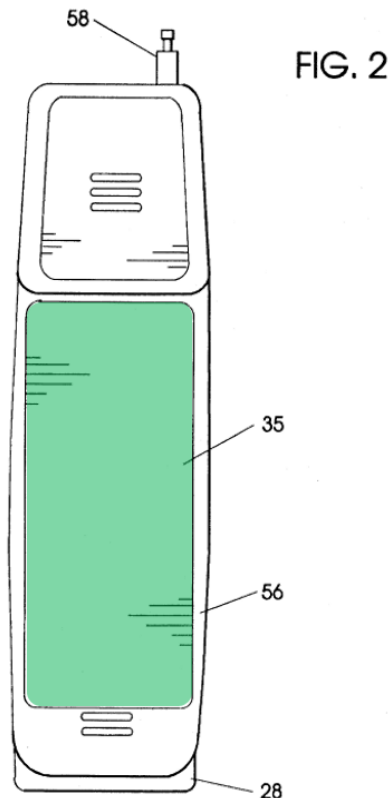
out from [the phone's] housing,” as claimed in the '144 patent. Ex. 1001, 104:61, 104:64-65, 104:19, 104:23-28, 106:7-9.



Tattari, Fig. 2.

70. Phones were also moving in the direction of enhanced functionality and features. Even as early as 1992, mobile-phone hardware and software became ripe for providing “display and user interface facilities necessary to execute many of the personal organizer applications found on personal computers.” *Beatty*, 1:15-18. At this time, IBM revealed a handset “that integrates the functionality of a personal computer with the communication possibilities of a cellular telephone to provide an apparatus with sophisticated computing as well as communication functions.” *Beatty*, 1:31-35. The front of the IBM phone’s housing 56 is integrated with a speaker 52, a microphone 54, and a **user interface 35** featuring a touch

overlay 26. *Beatty*, 3:51-55. “User interface 35 extends through the housing 56 so that touch overlay 26 is exposed and accessible to the user.” *Beatty*, 3:53-55. The components of the phone are “integrate[d] ... into a portable, lightweight package which fits in the user’s hand or pocket.” *Beatty*, 3:60-64.



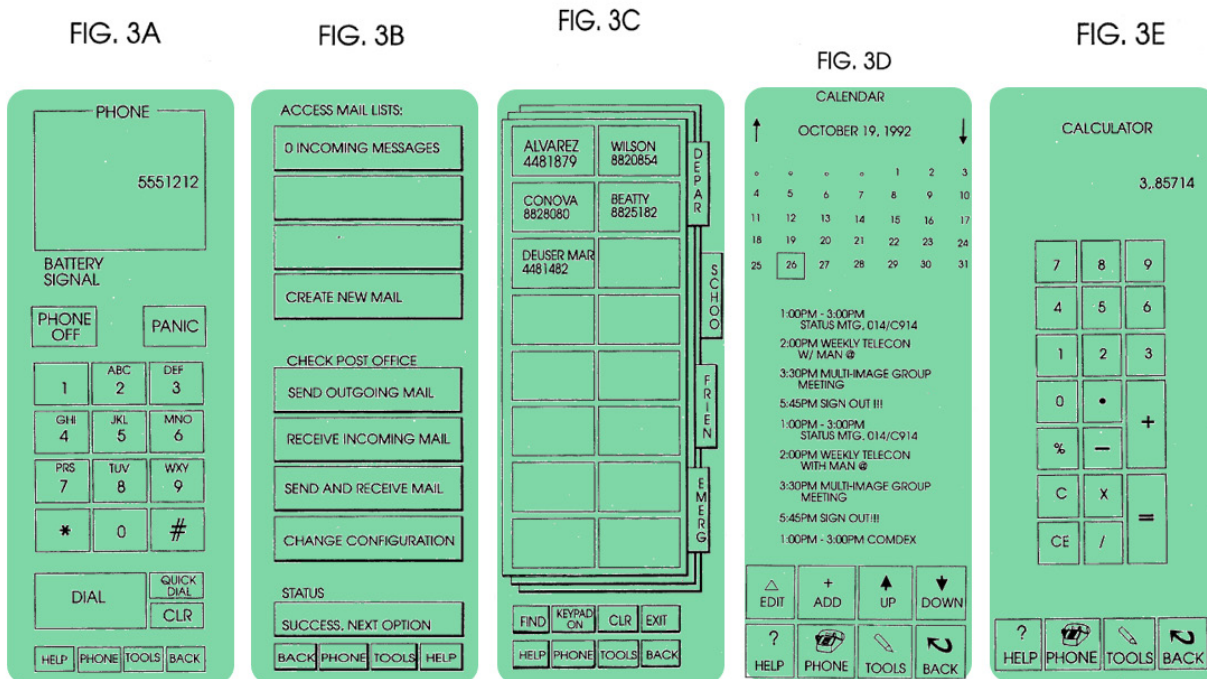
Beatty, Fig. 2.¹⁴

71. User interface 35 can display various applications, e.g., “a phone emulation application,” “an electronic mail application,” “an address book

¹⁴ All colors and colored annotations added to figures unless otherwise noted.

simulation application,” “a calendar application,” “a calculator application,” etc.

Beatty, 4:11-28. It also provides “virtual keys,” such as “PHONE” and “TOOLS,” so that “the user may select an application for execution.” *Beatty*, 4:36-41.

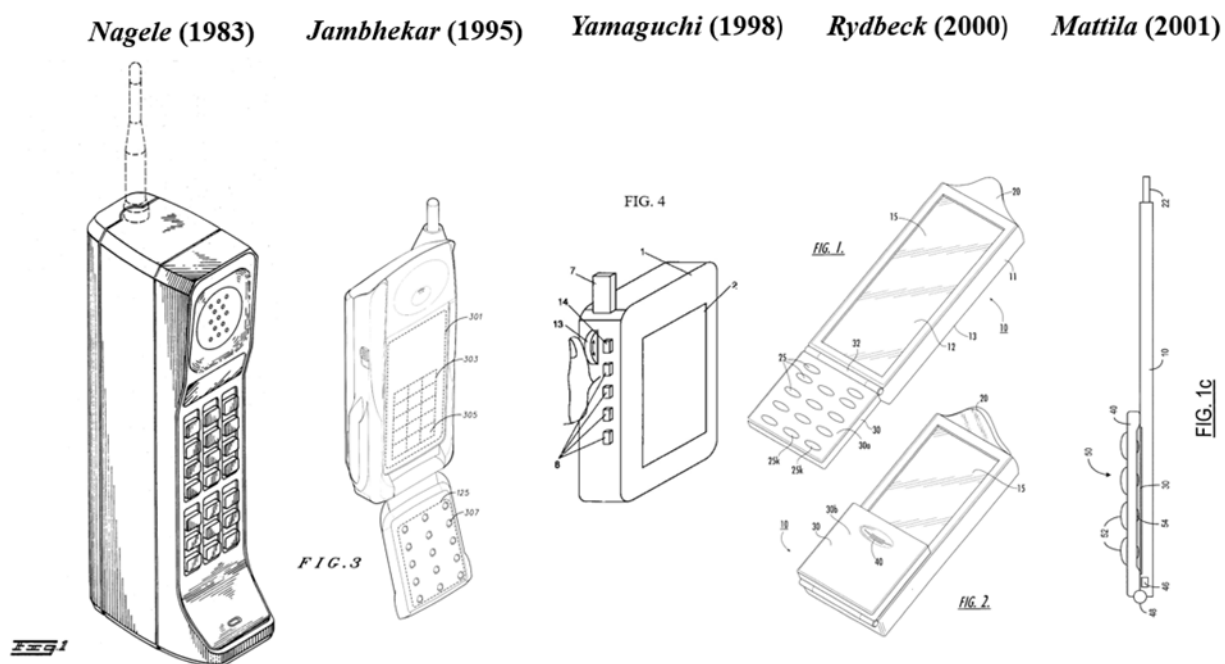


Beatty, Figs. 3A-3E.

A. Miniaturization and Portability

72. Phone makers continued to make phones smaller and thinner. *Dutta*, ¶[0002] (“A goal in the ongoing further development of portable terminals consists in continuously reducing its dimensions to make its transport as comfortable as possible.”); *Yamaguchi*, ¶[0007] (“a demand for a size such that the device can fit in a clothing pocket or the like from the perspective of making the device ‘easily portable anywhere’”); *Wedel*, 1:17-19 (“Still today, mobile phones are getting

smaller and smaller and the size is generally considered to be an important factor for the end customer.”). “In only a couple of decades”—still before the earliest claimed priority date of the ’144 patent—“the dimensions of the communication terminals have gone from briefcase size to the pocket[-]size[d] phones.” *Wedel*, 1:14-17. The figures in *Nagele* (Fig. 1), *Jambhekar* (Fig. 3), *Yamaguchi* (Fig. 4), *Rydbeck* (Figs. 1-2), and *Mattila* (Fig. 1c), respectively reproduced below, show this progression through the year 2001.



73. The development in electronics made it possible to miniaturize the components of the terminals. *Wedel*, 1:19-21. Benefiting from the advancement in component miniaturization and integration, mobile phones before the ’144 patent were capable of “rendering a very slim profile.” *Ericson*, [0012]; see also *Peterzell*,

¶¶[0027] (“[A] very thin, low-profile rectangular prismatic cell battery is used.”), [0030] (“thinner lithium polymer batteries[] ... no thicker than most of the components within the phone casing”). For example, as early as 1998, five years before the ’144 patent, *Yamaguchi* disclosed a phone thickness of just 15mm. *Yamaguchi*, ¶¶[0009], [0015].

B. Full-Length Touchscreen and Buttonless Design

74. As mobile phones became “smaller, miniaturized, or ‘pocket-sized,’” this put strain on the phone’s display and keyboard. *Rydbeck*, 1:11-19. There was a “need for a small communications device that merges the functions of a personal digital assistant and a telephone, cellular or otherwise, while still providing a display that is large enough for practical information viewing and a keypad that is easy to use.” *Gupta*, ¶[0004]. For example, *Gupta* describes a “buttonless . . . wireless radiotelephone for use in a cellular system.” *Gupta*, ¶[0019]. The device has “a full-length touchscreen display” that “can display a keypad” in replacement of “a fixed keypad.” *Gupta*, ¶¶[0051], [0017]. Thus, it “does not ... [require] a physical button or switch.” *Gupta*, ¶[0020].

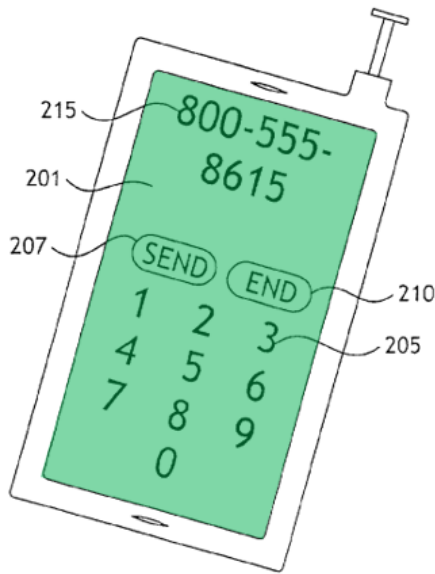


Fig. 2

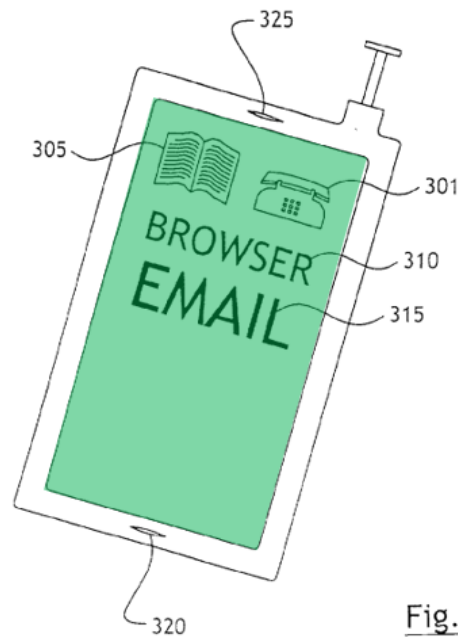
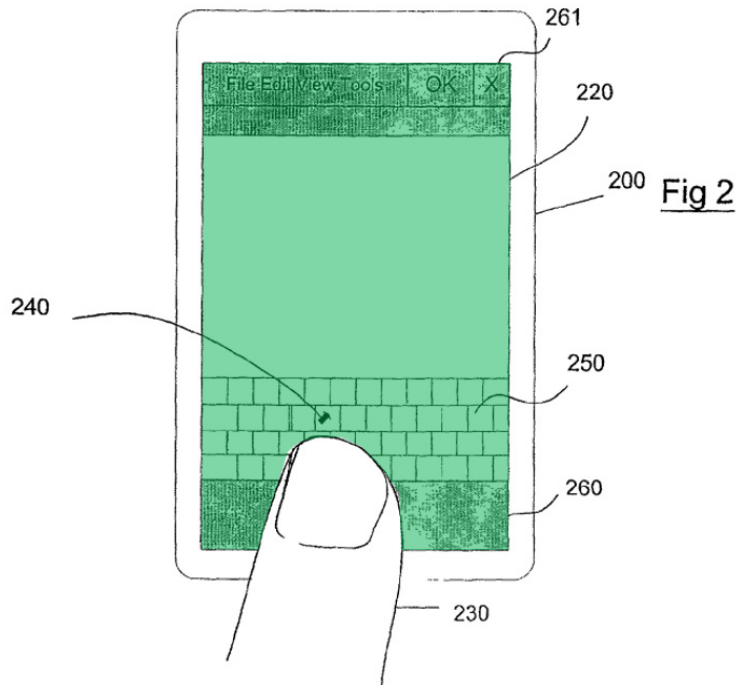


Fig. 3

Gupta, Figs. 2-3.

75. Similarly, *Mouton* discloses “user interfaces for electronic devices, ... [such as] personal digital assistants, mobile phones or mobile computers[] that have small display screens and that employ touch sensing as a means of data input.” *Mouton*, ¶[0001]; see also *Mouton*, Abstract (“Apparatus, such as personal digital assistants, mobile phones or mobile computers, is described having a touch sensitive display”). As shown in *Mouton*’s Figure 2, below, it depicts an exemplary electronic device, e.g., a mobile phone, that has “a touch sensitive display 220” that spans almost the phone’s entire front surface and is large enough to simultaneously display both a virtual keyboard and the entered data. *Mouton*, ¶[0022], Figs. 2-3.



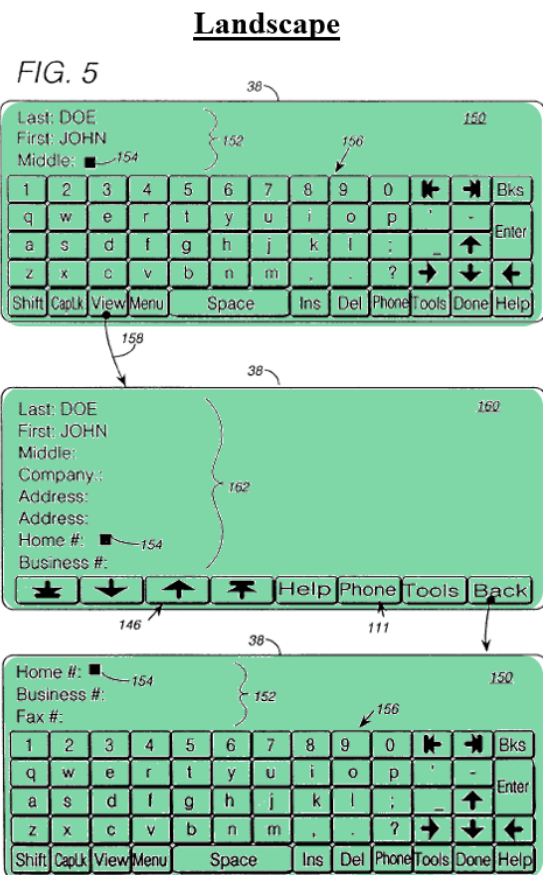
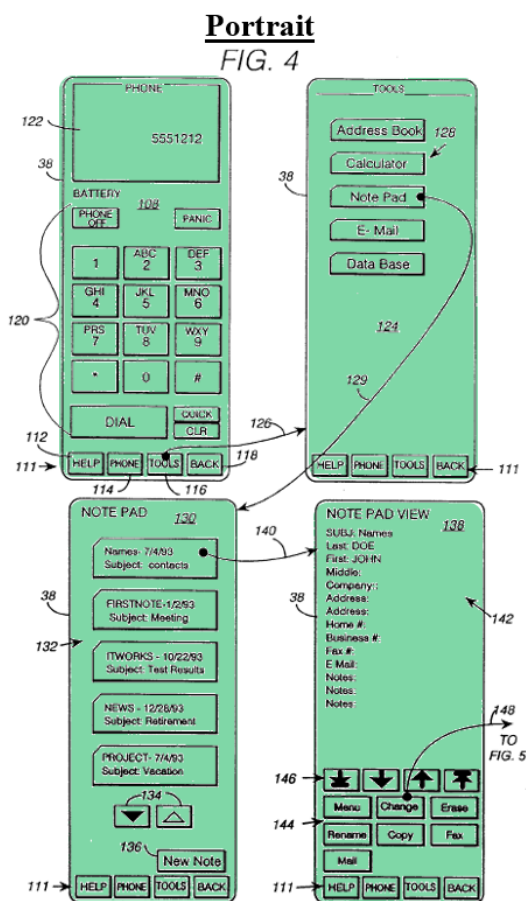
Mouton, Fig. 2.

76. As understood in the art, the buttonless design and full-length flat touchscreen further reduce the phones' sizes, thereby mutually reinforcing the known design objectives of miniaturization and portability.

C. Versatile Display and Virtual Keyboard

77. In addition to the above hardware improvements, the display and input software had also been customized to better use the limited real estate of the shrinking mobile phones. For example, *Allard* discloses a mobile phone **touchscreen** that can switch between portrait and landscape orientations. *Allard*, 7:37-40. The portrait view is used for navigating between different applications and could render a simulated cellular phone keyboard 120 for use with a phone

application (*Allard*, 6:46-7:40, Fig. 4), whereas the landscape view is used for editing messages and can display a full “qwerty” keyboard 156 that is collapsible to expand the area for data displaying (*Allard*, 7:41-8:38, Fig. 5). A user can select specific virtual keys displayed on the **touchscreen** to switch the portrait/landscape view and collapse/restore the virtual keyboard. *Allard*, 7:34-40, 8:9-17, 8:39-9:10.



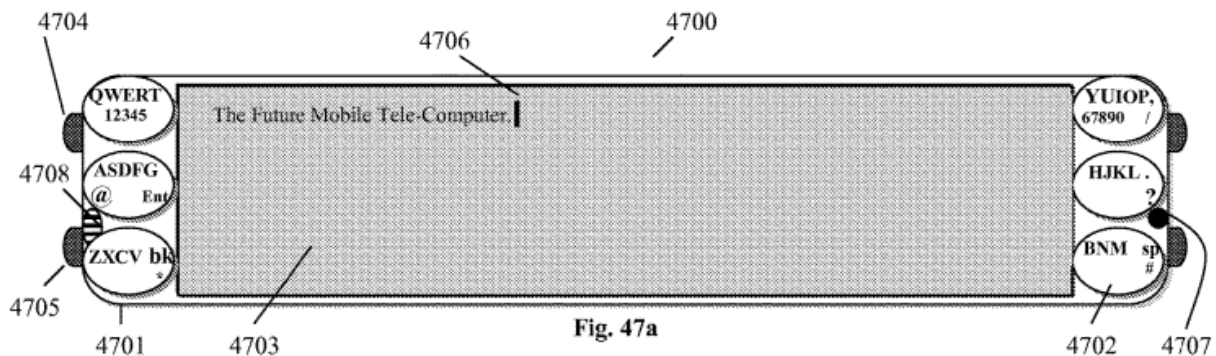
Allard, Figs. 4-5.

VII. THE '144 PATENT

A. Alleged Invention of the '144 Patent

78. The '144 patent is entitled “Systems to Enhance Data Entry in Mobile and Fixed Environment.” The '144 patent issued on November 15, 2022. The '144 patent purports to provide a data entry method for small electronic devices.

Ex. 1001, 1:31-35, 1:66-2:3, 7:25-32. For example, Figure 47a shows a mobile phone 4700 “having two rows of keys 4701, 4702.” Ex. 1001, 69:42-46. “Use of few keys (e.g.,[,] in two rows only) for data entry[] permits to integrate a wide display 4703 within said device.” Ex. 1001, 69:51-53. The phone includes a “microphone 4707 and ... a speaker 4708,” “[t]he distance between ... [which] may correspond to the distance between [the] mouth and ear of a user.” Ex. 1001, 70:20-24. It “may also have other buttons such as the buttons 4704, 4705 for functions such as scrolling the document to upward/downward, to left/right, navigating a cursor 4706 within said display 4703, send/end functions, etc.” Ex. 1001, 69:56-61.



Ex. 1001, Fig. 47a.

79. In another embodiment, Figure 68a shows an electronic device 6810 in which “a large display 6811 substantially covers the surface of at least one side of said electronic device.” Ex. 1001, 98:2-6.



Fig. 68a

Ex. 1001, Fig. 68a.

80. In another embodiment, Figure 14 shows “a mobile phone 1400” with “[a] plurality of different icons 1411-1414 representing different applications ... displayed on the screen 1402 of said device.” Ex. 1001, 18:24-27. A user can open an application by selecting the corresponding icon. Ex. 1001, 18:27-34.

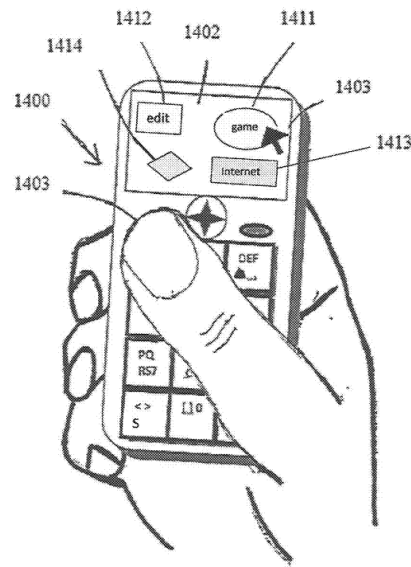


Fig. 14

Ex. 1001, Fig. 14.

B. Prosecution History

81. I have reviewed the prosecution history of the '144 patent. Based on the prosecution history and the "References Cited" noted on the second page of the patent, the '144 patent was allowed after the Examiner considered eight references, all of which were cited by the Examiner himself. None of the prior-art references that I rely on in my analysis herein were considered by the Examiner. During prosecution, to overcome the Examiner's prior-art rejections, the applicant amended the claims to add the limitations now recited in the issued claims, and argued:

[T]he cited prior art, Kubes, describes a mobile phone device ... wherein the antenna of the device is significantly extended out from

the housing of the device, making it difficult to use in different positions (e.g., landscape position) and very cumbersome for portability. In addition, Kubes describes that the device has a standard 12-key keypad (having the digit keys 0 to 9), which confirms that Kubes'[s] device was adapted/created to be used in portrait position only, like any other mobile handset at the time of Kubes'[s] invention. Note that Kubes'[s] device is also very thick, which again confirms that the device was designed for use with one hand in vertical/portrait position only.

Ex. 1004, 362.

82. But, in my opinion, the above features and benefits relied on by the applicant to gain allowance were well known in the art (*see* Section VI) and taught by the references discussed in this declaration (*see* Sections IX-XIV).

C. Priority Date for the '144 Patent Claims

83. As part of my analysis, I have been asked to consider whether the subject matter claimed in the '144 patent is disclosed in its claimed priority applications. It is my opinion that the claimed subject matter is not disclosed in the priority applications, for the reasons stated below.

1. Claims 1-14

84. Independent claim 1 and its dependent claims 2-8 require "wherein said mobile phone device does not include a physical key on the front surface."

Ex. 1001, 104:20-24, 104:29-51. Similarly, independent claim 9 and its dependent

claims 10-14 require “wherein said front surface of the mobile phone does not have a physical button.” Ex. 1001, 104:64-67, 105:10-30.

85. Based on my review, I have determined that the earliest provisional application—No. 60/463,844—does not contain any disclosure about the above claimed feature. Ex. 1007. The next 11 provisional applications also do not. *See* Exs. 1008-1018. For example, the 12th provisional application—No. 60/536,564—included a Figure 110a to show “a mobile communication device 11000 comprising ... few keys (here, arranged in two rows 11001-11002) ..., along with a relating display unit 11003.” Ex. 1018, 131.

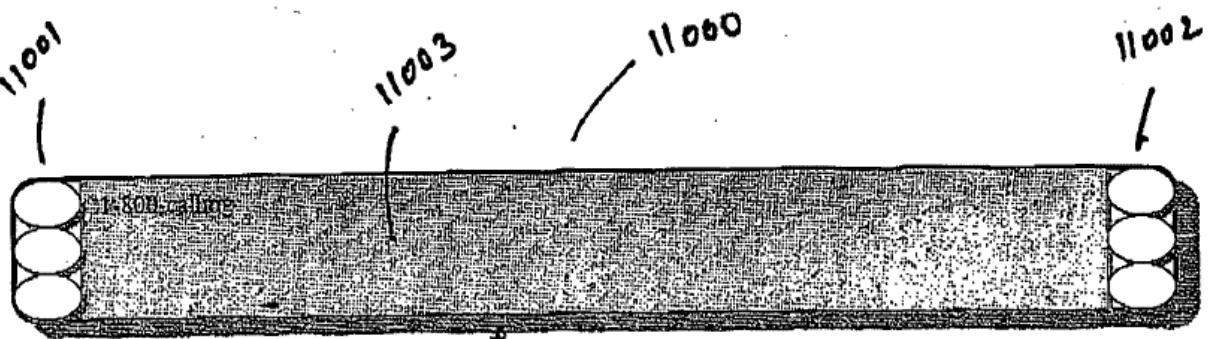


Fig. 110a

Ex. 1018, 208 (Fig. 110a). Here, a POSITA would understand that the two rows of keys 11001-11002 are physical keys on the front surface of the mobile communication device 11000 because they are located in areas separate from the display unit 11003. The '564 application does not contain any disclosure teaching or suggesting all of the keys 11001-11002 can be changed to virtual keys. A

POSITA would understand that making this change would require modifying the mobile communication device 11000 to display all of the keys 11001-11002 as virtual keys on the display unit 11003, but the '564 application does not contain any teaching or suggestion for making this change.

2. Claims 3, 4, 12, 13, and 15-20

86. Independent claim 15 recites “wherein upon identifying an input corresponding to a sweeping action provided on a touch sensitive surface of said device, said processor displays [a] plurality of other icons corresponding to [a] plurality of other applications on said display unit.” Ex. 1001, 106:10-14.

Dependent claims 3 and 12, and their respective further dependents 4 and 13, have substantially similar limitations. Ex. 1001, 104:31-39, 105:16-26. Based on my review, I have determined that neither the '144 patent's specification nor any of its claimed priority applications (or the prosecution history of these priority applications) contain any support for the above limitations of claims 3, 4, 12, 13, and 15-20. Exs. 1001 ('144 patent), 1005-1006 (prosecution history of the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575), 1007-1020 (provisional applications), 1040-1042 (the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575, and the parent International Patent Application No.

PCT/US2004/012082). Therefore, it is my opinion that a POSITA would not consider the '144 patent's specification and its claimed priority applications

(including the prosecution history of these priority applications) to teach or suggest the above limitations recited in claims 3, 4, 12, 13, and 15-20.

3. Claim 8

87. Dependent claim 8 recites “the thickness of the device is less than 20 percent of said [device’s] width.” Ex. 1001, 104:50-51. Based on my review, I have determined that neither the ’144 patent’s specification nor any of its claimed priority applications (or the prosecution history of these priority applications) describe the dimensions of the thickness or width, let alone their ratio. Exs. 1001 (’144 patent), 1005-1006 (prosecution history of the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575), 1007-1020 (provisional applications), 1040-1042 (the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575, and the parent International Patent Application No. PCT/US2004/012082). Moreover, the ’144 patent and the priority applications do not state that their figures are drawn to scale. Exs. 1001 (’144 patent), 1005-1006 (prosecution history of the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575), 1007-1020 (provisional applications), 1040-1042 (the parent U.S. Patent Application Nos. 14/146,125 and 10/553,575, and the parent International Patent Application No. PCT/US2004/012082). Instead, the ’144 patent says the opposite—“It is to be understood that the drawings are not necessarily drawn to scale, but that they are merely conceptual in nature.” Ex. 1001, 24:64-66, 103:34-36. Thus, I understand

that the drawings cannot be relied on regarding their scale. Therefore, in my opinion, a POSITA would not consider the drawings to teach or suggest any dimensions or their ratios.

D. Claim Construction

88. I have been instructed that the “intrinsic record” includes the ’144 patent itself, including the claims, description, and figures (Ex. 1001), and the ’144 patent’s prosecution history—i.e., the record of proceedings at the U.S. Patent and Trademark Office (“Patent Office”) concerning the ’144 patent (Ex. 1004). I understand that, like the claims and written description, the prosecution history provides evidence to a POSITA of how the inventor intended his patent to be understood, and how the Patent Office understood the patent. I understand that the inventor is permitted to apply a special definition to the terms or to limit the scope of claim terms in his patent claims, which may differ from the term’s plain and ordinary meaning. That special definition or limitation on scope may be provided in the patent’s written description, the patent’s prosecution history, or both.

89. I understand that claim interpretation may also be informed by “extrinsic evidence” (that is, evidence outside of the patent record itself). I have been informed that extrinsic evidence may include dictionaries, technical treatises, and other materials evidencing the meaning of a claim term and the understanding held by a POSITA in the relevant time period.

90. I have been asked for purposes of this declaration to apply the plain and ordinary meaning of the claim terms as they would have been understood by a POSITA at the earliest claimed priority date of the '144 patent (as relevant to the priority dates that I apply in each of my analyses below).

91. I understand that no claim term's construction is in dispute at this time. Based on my review of these materials and my personal knowledge and experience, I have considered each term of the '144 patent as it would have been understood by a POSITA at the earliest claimed priority date applicable in my analyses below.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

92. In rendering the opinions set forth in this declaration, I have been asked to consider the '144 patent's claims and the prior art through the eyes of a person of ordinary skill in the art (which I may also refer to as "one skilled in the art," "skilled artisan," "POSITA," or similar variation). I have considered factors such as the educational level and years of experience of those working in the pertinent art, the types of problems encountered in the art, the teachings of the prior art, patents and publications of other persons or companies, and the sophistication of the technology.

93. Taking the factors described in the Legal Standards – Level of Ordinary Skill section into consideration, it is my opinion that a POSITA would

have had at least a bachelor's degree in electrical engineering, computer science, or a similar field and two to three years of experience designing or analyzing mobile devices and designing graphical user interfaces using touchscreens. Additional relevant work experience can compensate for less education, and vice versa.

IX. THE PRIOR ART FOR GROUNDS 1A-5A

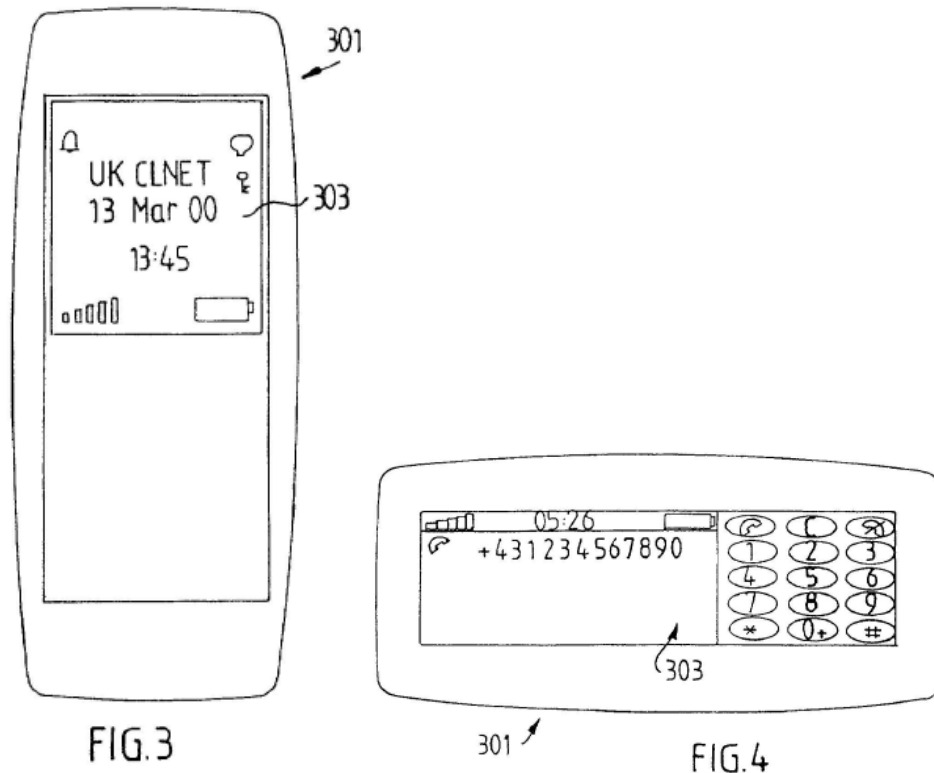
94. In forming my opinions, I relied on the following prior art when considering whether the claims of the '144 patent would have been obvious to a POSITA. I provide a table of this art below:

Ex. 1021	<i>Pensjo</i> , European Patent Application Publication No. 1229428, published on July 8, 2002.
Ex. 1025	<i>Jambhekar</i> , U.S. Patent No. 5,848,356, filed on October 2, 1995, and issued on December 8, 1998.
Ex. 1026	<i>Benoit</i> , French Patent Application Publication No. 2830093, filed on September 25, 2001, and published on March 28, 2003.
Ex. 1027	<i>Kobayashi</i> , United Kingdom Patent Application Publication No. 2331204, published on May 12, 1999.

A. *Pensjo* (European Patent Application Publication No. 1229428)

95. *Pensjo* is European Patent Application Publication No. 1229428 (Ex. 1021), published July 8, 2002, from a European application filed February 2, 2001. I have been asked to assume that *Pensjo* is prior art to the '144 patent.

96. *Pensjo* is directed to “a portable touch screen device, such as a PDA (Personal Digital Assistant) or a smart phone.” *Pensjo*, ¶[0001]. *Pensjo* discloses “an exemplary mobile telephone 301 comprising a touch screen display 303.” *Pensjo*, ¶[0010]. The device may include a “pen” or “stylus.” *See generally Pensjo*. The mobile phone has a large “touch screen display” that displays a user interface in both “landscape” and “portrait.” *Pensjo*, ¶[0010]-[0011]. These features are further shown in the figures, including Figures 3 and 4, which I reproduce below.

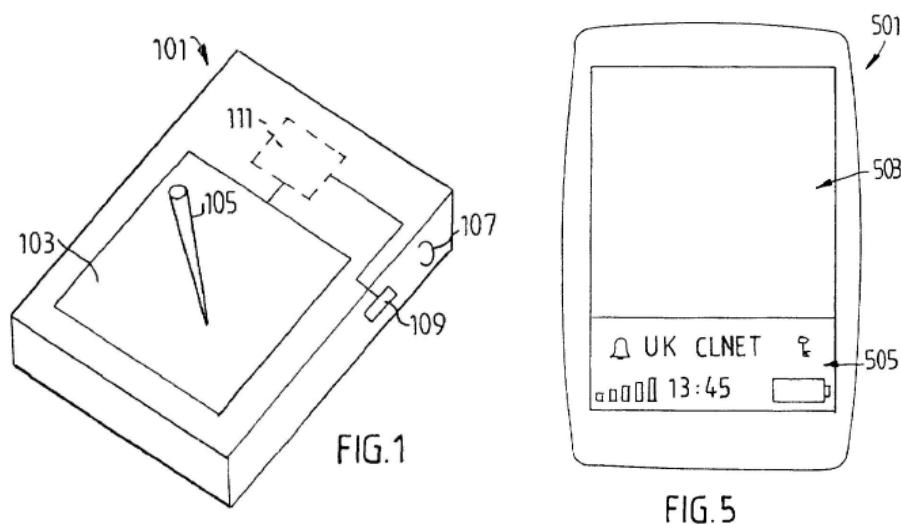


97. *Pensjo* says that a variety of “applications [may be] used by the device.” *Pensjo*, ¶[0014]. The phone may have “a telephone application” where “removal of the pen may trigger the appearance of a display layout including a numeric keyboard for entering a telephone number.” *Pensjo*, ¶[0014]. It may also have “an e-mail application” where “an alphanumeric keyboard[] . . . can be used for input of alphanumeric characters.” *Pensjo*, ¶[0014].

98. *Pensjo* teaches a mobile phone device having a form factor to fit within a “pocket” (*Pensjo*, ¶[0013]). In my view, this is consistent with its “mobile,” “portable,” and “hand-held” nature (*Pensjo*, ¶¶[0002], [0007]-[0008], [0010]-[0011]). *Pensjo* discloses other exemplary form factors of the electronic

device. *See, e.g., Pensjo*, Figs. 1, 5 (shown below). *Pensjo*'s figures depict a mobile phone device with similar portability and software features. *Pensjo*, ¶¶[0007]-[0009], [0012]-[0013]. *Pensjo* discusses hardware of the mobile phone, including its "control unit 111" that controls "the screen display 103." *Pensjo*, ¶[0009], Abstract. The control unit and screen display may permit an "active state in which the screen display 103 is responsive to input by touching." *Pensjo*, ¶[0009]. According to *Pensjo*, "[t]he screen may in this mode display various input keys, buttons[, or symbols, such as an alphanumeric keyboard." *Pensjo*, ¶[0009].

99. I include below Figures 1 and 5 of *Pensjo*, which depict such features.



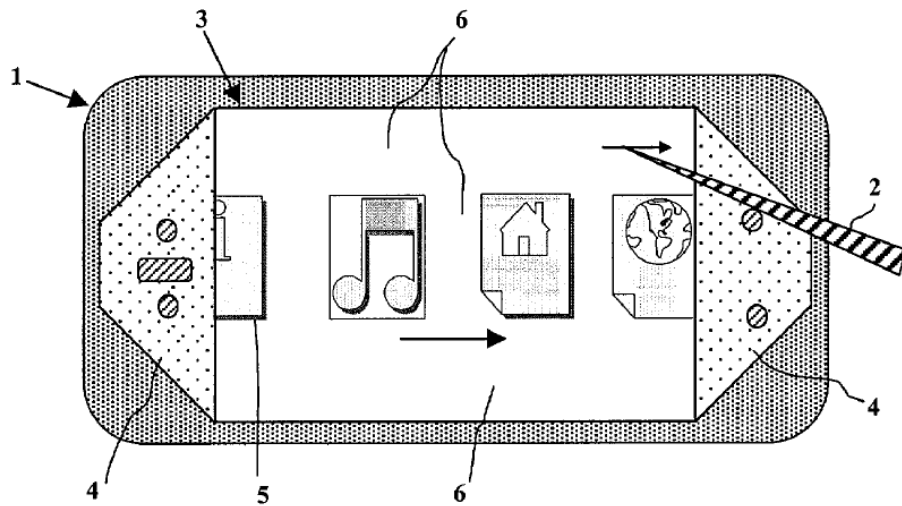
100. In my opinion, *Pensjo* is analogous prior art to the '144 patent at least because it is in the same field of endeavor as the '144 patent—a mobile device

with a touchscreen. *Compare Pensjo*, Abstract, ¶¶[0001], [0004]-[0007], with Ex. 1001, Claims 1, 9, 15. I believe that *Pensjo* is also reasonably pertinent to the particular problem the patent at issue is concerned with because it deals with technologies relating to information input with a touch sensitive device. *Compare Pensjo*, Abstract, ¶¶[0001], [0004]-[0009], Figs. 1-5, with Ex. 1001, Abstract, 1:66-2:19, 25:42-54, Claims 1, 9, 15.

B. *Benoit* (French Patent Application Pub. No. 2830093)

101. *Benoit* is French Patent Application Pub. No. 2830093 (Ex. 1026), published March 28, 2003, from a French application filed September 25, 2001. I have been asked to assume that *Benoit* is prior art to the '144 patent.

102. *Benoit* is directed to “a human-machine interface on a touch screen, for example[,] on a personal digital assistant (PDA).” *Benoit*, Abstract. *Benoit* teaches a method for navigating and launching an application on a touchscreen device. *Benoit*, 1:3-7. “To launch a program, one scrolls through a series of icons on the screen and then highlights the suitable icon for launching that program.” *Benoit*, Abstract. “Scrolling is achieved by using the PDA’s stylus (or a finger) in the control area to indicate a move in the direction of the scroll.” *Benoit*, Abstract. This scrolling through a series of icons is depicted in Figure 1 of *Benoit*, which I provide below.



Benoit, Fig. 1. Once a suitable icon is located, “a brief touch of the stylus [or the finger] on the icon” opens the corresponding program. *Benoit*, 5:22-23.

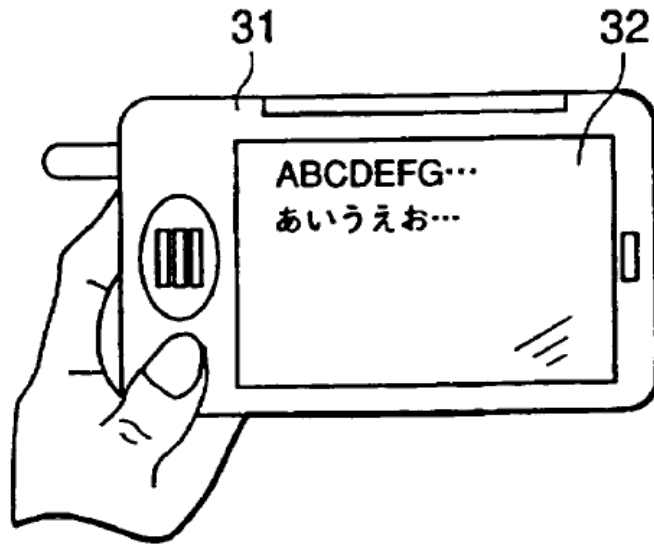
103. In my opinion, *Benoit* is analogous prior art to the '144 patent at least because it is in the same field of endeavor as the '144 patent—a mobile device with a touchscreen. *Compare Benoit*, Abstract, 1-3, with Ex. 1001, Claims 1, 9, 15. In my view, *Benoit* is also reasonably pertinent to the particular problem the patent at issue is concerned with because it deals with technologies relating to information input with a touch sensitive device. *Compare Benoit*, Abstract, 1:3-3:24, with Ex. 1001, Abstract, 1:66-2:19, 25:42-54, Claims 1, 9, 15.

C. *Kobayashi* (United Kingdom Patent Application Publication No. 2331204)

104. *Kobayashi* is United Kingdom Patent Application Publication No. 2331204 (Ex. 1027), published May 12, 1999, from an application filed

November 5, 1998. I have been asked to assume that *Kobayashi* is prior art to the '144 patent.

105. *Kobayashi* relates to a “portable terminal device.” *Kobayashi*, 2:5-6. The device has a “display for displaying data,” a “decision circuit for deciding whether or not the portable terminal device is held by a user,” and “a controller for automatically controlling a direction of [the] screen display on the displaying means in accordance with a result of [the] decision from the decision circuit.” *Kobayashi*, 2:15-21. The portable terminal device also includes a “telephone function.” *Kobayashi*, 2:24-27. According to *Kobayashi*, “the display screen on the display 32 can be automatically controlled between the direction of the short side and the direction of the long side in response to how the user holds the mobile information terminal 31, without necessity of any operation.” *Kobayashi*, 19:25-20:4.



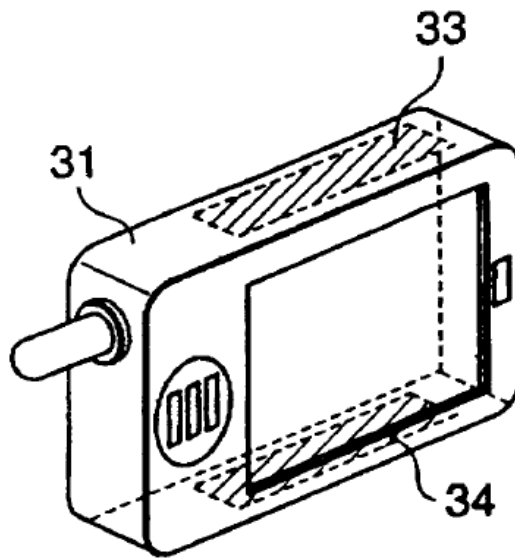
Kobayashi, Fig. 8a.

106. To facilitate the automatic orientation of the screen display, *Kobayashi* discloses “pressure sensors 33 and 34” that are disposed on the side surfaces of the device, as depicted in Figure 8b (below). *Kobayashi*, 17:27-18:5. *Kobayashi* explains that the pressure sensors detect the user’s hands to determine whether the mobile device is positioned in a landscape or portrait orientation, and *Kobayashi* uses this information to rotate the displayed information accordingly.

In Figs. 8b and 9b, when the mobile information terminal 31 is laterally used and held, pressure sensors 33 and 34 are disposed on the upper and lower surfaces of the mobile information terminal 31. When the mobile information terminal 31 is longitudinally used and held, the pressure sensors 33 and 34 are disposed on both the side surfaces of the mobile information terminal 31. The user’s fingers and palm come into contact with the pressure sensor 33 and/or the

pressure sensor 34, whereby the direction of [the] screen display on the display 32 is controlled. That is, when the user uses and holds the mobile information terminal 31 laterally as shown in Figs. 8a and 8b, the user's fingers and palm do not come into contact with the pressure sensors 33 and 34. Thus, the screen is displayed along the long side on the display 32.

Kobayashi, 17:27-18:6.



Kobayashi, Fig. 8b; *see also Kobayashi*, Figs. 9a-9b.

107. In my opinion, *Kobayashi* is analogous prior art to the '144 patent at least because it is in the same field of endeavor as the '144 patent—a mobile device with a touchscreen. *Compare Kobayashi*, 2:5-3:14, 12:4-27, Figs. 8a-9b, with Ex. 1001, Claims 1, 9, 15. *Kobayashi* is also reasonably pertinent to the particular problem the patent at issue is concerned with because it deals with technologies relating to information input with a touch sensitive device. *Compare*

Kobayashi, 2:5-3:14, 12:4-27, Figs. 8a-9b, *with* Ex. 1001, Abstract, 1:66-2:19,
Claims 1, 9, 15.

D. *Jambhekar* (U.S. Patent No. 5,848,356)

108. *Jambhekar* is U.S. Patent No. 5,848,356 (Ex. 1009), issued December 8, 1998, from a U.S. application filed October 2, 1995. I have been asked to assume that *Jambhekar* is prior art to the '144 patent.

109. *Jambhekar* is directed to a mobile device (radio communication device) with a touchscreen that provides telephone, email, and other capabilities. *Jambhekar*, Abstract, Fig. 3, 2:20-31. *Jambhekar* discloses a virtual alphanumeric keyboard usable with the touchscreen that can be displayed in either portrait or landscape directions. *See, e.g., Jambhekar*, Figs. 4C, 5F (shown below).

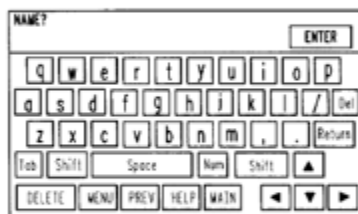


FIG. 4C

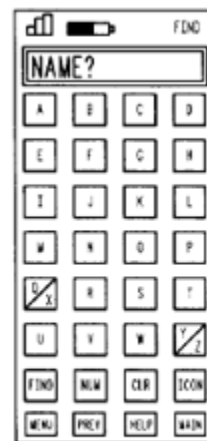


FIG. 5F

110. *Jambhekar*'s touchscreen display is rectangular shaped. *Jambhekar*, 4:22-23, 4:52-61, Fig. 3. *Jambhekar*'s touchscreen display can display information

“vertically in a portrait mode, or horizontally in a landscape mode.” *Jambhekar*, 4:23-25. *Jambhekar* discloses that virtual keyboards are provided in these display modes to enable text input. For example, Figures 5F-5H (I include these below) depict a virtual keyboard provided in a portrait mode for a user to look up a phone book directory by first typing a partial name and then selecting from entries matching the name. *Jambhekar*, 6:1-2, 6:19-31.

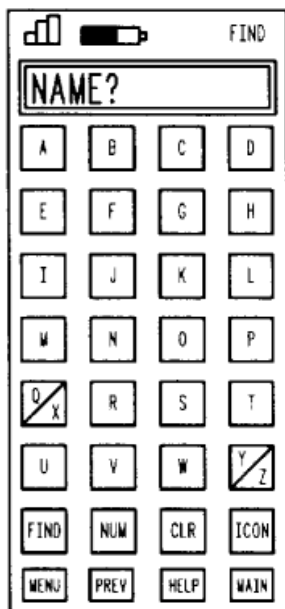


FIG. 5F

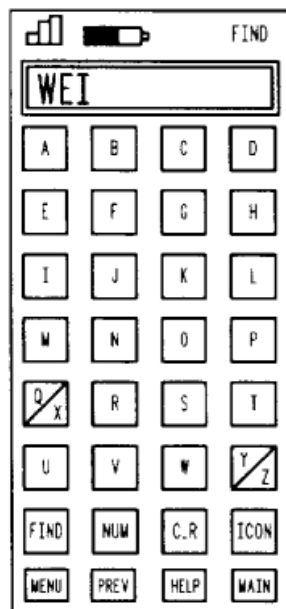


FIG. 5G

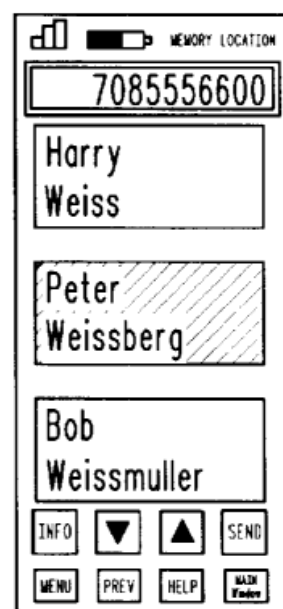


FIG. 5H

Jambhekar, Figs. 5F-5H. I include Figures 8A-8C below, which depict a virtual keyboard provided in a landscape mode for a user to type and view a text message. *Jambhekar*, 7:41-48.

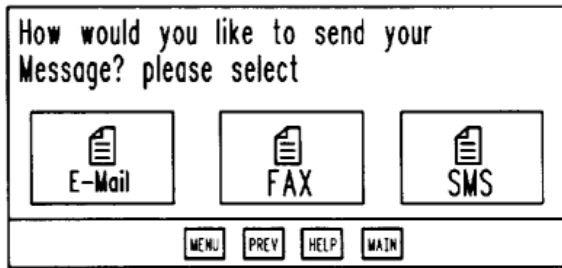


FIG. 8A

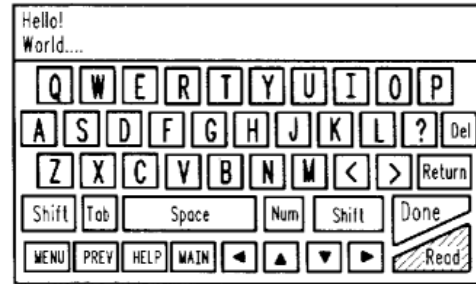


FIG. 8B

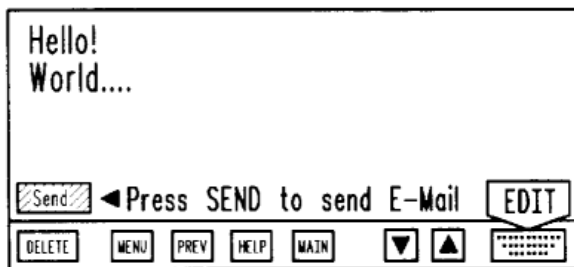


FIG. 8C

Jambhekar, Figs. 8A-5C.

111. In my opinion, *Jambhekar* is analogous prior art to the '144 patent at least because it is in the same field of endeavor as the '144 patent—a mobile device with a touchscreen. *Compare Jambhekar*, Abstract, 1:5-8, 2:20-31, 4:22-23, 4:37-61, Figs. 2, 3, 4C, 5F, *with* Ex. 1001, Claims 1, 9, 15. In my view, *Jambhekar* is also reasonably pertinent to the particular problem the patent at issue is concerned with because it deals with technologies relating to information input with a touch sensitive device. *Compare Jambhekar*, Abstract, 1:5-8, 2:20-31, 4:22-25, 6:1-7:59, Figs. 2-8, *with* Ex. 1001, Abstract, 1:66-2:19, Claims 1, 9, 15.

X. SUMMARY OF GROUNDS 1A-5A

112. Based on my review of the materials set forth above, including my application of the knowledge of a POSITA, it is my opinion that claims 1-5 and 7-20 of the '144 patent would have been obvious to one of ordinary skill in the art.

113. In particular, it is my opinion that claims 1-5 and 7-20 of the '144 patent would have been obvious to a POSITA based on the combinations shown below.

Ground	Claims	Basis	Prior Art
1A	1, 2, 7, 8	Obviousness	<i>Pensjo</i>
2A	3, 4, 15-19	Obviousness	<i>Pensjo</i> in view of <i>Benoit</i>
3A	5, 9-11, 14	Obviousness	<i>Pensjo</i> in view of <i>Kobayashi</i> and <i>Jambhekar</i>
4A	12, 13	Obviousness	<i>Pensjo</i> in view of <i>Kobayashi</i> , <i>Jambhekar</i> , and <i>Benoit</i>
5A	20	Obviousness	<i>Pensjo</i> in view of <i>Benoit</i> , <i>Kobayashi</i> , and <i>Jambhekar</i>

XI. GROUNDS 1A-5A: CLAIMS 1-5 and 7-20 WOULD HAVE BEEN OBVIOUS TO A POSITA

114. In my opinion, claims 1-5 and 7-20 would have been obvious to one skilled in the art at the earliest possible priority date of the '144 patent of April 18,

2003. Claim 8 would also be obvious at a priority date that is no earlier than January 22, 2017.

A. Ground 1A: Claims 1, 2, 7, and 8 Are Obvious over *Pensjo*

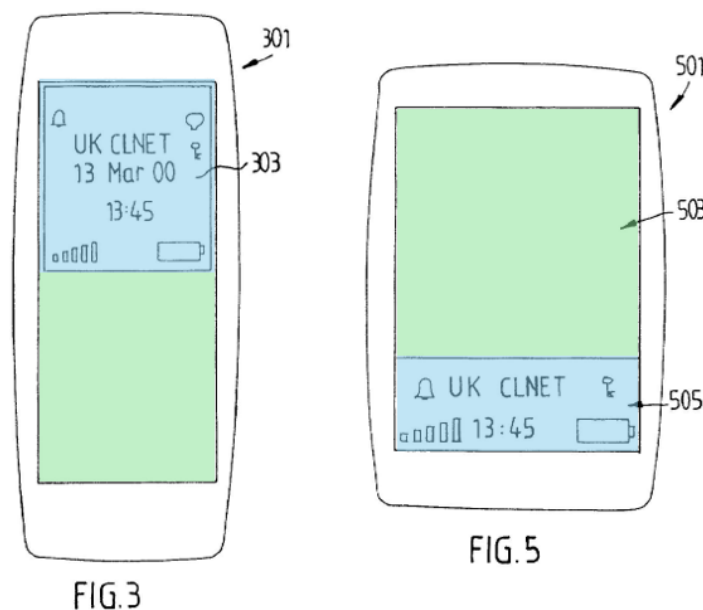
115. In my opinion, *Pensjo* renders obvious claims 1, 2, 7, and 8.

1. Reasons to Modify *Pensjo* Based on Its Teachings and the Knowledge of a Person Having Ordinary Skill in the Art

116. In my opinion, it would have been obvious to a POSITA at the time of the alleged invention to modify *Pensjo* based on its own teachings and the knowledge of a POSITA. *Pensjo* depicts several form factors and configurations in Figures 1 and 3-5. A POSITA would have known that the example form factors and features disclosed in *Pensjo* are complementary, interchangeable, and otherwise modifiable.

117. A POSITA would have recognized that *Pensjo*'s disclosed devices are complementary, interchangeable, and otherwise modifiable because *Pensjo* discloses similar yet slightly differing devices. For example, each of the devices is “mobile,” “portable,” and “hand-held.” *Pensjo*, ¶¶[0002], [0007]-[0008], [0010]-[0011]. *Pensjo* discloses that all the devices are phones. *Pensjo*, ¶¶[0001], [0007], [0009] (device of Figure 1 “displaying incoming calls”), [0010]-[0011] (device of Figures 3, 4 is a “mobile telephone”), [0012]-[0014] (device displays “telephone numbers” and uses a “telephone application”). Each of the devices is also

configured to use the same hardware, including a processor and a “pen” or “stylus.” *See generally Pensjo*. I note that even the displayed icons and features, such as battery percentage, network signal strength, and cell carrier, are depicted in similar fashion across devices, as can be seen in Figures 3 and 5 (which I reproduce and annotate below).



Pensjo, Figs. 3, 5. Each of the devices also depicts modest changes in relative dimensions (e.g., of the overall housing and screen), suggesting the devices are amenable to such modifications. *Pensjo* affirms the modifiability and interchangeability of the devices, saying that “[v]arious alternatives, modifications[,] and equivalents may be used without departing from the spirit of the invention.” *Pensjo*, ¶[0015].

118. Therefore, in my opinion, the disclosure of *Pensjo* teaches and suggests to a POSITA that the devices are amenable to modification, and a POSITA would have been motivated to modify, interchange, and otherwise adjust the features and form factors of the devices shown and described in *Pensjo*. Different form factors taught in *Pensjo* were known and obvious to achieve a device that, for example, was more portable, had a larger screen size to facilitate interaction with content, or other such obvious modifications. As another example, a POSITA would find that the relative dimensions and features taught in *Pensjo* could have been predictably modified by, for example, simple substitution, at least because of the predictability of the art in changing the dimensions of mobile phones and the known interchangeability of the various elements in *Pensjo*. This modifiability and interchangeability of mobile devices, their features, and their dimensions are consistent with the nature of mobile devices at that time. Manufacturers used various form factors generally trending towards thinner devices, fewer physical buttons (in favor of virtual buttons and keyboards), and larger overall screens. *See, e.g.*, Section VI.

119. As one illustration, *Pensjo* discloses a variety of different form factors in Figures 1 and 3-5. Considering the variety of different form factors disclosed in *Pensjo*, a POSITA would have found it obvious to modify the length, width, and thickness of the phones in *Pensjo*. A POSITA would have been motivated to adjust

the dimensions of *Pensjo*'s phones to improve their portability and ability to fit in a user's hand or pocket, both of which were considerations contemplated by *Pensjo*. *Pensjo*, ¶¶[0002], [0007]-[0008], [0010]-[0011], [0013].

120. As I note above, in Section VI, a POSITA was aware of thick (e.g., brick-style) phones at the time of the alleged invention. This style of phone had been prevalent in the 1980s and 1990s. Given general trends in the industry, one obvious modification to a POSITA would have been using a thin profile as shown in Figure 1 of *Pensjo* with the phone of Figure 3, which does not expressly disclose a profile. A POSITA would have been motivated to make the phone of Figure 3 thin (to the extent that it was not already) to allow the phone to fit more comfortably in a user's hand and pocket. *Pensjo* further suggests a thin phone by noting its ability to fit within a "pocket." *Pensjo*, ¶[0013].

121. In addition to the teachings from *Pensjo* itself, a POSITA would have found it obvious to modify the dimensions of *Pensjo* based on the knowledge of a POSITA. As I note above, it was well known in the art to make a phone housing thin. *See* Section VI. *Yamaguchi*, for example, teaches a mobile phone that is approximately 75mm in width and 15mm in depth, thus having a thickness that is about 20 percent of said width. *Yamaguchi*, ¶¶[0034], [0036]. *Yamaguchi* notes "a demand for a size such that the device can fit in a clothing pocket or the like from the perspective of making the device 'easily portable anywhere'" and "a demand

for a series of manipulations to be performable with one hand from the perspective of making the mobile-communication-information terminal device ‘easy to manipulate.’” *Yamaguchi*, ¶[0007]. Mobile phones with large touchscreens had been routinely made thin to fit into a pocket.

122. Mobile devices disclosed after *Yamaguchi*—but still prior to the ’144 patent’s alleged priority date—continued to emphasize the importance of decreasing the thickness of mobile devices, thus creating a motivation to decrease below a thickness that is 20 percent of said width. For example, *Dutta* teaches that it was a “goal” to “continuously reduc[e] [a mobile device’s] dimensions to make its transport as comfortable as possible.” *Dutta*, ¶[0002]. *Rydbeck* discloses a “smaller, miniaturized, or ‘pocket-sized’ wireless telephone[] ... which allows for [a] larger display[] over conventional devices.” *Rydbeck*, 1:11-19, Figs. 1-2; *see also id.*, 2:60-62, 4:24-44, 10:29-30; *see also Jambhekar*, 1:31-36 (“For example, in a portable radiotelephone often there is a small display and a fixed data input keypad. On the other hand, a wireless data service such as e-mail requires extensive display of received messages as well as extensive user data input from either a pen or a keyboard.”). The motivation to slim mobile devices existed in tandem with the known motivation to maximize the mobile device’s screen size, which would serve to maintain a width of already pocket-sized devices while slimming them down. *See* Section VI.

123. Another obvious modification to the phone dimensions would involve changing its height-to-width ratio. *Pensjo* depicts several embodiments varying in height and width: Figure 3 depicts a height that is approximately double its width (e.g., *Pensjo*, Fig. 3); and Figures 1 and 5 depict slightly wider phones (e.g., *Pensjo*, Figs. 1, 5). Thus, *Pensjo* contemplated dimensional modifications, and they would have been obvious to a POSITA. Therefore, even if *Pensjo*'s Figure 3 did not already disclose a width of the device that is approximately half of the device's length, a POSITA would have found this feature obvious. These relative dimensions were well known to POSITAs at the time of the alleged invention. For example, *Rydbeck* at 4:39-43 discloses "pocket[-]" or "palm"-sized mobile devices, explaining that such devices are "[t]ypically[] ... are less than about 8-10 inches in length and less than about 4 inches in width." In another example, *Yamaguchi* at ¶¶[0034], [0036] describes a mobile phone that is 100-150mm in length, 60-75mm in width, and 15-25mm in depth. In yet a further example, Ex. 1045 at 188 discloses a rectangular, touchscreen mobile device that is 117mm in length and 59mm in width. Based on my calculations, this is a 50.4% width/length ratio. See also Ex. 1045, 9, 123.

124. A variety of different rationales show why dimensional changes to the phones of *Pensjo* and alterations to its exterior features would have been obvious to a POSITA. A POSITA would have considered such dimensional changes to

Pensjo obvious because they involved (A) combining prior-art elements (e.g., *Pensjo*'s mobile phone depicted in Figure 3) according to known methods to yield predictable results (e.g., modified dimensions and external features as shown in *Pensjo*'s Fig. 1 and Fig. 5 or knowledge of a POSITA); (B) use of a known technique (e.g., modifying dimensions and external features of mobile devices as shown in *Pensjo*'s Fig. 1 and Fig. 5 or knowledge of a POSITA) to improve similar devices (e.g., *Pensjo*'s mobile phone depicted in Figure 3) in the same way; (C) applying a known technique (e.g., modifying dimensions and external features of mobile devices as shown in *Pensjo*'s Fig. 1 and Fig. 5 or knowledge of a POSITA) to a known device (e.g., *Pensjo*'s mobile phone depicted in Figure 3) ready for improvement to yield predictable results; and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the dimensions of the mobile phone disclosed by *Pensjo*.

125. A POSITA would have a reasonable expectation of success in modifying the dimensions and external features of *Pensjo*'s Figure 3, given teachings of form factors and how to arrange components already taught in references like *Yamaguchi*, *Mouton*, and *Dutta*. A wide range of commercially available components were available at this time, housings could easily be crafted for a particular form factor to house the components, and a POSITA would have known that the device with standard components would have worked reliably in a

wide range of layouts or arrangements of the components. And as discussed above, the prior art (e.g., *Yamaguchi*, *Rydbeck*, etc.) teaches various mobile phones that have large touchscreens and made in pocket sizes. Thus, a POSITA would have reasonably expected that the form factor of *Pensjo*'s phone housing could be modified in a similar way as these prior-art devices. The '144 patent itself discloses no special arrangement of the internal components needed to achieve any of its claimed dimensions, size ratios, or external features, confirming that such was well within the level of skill in the art at the time. *See generally* Ex. 1001.

126. Additionally, *Pensjo* includes elements, such as the pen 105 and pen holder 107 that are not needed. Removing such elements would make it easier to modify the dimensions of the device, including making it thinner, since fewer items would need to be incorporated within the device. A POSITA would have known that a pen was not necessary since numerous touch screen mobile devices did not have pens. *Pensjo* itself explains that touch screens on mobile devices and smart phones “can be touched by a human finger.” *See Pensjo*, ¶[0002]. More generally, in my experience, experimenting with the form factors of mobile devices was a key activity of POSITAs in this time period because there was so much interest in devices and the market was so clearly growing. The commercial existence of so many form factors of mobile devices is itself evidence that a

POSITA would have been successful in the development of further modifications of basic design elements such as height, width, and depth.

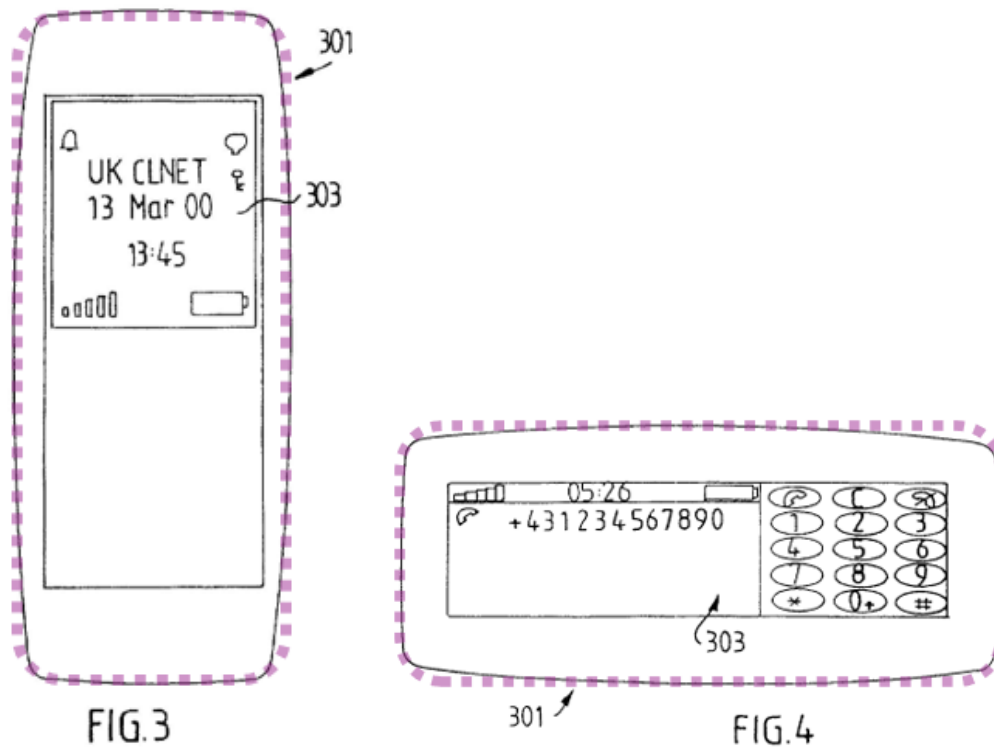
2. Independent Claim 1

a. 1[pre]: “A mobile phone device, comprising:”

127. *Pensjo* discloses 1[pre] by disclosing a mobile telephone, which is a mobile phone device. *Pensjo*, ¶¶[0007], [0010]-[0011], Figs. 1, 3-5. *Pensjo* discloses an “exemplary mobile telephone 301 comprising a touch screen display 303.” *Pensjo*, ¶[0010]. *Pensjo* also discloses a “portable device 101” that includes “a touch sensitive screen display 103 used for input of operational commands and/or data.” *Pensjo*, ¶[0008]. The screen may “be capable of displaying incoming calls.” *Pensjo*, ¶[0009].

b. 1[a]: “a practically rectangular-shaped housing within which the components of a mobile phone are integrated, said housing having a front surface, a back surface and four side surfaces,”

128. In my opinion, *Pensjo* discloses 1[a] or renders it obvious. The mobile phone in *Pensjo* has a practically rectangular-shaped housing within which the components of a mobile phone are integrated, said housing having a front surface, a back surface, and four side surfaces. By way of example, Figures 3 and 4 of *Pensjo* disclose such a **practically rectangular-shaped housing**. I have annotated Figures 3 and 4 below to show this.



Pensjo, Figs. 3-4; see also *Pensjo*, ¶[0007], Figs. 1, 5. The housing has components integrated within it, including “an electronic control unit 111” that “operates to control circuits, not shown, for displaying various patterns, pictures[,] and/or information on the screen display 103.” *Pensjo*, ¶[0008]; see Section IX.A.

The rectangular housing in *Pensjo* depicts a front surface and four side surfaces.

Pensjo, Figs. 1, 3-5. *Pensjo* does not depict its back surface, but a housing including a back surface would be obvious to a POSITA (e.g., to retain and protect components of the phone as was routine and conventional in the art). Furthermore, it would be uncomfortable to hold without a back surface and would actually be easier to build with a back surface since it would provide more structure to hold the

internal components. A POSITA would have a reasonable expectation of success in using a housing having a front surface, a back surface, and four side surfaces as this was the standard practice for mobile phone housings at the time of the invention.

c. 1[b]: “wherein the length of the front surface approximately corresponds to the distance between the ear and the mouth of a user and”

129. In my opinion, *Pensjo* discloses 1[b] or renders it obvious when combined with the knowledge of a POSITA. *Pensjo*’s phone is configured for “operation” by “a user.” *Pensjo*, ¶[0001]. Users at the time of the invention commonly used phone devices to conduct a “call[]” and interact with the front surface of the phone when doing so. *See Pensjo*, ¶[0009]. At the time of the alleged invention, mobile telephones were known to have a front surface having a form factor allowing a user to both speak and listen during a call. As such, a POSITA would have understood *Pensjo* to disclose—or would have found it obvious to modify *Pensjo* based on the knowledge of a POSITA to include—a front surface having a length approximately corresponding to the distance between the ear and the mouth of a user.

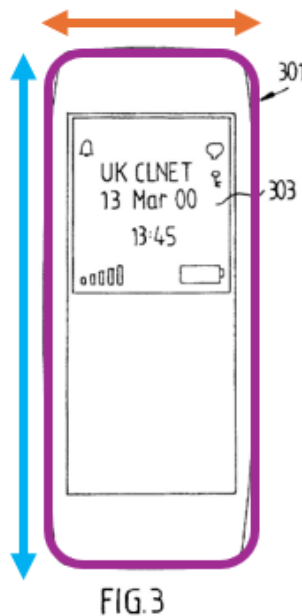
130. The length claimed in 1[b] allows a user to hold one end of the mobile phone device near the user’s ear for listening and another end near the user’s mouth for speaking. This length of the front surface was well understood in the art

for phone devices. *Yamaguchi*, ¶[0005] (discloses that “an ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations”); *Dutta*, ¶[0003] (disclosing that “the ideal size of a mobile phone is determined by the typical ear-to-mouth distance of the average user”), Figs. 2A-2B (depicting a microphone 215 and a speaker 220 located on the front surface). The length of the front surface is particularly suitable for phones, like *Pensjo*, that have a fixed shape. Given that adult human heads tend to be of similar sizes, designing a single-size phone would work for almost all users since the distance between their ears and mouth does not change much. Furthermore, market forces would encourage a POSITA to design a phone usable with a typical ear-to-mouth distance since that is what users had come to expect with commercially available mobile phones.

131. To the extent that *Pensjo* does not already disclose a length of the front surface approximately corresponding to the distance between the ear and the mouth of a user, modifying it to have such would merely entail a simple and predictable alteration of the phone’s dimensions based on the knowledge of a POSITA to make the phone more easily usable for listening and speaking. A POSITA would have known of this length of the front surface, had a motivation to use it, and would have had a reasonable expectation of success in achieving it.

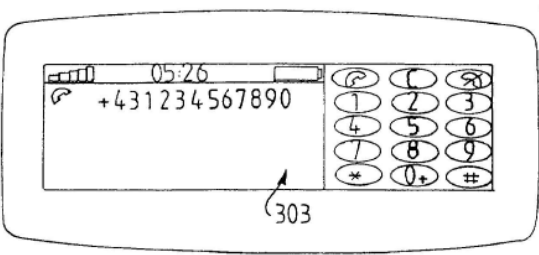
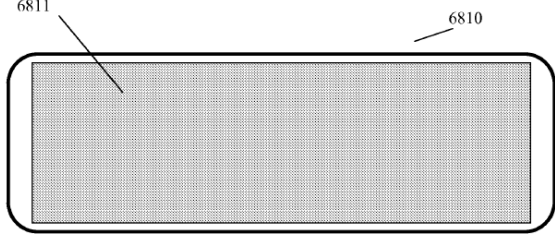
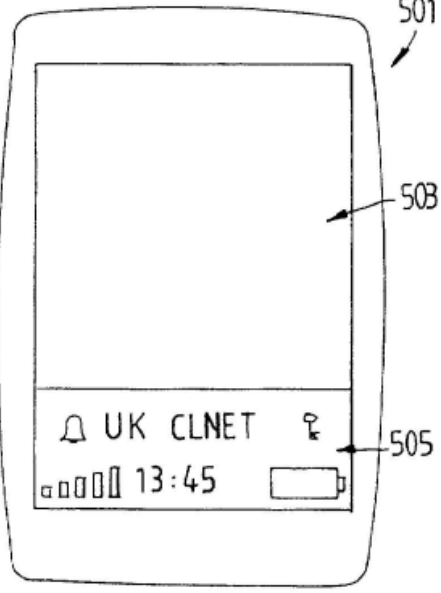
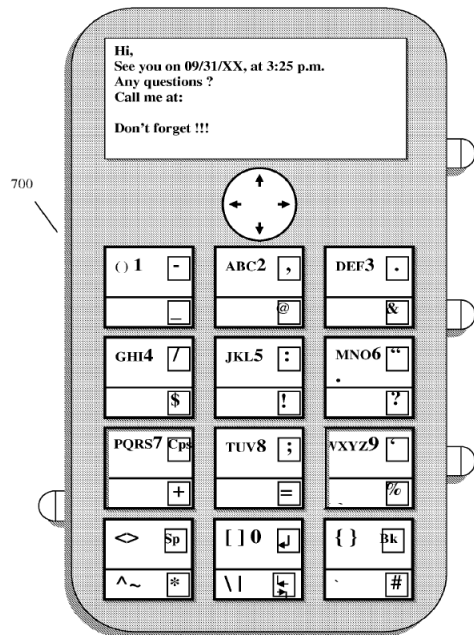
d. 1[c]: “wherein the width of the front surface is substantially shorter than the length and”

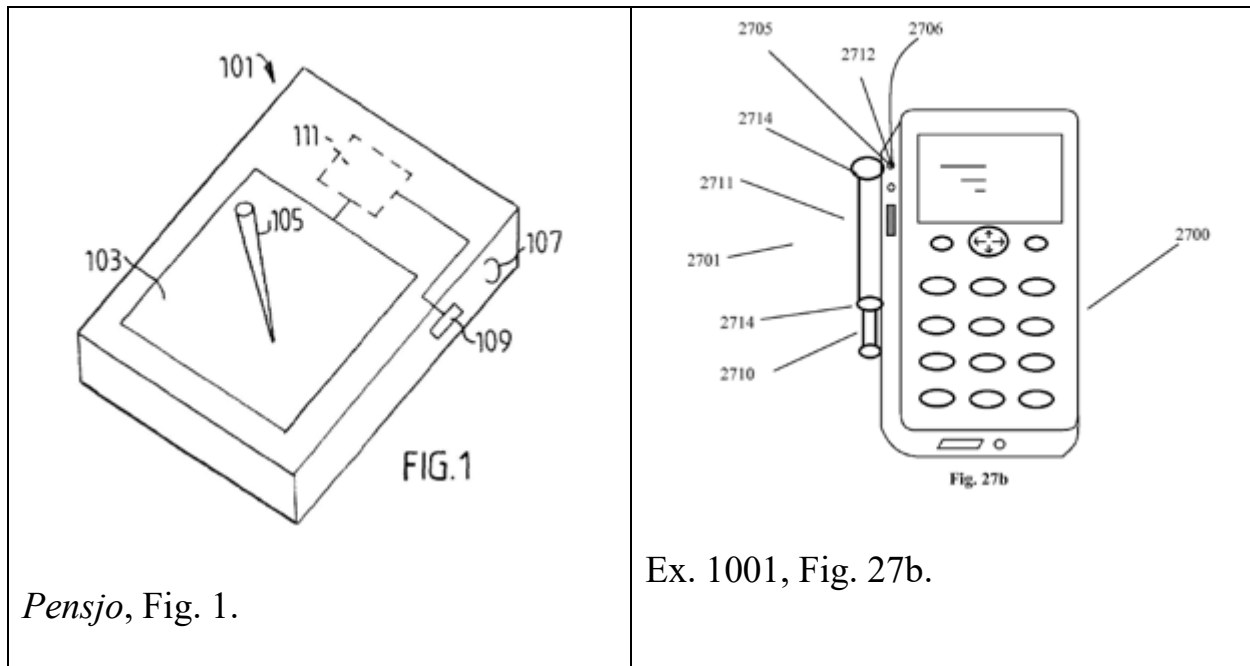
132. In my opinion, *Pensjo* discloses 1[c] or renders it obvious when combined with the knowledge of a POSITA. For example, *Pensjo*’s mobile phone is depicted as having a **width of the front surface** that is substantially shorter than the **length**. I annotate Figure 3 of *Pensjo* to show this below.



Pensjo, Fig. 3 (annotated); see also *Pensjo*, ¶[0007], Figs. 1, 4, 5.

133. In my opinion, the relative width and length dimensions of phones depicted in the drawings in *Pensjo* are consistent with the relative width and length dimensions of phones depicted in the drawings of the '144 patent. I provide below a table comparing exemplary drawings.

Drawings from <i>Pensjo</i>	Drawings from '144 Patent
 FIG. 4 <i>Pensjo</i>, Fig. 4; <i>see also id.</i>, Fig. 3.	 Fig. 68a Ex. 1001, Fig. 68a.
 FIG. 5 <i>Pensjo</i>, Fig. 5.	 Fig. 7 Ex. 1001, Fig. 7.



134. A POSITA would have understood *Pensjo* to disclose a width of the front surface that is substantially shorter than the length.

135. Even assuming that *Pensjo* did not already disclose a width of the front surface that is substantially shorter than the length, a POSITA would have found it obvious to modify *Pensjo* to have such, which would merely entail a simple and predictable alteration of the phone's dimensions based on the knowledge of a POSITA. These relative dimensions were well known at the time of the alleged invention. *See, e.g., Yamaguchi*, ¶¶[0009], [0015]; *Dutta*, ¶¶[0004], [0017], Figs. 2A-2B.

136. A POSITA would have found it obvious to use a width of the front surface that is substantially shorter than the length because this would improve

portability (allowing storage in a pocket) and the ability to comfortably hold the phone in a single hand and interface with the device. *See, e.g.*, Section XI.A.1; *Yamaguchi*, ¶¶[0009], [0015]; *Dutta*, ¶¶[0004], [0017], Figs. 2A-2B. Moreover, having a width of the front surface that is substantially shorter than the length is consistent with a form factor that is comfortable for holding the phone during telephone calls. For example, such dimensions permit placement of a microphone and speaker on ends of the device near where a user's ear and mouth would be located while still allowing the device to be comfortably held in a user's hand. This size ratio was observed across a variety of different handset types. A POSITA would have known of this size ratio, had a motivation to use it, and would have had a reasonable expectation of success in doing so.

e. 1[d]: “wherein the housing has a thin thickness; and”

137. In my opinion, *Pensjo* discloses 1[d] or renders it obvious when combined with the knowledge of a POSITA. As an initial matter, *Pensjo* alone discloses 1[d] in light of the applicant's admissions.

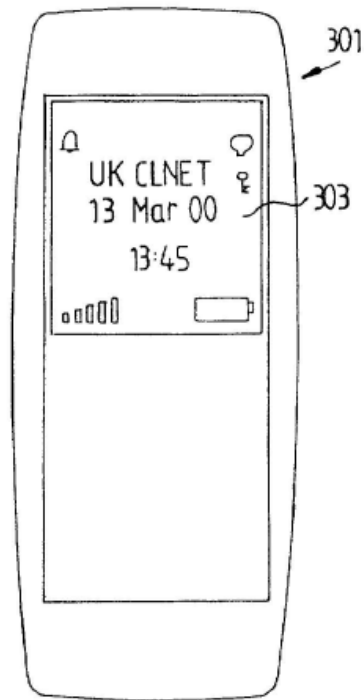


FIG. 3

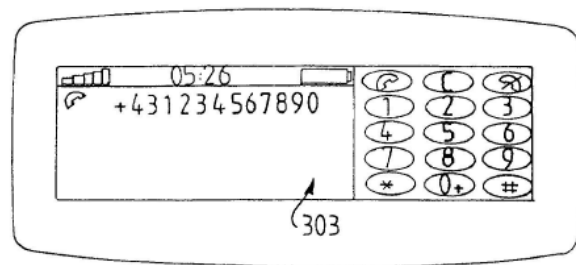


FIG. 4

Pensjo, Figs. 3-4.

138. I noted while reviewing the prosecution history that the applicant stated the following:

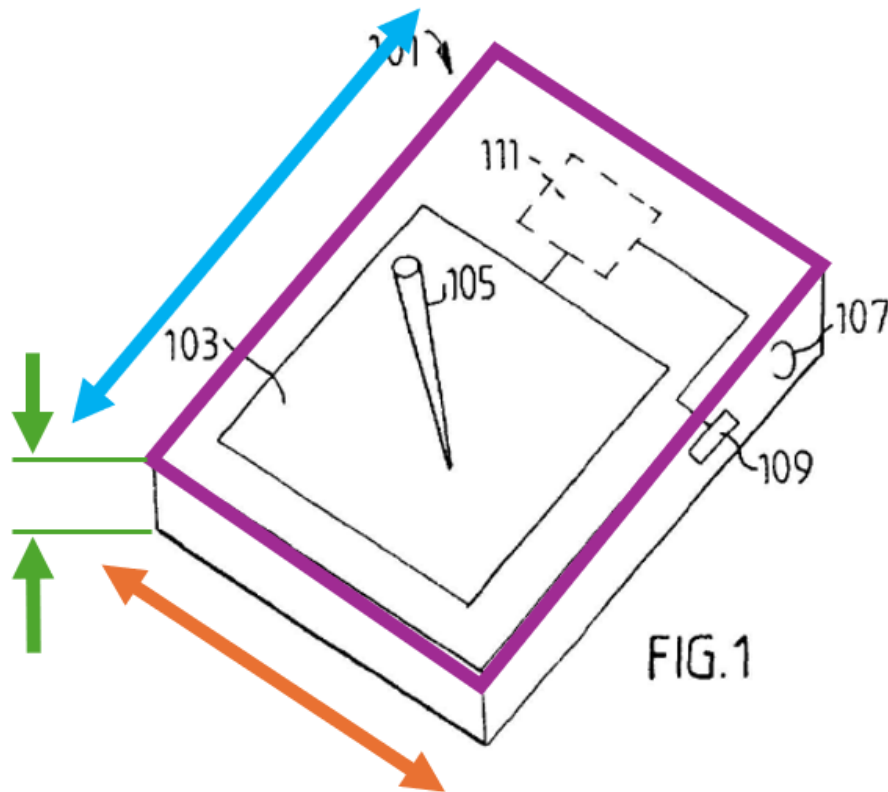
[T]he cited prior art, Kubes, describes a mobile phone device ... wherein the antenna of the device is significantly extended out from the housing of the device, making it difficult to use in different positions (e.g., landscape position) and very cumbersome for portability. In addition, Kubes describes that the device has a standard 12-key keypad (having the digit keys 0 to 9), which confirms that Kubes'[s] device was adapted/designed to be used in portrait position only, like any other mobile handset at the time of Kubes'[s] invention. Note that Kubes'[s] device is also very thick, which again confirms

that the device was designed for use with one hand in vertical/portrait position only.

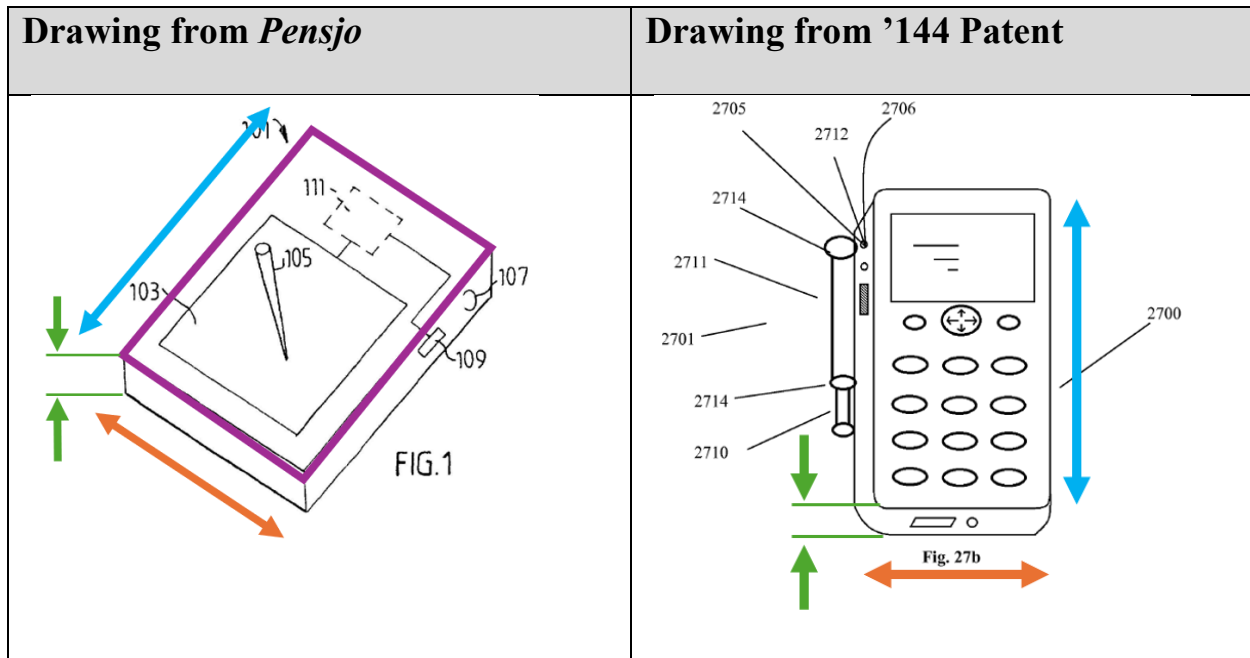
Ex. 1004, 362.

139. The applicant is thus stating that a “thick” device is one that is designed “for use with one hand in the vertical/portrait position only.” Ex. 1004, 362. *Pensjo*, by contrast, teaches a mobile phone device capable of use in both portrait and landscape orientations (*see Pensjo*, Figs. 3-4 (reproduced above)); *see also Pensjo*, ¶¶[0010]-[0011], consistent with the applicant’s apparent understanding of a “thin” device. Therefore, applicant’s own admissions confirm that *Pensjo* discloses 1[d].

140. *Pensjo* also depicts a phone housing with thin thickness in Figure 1, and a POSITA would have found it obvious to apply this teaching to the housing of Figure 3. I have annotated the thickness of Figure 1 below.



Pensjo, Fig. 1; see also *Pensjo*, ¶[0007], Figs. 3-5. In my opinion, the thin thickness disclosed in *Pensjo* is consistent with drawings of the '144 patent where a profile is shown. I provide below a table with annotated drawings as an example.



Pensjo, Fig. 1; Ex. 1001, Fig. 27b (annotated). A POSITA would have been motivated to use the thin thickness of Figure 1 with the Figure 3 housing for the reasons explained in Section XI.A.1. *Pensjo* further suggests a reason to make the device thin by noting its ability to fit within a “pocket” (*Pensjo*, ¶[0013]), which is consistent with its hand-held nature (*Pensjo*, ¶¶[0002], [0007], [0010]-[0011]). Accordingly, a POSITA would have understood *Pensjo* to disclose 1[d] or render it obvious.

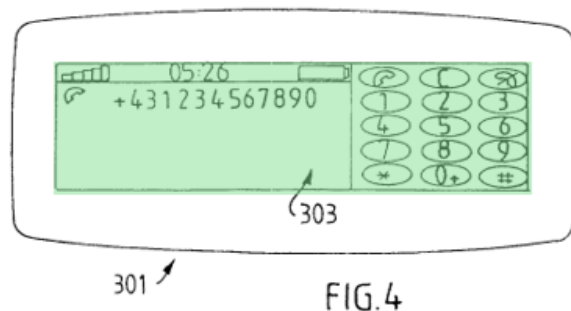
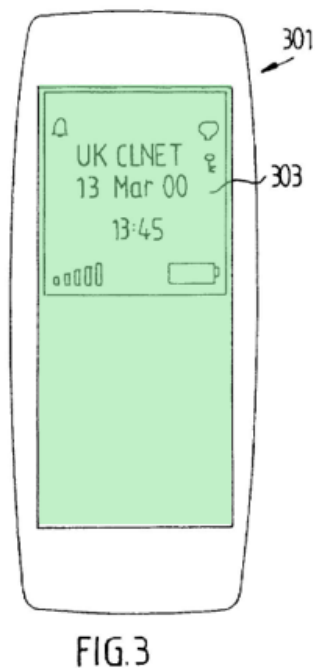
141. Even assuming that *Pensjo* did not already disclose a housing that has a thin thickness, modifying it to have such would merely entail a simple and predictable alteration of the phone's dimensions based on the knowledge of a POSITA. At the time of the alleged invention, it was well known to make housings thin. *See* Sections VI, XI.A.1. At that time, phone manufacturers were moving away from the thick brick-style phones that had been used in the past in favor of more portable thin designs. A POSITA would have found it obvious to use such dimensions because it would improve portability (allowing storage in a pocket) and the ability to comfortably hold the phone in a single hand and interface with the device. *See, e.g.,* Section XI.A.1; *Yamaguchi*, ¶¶[0009], [0015]; *Dutta*, ¶¶[0004], [0017], Figs. 2A-2B. A POSITA would have known of the desire to make the housing of the phone thin, had a motivation to do so, and would have had a reasonable expectation of success in achieving it.

- f. **1[e]: “a display unit integrated within the front surface of said housing wherein said display unit practically covers the entire front surface of said housing;”**

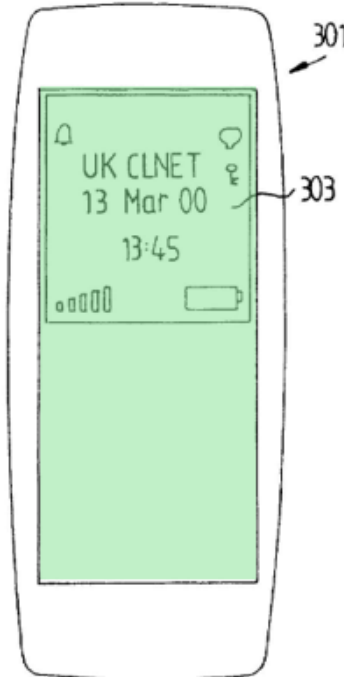
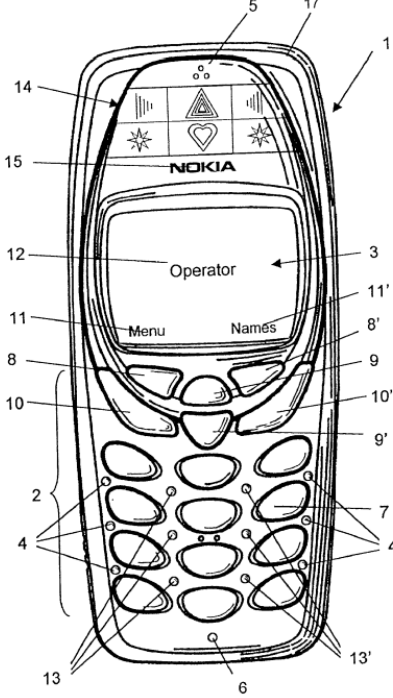
142. In my opinion, *Pensjo* discloses 1[e] or renders it obvious when combined with the knowledge of a POSITA. For example, *Pensjo* discloses a **touchscreen display** that is integrated into the front surface of the housing. *Pensjo*, ¶¶[0001], [0004], [0007]-[0008], [0010], [0012], Figs. 1, 3-5. A POSITA would

understand that the screen is integrated into the front surface to secure it in place and facilitate user interaction. *Pensjo* explains that “[i]t is an object of the present invention to provide a method and a device which facilitates the operation by a user of a portable touch screen device.” *Pensjo*, ¶[0004]. *Pensjo* discloses in Figures 3 and 4, respectively, a “front view of a mobile telephone comprising a touch screen being in a first mode” and “the touch screen being in a second mode.” *Pensjo*, ¶[0007]. The touchscreen, consistent with its standard understood use, is “used for input of commands and/or data.” *Pensjo*, ¶¶[0007]-[0008].

143. As shown in the figures, the touchscreen of *Pensjo* practically covers the entire front surface of said housing. I provide below annotated Figures 3 and 4 from *Pensjo*, which show this.

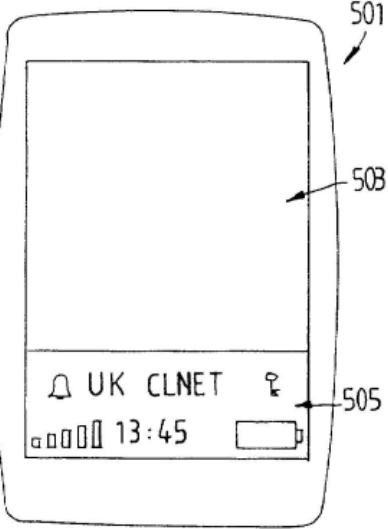
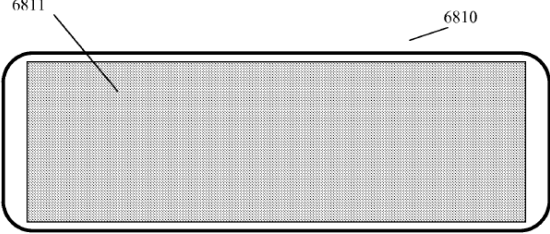


Pensjo, Figs. 3-4. By comparison, screens of other phones of the era, such as certain Nokia models (e.g., the Nokia 3310), had much smaller screens that only covered a small portion of the front surface.

Drawing from <i>Pensjo</i>	Nokia Phone Disclosed in <i>Messel</i>
 FIG. 3 See <i>Pensjo</i>, Fig. 3.	 Fig. 1a See <i>Messel</i>, Fig. 1a.

144. *Pensjo* also discloses Figure 5, where the screen covers an even greater amount of the front surface of the housing. Screens depicted in *Pensjo* have similar coverage to those depicted in certain embodiments of the '144 patent, with limited framing along the length of the screen and slightly more framing along the

short dimension. This limited framing would commonly provide space for a microphone and a speaker. By contrast, many earlier phones, such as the Nokia 3310 that I note above, included physical keyboards and other such features on the front surfaces that limited the practical area that the screen could cover.

Drawing from <i>Pensjo</i>	Drawing from '144 Patent
 FIG. 5 <i>Pensjo</i>, Fig. 5; see also <i>Pensjo</i>, Fig. 3.	 Fig. 68a Ex. 1001, Fig. 68a.

145. It would have been obvious to a POSITA at the time of the alleged invention to continue to expand the screen of *Pensjo* in Figure 3 consistent with Figure 5 to provide more viewing area for content and to increase the touchable area for data input (e.g., by selecting icons or typing on a virtual keyboard). A POSITA would have known of the desire to make the screen larger relative to the

housing, had a motivation to do so, and would have had a reasonable expectation of success in achieving it.

146. Even assuming that *Pensjo* did not already disclose a display unit that practically covers the entire front surface of said housing, modifying it to have such would merely entail a simple and predictable alteration of the phone's dimensions based on the knowledge of a POSITA. At the time of the alleged invention, it was well known to increase the screen size relative to the housing. *See, e.g., Gupta*, Figs. 2-4, ¶¶[0017] (disclosing a “full length, tactile response, touchscreen display”), [0019]-[0020] (teaching a “buttonless” device with a “large touchscreen display”); Sections XI.A.1, VI. A POSITA would have found it obvious to practically cover the entire front surface of the housing because it would provide more viewing area for content and would increase the touchable area for data input (e.g., by selecting icons or typing on a virtual keyboard). A POSITA would have known of the desire to make the screens larger relative to the housing, had a motivation to do so, and would have had a reasonable expectation of success in achieving it in light of the prior art.

147. A POSITA would have known that modifying the screen dimensions of those already disclosed in Figure 3 of *Pensjo*, for example, could entail trade-offs with battery life and component selection. But these were understood at time of the alleged invention as already confirmed by the embodiment of Figure 5.

Additionally, increasing the screen size would reduce the availability of space for physical buttons on the front surface, but as already shown, a POSITA would already be familiar with mobile devices where there are no buttons at all on the front surface. And since physical buttons incur cost and tend to decrease reliability, having a larger screen and fewer physical buttons would provide natural advantages.

g. 1[f]: “wherein said mobile phone device does not include a physical key on the front surface, and”

148. In my opinion, *Pensjo* discloses 1[f] and renders it obvious. For example, *Pensjo* discloses a mobile phone that does not include a physical key on the front surface. *Pensjo*, Figs. 3-4. *Pensjo* teaches that the touchscreen includes a virtual keyboard, thus removing the need for a physical key. *Pensjo*, ¶¶[0005], [0009], [0011], [0014]. I include Figures 3 and 4 below, neither of which depicts physical keys on the front surface of the device.

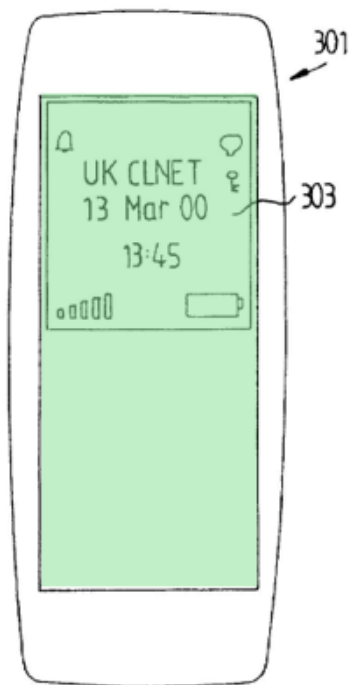


FIG. 3

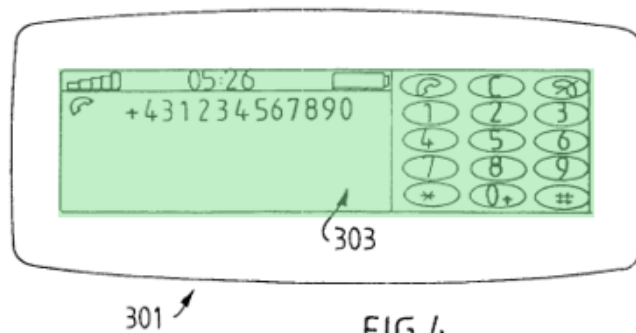


FIG. 4

Pensjo, Figs. 3-4; *see also Pensjo*, Figs. 1, 5. The design of Figures 3 and 4 shows the display with numeric virtual buttons displayed on the screen. *Pensjo* also teaches an alphabetic keyboard, noting that “removal of the pen from the pen holder may trigger the appearance of an alphabetic keyboard, which can be used for input of alphanumeric characters.” *Pensjo*, ¶[0005]. It would have been obvious to a POSITA that the design of Figures 3 and 4 would also use an alphabetic keyboard in addition to a numeric keyboard to permit entry of alphabetic text for text messages, emails, and other functions known in the art and disclosed in *Pensjo*. *Pensjo*, ¶[0014] (“On the other hand, if an e-mail application is used,

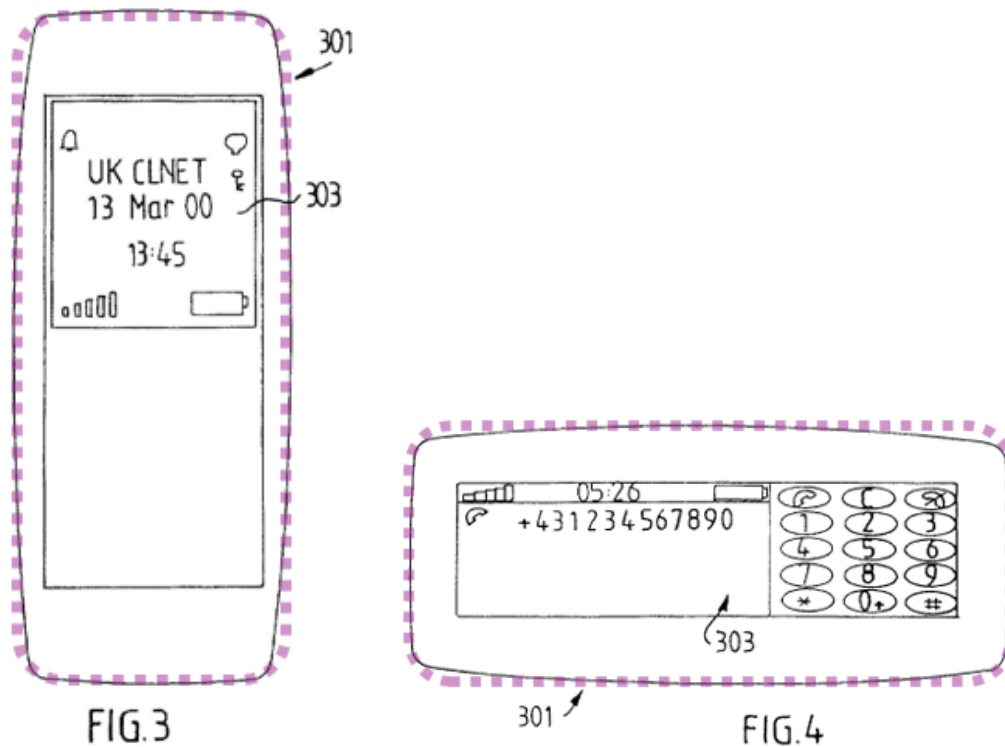
removal of the pen may instead trigger the appearance of an alphanumeric keyboard, which can be used for input of alphanumeric characters.”).

149. The desire to use buttonless designs and remove physical keys from the front surface was also well known and obvious to POSITAs. *See, e.g., Gupta*, Figs. 2-3, ¶¶[0019]-[0021] (“illustrates [a] buttonless communication device”); Section VI. A POSITA would have been motivated to remove buttons to provide a sleeker device profile, reduce mechanical components that may fail, reduce points of entry for water and debris, increase the screen size, and allow reconfiguring of buttons for data entry merely using software.

150. A POSITA would have a reasonable expectation of success in using a design without a physical key on the front surface in light of the prior art. Virtual keys could perform the same basic functions as physical keys and had been used in many mobile device applications at that time. They could be selected with a stylus/pen or with a finger touch. Their implementation was well understood, as shown by *Pensjo* itself and other contemporaneous publications, such as *Mouton* (see *Mouton*, Figs. 2-3) and *Benoit* (see *Benoit*, Fig. 1). Furthermore, as I described in the previous section, increasing the screen size and removing physical buttons are design characteristics that naturally support each other.

- h. 1[g] “wherein said components of the mobile phone are integrated within said housing such that none of said components is noticeably extended out from said housing.”**

151. In my opinion, *Pensjo* discloses 1[g] and renders it obvious. *Pensjo* shows that the components of the mobile phone are integrated within said housing such that none of the components noticeably extends out from the housing. By way of example, Figures 3 and 4 of *Pensjo* disclose a **housing** having no components extending therefrom. The housing has components integrated within it, including “an electronic control unit 111” that “operates to control circuits, not shown, for displaying various patterns, pictures[,] and/or information on the screen display 103.” *Pensjo*, ¶[0008]; see Section XI.A.1. Neither the electronic control unit nor the screen noticeably extends from the **housing**. *Pensjo* further teaches a buttonless design. See Section XI.A.2.g. I annotate Figures 3 and 4 of *Pensjo*, which depict this.



Pensjo, Figs. 3-4; see also *Pensjo*, ¶[0007], Figs. 1, 5. *Pensjo* also teaches a pen 105 that is inserted into the body of the device via pen holder 107, such that it does not noticeably extend from the housing. *Pensjo*, ¶[0008], Fig. 1. Moreover, locating the phone's components within the housing such that they do not noticeably extend would have been an obvious design choice to prevent the components from catching on pockets or other objects during phone use, and a POSITA would have had a reasonable expectation of success in achieving this design in light of the prior art.

152. The only components exposed on the front surface are not noticeably extended out because the touchscreen is depicted as flat. To the extent that *Pensjo*'s

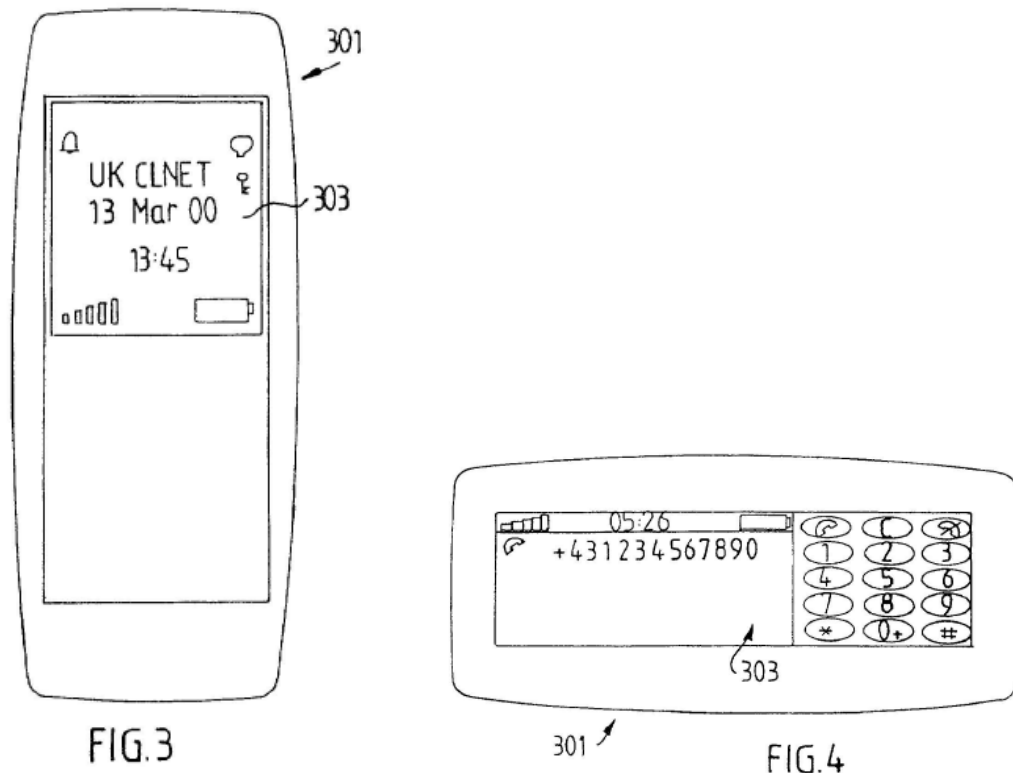
speaker and microphone were located on the front surface (as opposed to the top and bottom surface of the housing), it would have been obvious to have these features be recessed rather than extended out from the housing. And *Pensjo* does not disclose a camera, but even if it had one and that camera were positioned on the back surface of the phone, a POSITA would have found it obvious (and even expected) that it and other structures on the back surface would likewise be recessed within the housing. In fact, Keyless concedes a similar understanding in its contentions. Ex. 1034, 33 (Keyless's infringement contentions for the '144 patent argued that a camera protruding from the back of a phone "does not noticeably extend out from the housing" because the camera's surrounding "housing extends outward over and around the camera" such that "the cover for the camera, which is part of the housing, is recessed slightly within the housing")

153. A POSITA would have a reasonable expectation of success in having features such as a microphone, speaker, or other components recessed within the housing. A POSITA would have known how to locate such features relative to the housing to create a flush surface as this was a straightforward matter of ergonomics, housing design, and component selection.

154. As I explain above, it is thus my opinion that *Pensjo* renders obvious claim 1.

3. Claim 2: “The device of claim 1, wherein said practically rectangular shape has rounded corners.”

155. In my opinion, *Pensjo* discloses that its practically rectangular shape has rounded corners. By way of example, Figures 3 and 4 of *Pensjo* (shown below) depict the housing with rounded corners.



156. *Pensjo* also depicts the design of Figure 5 having rounded corners. See *Pensjo*, Fig. 5.

157. Rounding the corners of a mobile phone was also obvious in light of the knowledge of a POSITA. A POSITA would have appreciated that having rounded corners would be ergonomically more friendly—making the phone more

comfortable for a user to hold and making it easier to tilt the phone with one hand. Moreover, rounded corners were well known and widely used in the art. *See* Section VI (*see* figures in *Beatty*, *Gupta*, and *Mouton*); *Dutta*, Figs. 2A-2B (showing a rectangular-shaped mobile phone with rounded corners). Therefore, even assuming that *Pensjo* did not teach rounded corners, a POSITA would have been motivated to modify *Pensjo*'s phone housing to have rounded corners.

158. A POSITA would also have a reasonable expectation of success for doing so, because it would have been a negligible change to the housing's shape and external appearance, particularly because the phone already has streamlined side surfaces. And, it would have only negligible effect on the internal space of the housing, thus not affecting the components integrated therein. Finally, the rounded corners can be easily manufactured by slightly curving the corners of the mold for the housing.

4. Claim 7: "The device of claim 1, wherein the width of the device is approximately half of said length."

159. In my opinion, *Pensjo* discloses a width of the device that is approximately half of the length or renders it obvious when combined with the knowledge of a POSITA. For example, *Pensjo* discloses a mobile phone depicting a **width of the front surface** that is approximately half of the **length**. I annotate Figure 3 of *Pensjo* to show this below.

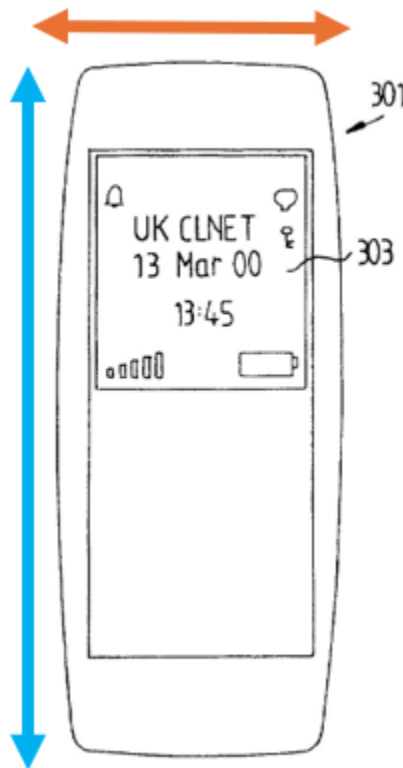
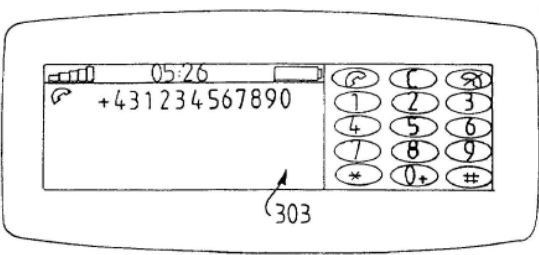
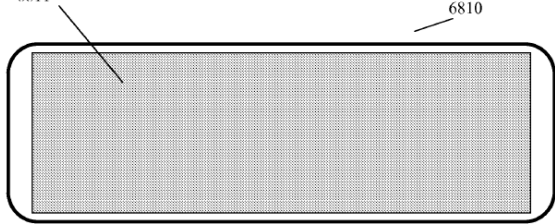
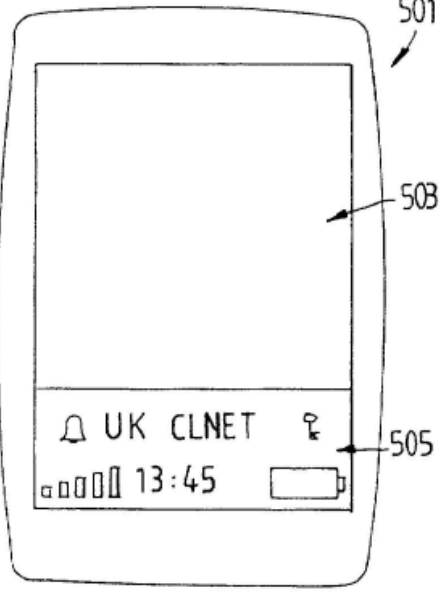
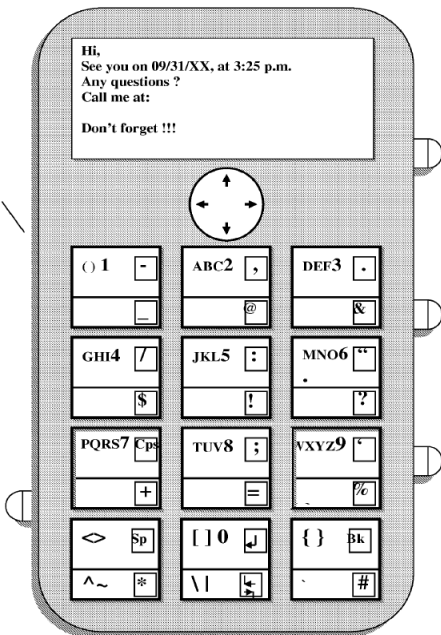
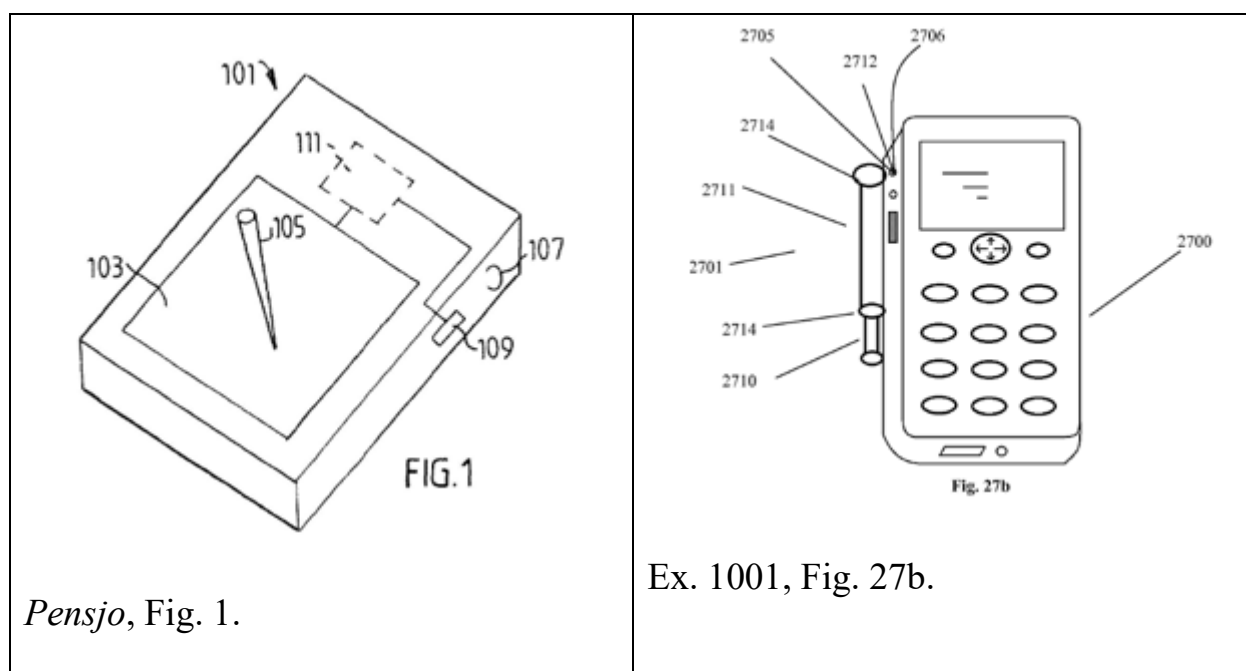


FIG. 3

Pensjo, Fig. 3; see also *Pensjo*, ¶[0007], Figs. 1, 4-5.

160. The relative width and length dimensions of phones depicted in the drawings of *Pensjo* are consistent with the relative width and length dimensions of phones depicted in the drawings of the '144 patent. I provide a table below of various different figures from each to show this comparison.

Drawings from <i>Pensjo</i>	Drawings from '144 Patent
 FIG. 4 <i>Pensjo</i>, Fig. 4; see also <i>Pensjo</i>, Fig. 3.	 Fig. 68a Ex. 1001, Fig. 68a.
 FIG. 5 <i>Pensjo</i>, Fig. 5.	 Fig. 7 Ex. 1001, Fig. 7.



161. A POSITA would have understood *Pensjo* to disclose a width of the device that is approximately half of the length.

162. Even assuming that *Pensjo* did not already disclose a width of the device that is approximately half of the length, a POSITA would have found it obvious to modify *Pensjo* to include these relative dimensions, which were well known to POSITAs at the time of the alleged invention. *See, e.g., Rydbeck*, 4:39-43 (teaching that “pocket[-]” or “palm”-sized mobile devices “[t]ypically[] ...are less than about 8-10 inches in length and less than about 4 inches in width”); *Yamaguchi*, ¶¶[0034], [0036] (teaching a mobile phone 100-150mm in length, 60-75mm in width, and 15-25mm in depth); Ex. 1045, 188 (disclosing that a rectangular, touchscreen mobile device has 117mm in length and 59mm in width,

i.e., based on my calculation, a 50.4% width/length ratio); *see also* Ex. 1045, 9, 123.

163. Modifying *Pensjo* to have the dimensions of claim 7 would merely entail a simple and predictable alteration of the phone's dimensions based on the knowledge of a POSITA. A POSITA would have found it obvious to use such dimensions because they were known in the art and doing so would improve portability (allowing storage in a pocket) and the ability to comfortably hold the phone in a single hand and interface with the device. *See, e.g.*, Section XI.A.1; *Rydbeck*, 4:39-43; *Yamaguchi*, ¶¶[0009], [0015]; *Dutta*, ¶¶[0004], [0017], Figs. 2A-2B. Moreover, having the width of the device be approximately half of the length is consistent with a form factor that is comfortable for holding the phone during telephone calls. For example, such dimensions permit placement of a microphone and speaker on ends of the device near where a user's ear and mouth would be located while still allowing the device to be comfortably held in a user's hand. A POSITA would have known of this size ratio, had a motivation to use it, and would have had a reasonable expectation of success in achieving it. *See, e.g.*, *Yamaguchi*, ¶¶[0005] ("In addition, by adjusting one's grip on the main device 1, an ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations."), [0015] ("the device body has dimensional ratios of length 100–150 mm, width 60–75 mm, and depth 15–25 mm;

thus, the invention has the effect of improved portability and ease of manipulation, such as when storing the device in a clothing pocket, holding the device with one hand, and manipulating the various buttons”), [0034] (“length 100–150 mm, width 60–75 mm, and depth 15–25 mm, such that a hand can hold a bottom-surface portion and both side-surface portions of the device body 1 when holding the device body 1”), [0036] (“the dimensional ratios of the device body are length 100–150 mm, width 60–75 mm, and depth 15–25 mm, thereby enabling a series of manipulations to be performed with one hand and enabling the device body to fit in a clothing pocket or the like”). Such dimensions were consistent with a large number of commercially available mobile phones that a POSITA would have been familiar with.

5. Claim 8: “The device of claim 1, wherein the thickness of the device is less than 20 percent of said width.”

164. In my opinion, *Pensjo* renders this feature obvious when combined with the knowledge of a POSITA. Although *Pensjo* does not depict the profile of the phone in Figure 3, a POSITA would have found it obvious to use a thickness of the device that is less than 20 percent of the width.

165. In particular, a POSITA would also have found it obvious to modify the shape and size of *Pensjo* based on the knowledge of a POSITA. It was well known in the art to make a phone housing thin. *See* Sections VI, XI.A.1.

Yamaguchi, for example, teaches a mobile phone that is approximately 75mm in width and as thin as 15mm in depth, thus having a thickness that is about 20 percent of said width. *Yamaguchi*, ¶¶[0034], [0036]. *Yamaguchi* notes “a demand for a size such that the device can fit in a clothing pocket or the like from the perspective of making the device ‘easily portable anywhere.’” *Yamaguchi*, ¶[0007]. In particular, *Yamaguchi* discloses:

Dimension A 17, dimension B 18, and dimension C 19 of the mobile-communication-information terminal device according to the fourth embodiment are length 100–150 mm, width 60–75 mm, and depth 15–25 mm, such that a hand can hold a bottom-surface portion and both side-surface portions of the device body 1 when holding the device body 1.

Yamaguchi, ¶[0034].

166. A POSITA would understand that *Yamaguchi* here is at minimum providing endpoints for the width and length—e.g., a device that is as large as 150mm x 75mm and as small as 100mm x 60mm. Within these bookends, a POSITA would have desired to use a device body that comfortably fits in the hand, and thus would be motivated to use a thinner profile when using a phone having larger length and width dimensions (to avoid making the phone too bulky for handling with one hand). Moreover, a POSITA would have known that the components could more easily fit within a thinner phone if the other dimensions

(length and width) were larger. Therefore, a POSITA would have contemplated in light of *Yamaguchi*'s disclosure a phone having the largest width and length dimensions matched with the smallest thickness, i.e., 150mm x 75mm x 15 mm. These dimensions together result in a phone having a thickness of the device that is 20 percent of the width.

167. Mobile devices disclosed after *Yamaguchi*—but still prior to the '144 patent's alleged priority date—continued to emphasize the importance of decreasing the thickness of mobile devices, thus creating a motivation to decrease below a thickness that is 20 percent of the width. *See, e.g., Dutta*, ¶[0002]; Sections VI, XI.A.1. A POSITA would be motivated to configure *Pensjo*'s mobile phone to be thin (including having a thickness that is less than 20 percent of the width) to improve the ease of use and improve portability of the phone. A POSITA would have a reasonable expectation of success in modifying the dimensions of Figure 3 to have a thin thickness (including having a thickness that is less than 20 percent of the width) given teachings of how to rearrange components already taught in references like *Yamaguchi* and *Dutta*. The '144 patent itself discloses no special arrangement of the internal components needed to achieve any of its claimed dimensions or size ratios, confirming that such was well within the level of skill in the art at the time. *See generally* Ex. 1001; *see* Sections VI, XI.A.1.

a. Claim 8 is also obvious when I use a priority date no earlier than January 22, 2017

168. I have also been asked to analyze claim 8 given the understanding that it is entitled to a priority date no earlier than January 22, 2017, and I find it also would have been obvious to a POSITA under this analysis. It was well known before January 22, 2017, that mobile phones with touchscreens and lacking physical keys on the front surface had less than a 20% thickness/width ratio. *E.g.*, Ex. 1046 (disclosing a 2015 touchscreen mobile device that is 72.2mm in width and 8.8mm in thickness, i.e., a 12.2% thickness/width ratio). For the same reasons that I explained above (e.g., to improve the ease of use and improve the portability of the phone), it would have been obvious to modify *Pensjo* to use a thickness of the device that is less than 20 percent of the width, and a POSITA would have had a reasonable expectation of success in doing so for the same reasons that I also explain above.

B. Ground 2A: Claims 3, 4, and 15-19 Are Obvious over *Pensjo* in View of *Benoit*

169. In my opinion, *Pensjo* in view of *Benoit* renders obvious claims 3, 4, and 15-19.

1. Rationale to Combine *Pensjo* and *Benoit*

170. In my opinion, it would have been obvious to a POSITA to modify *Pensjo* (as modified above) to include *Benoit*'s teaching of a series of icons

corresponding to a plurality of applications and swiping the screen to scroll through the series of icons. *Benoit* itself suggests reasons for the modification. Doing so would extend the control area “so as to distribute the touch points and prevent the premature wear of the touch screen over the defined areas.” *Benoit*, 2:9-16. According to *Benoit*, “the icons scroll along a virtual circle inscribed in a plane perpendicular to the plane of the screen” so that it is “possible to show each icon on the screen successively, with the other icons remaining in the background.” *Benoit*, 3:11-15. “In this case, it is possible to envisage that only the icon shown on the touch screen is capable of launching an application.” *Benoit*, 3:11-15.

171. Considering its teachings, *Benoit*’s configuration allows for effectively more screen real estate and allows for easier navigation. This would have improved a user’s ability to access a variety of different applications using a straightforward and intuitive scrolling technique known to POSITAs at the time of the invention. In my opinion, a POSITA would be motivated to configure *Pensjo*’s mobile phone to incorporate *Benoit*’s teaching of a series of icons corresponding to a plurality of applications and swiping the screen to scroll through the series of icons for at least these reasons.

172. *Pensjo*’s mobile phone has the same hardware environment because it comprises a touch sensitive display and a central processing unit. See, e.g., *Pensjo*, Abstract, ¶[0009]; *Benoit*, 1:1-10. Thus, it is ready for improvement according to

Benoit's known technology. Namely, a POSITA would merely need to update *Pensjo's* software to implement *Benoit's* teaching of swiping the screen to scroll through the series of application icons.

173. A POSITA would have considered modifying *Pensjo* with these teachings of *Benoit* to be an example of (A) combining prior-art elements (e.g., *Pensjo's* mobile phone teachings and *Benoit's* human-machine interface for a PDA) according to known methods to yield predictable results (e.g., configure *Pensjo's* software such that icons displayed on the touchscreen can be scrolled by a user by touching the touchscreen and moving in the intended scroll direction); (B) use of a known technique (e.g., *Benoit's* teaching of scrolling application icons) to improve similar devices (e.g., *Pensjo's* mobile phone capable of displaying a series of application icons) in the same way; (C) applying a known technique to a known device ready for improvement (e.g., *Pensjo's* mobile phone that has all the necessary hardware such as a large touchscreen and central processing unit) to yield predictable results (e.g., configure the central processing unit to enable *Benoit's* application navigation and launching method on the touchscreen); and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the mobile phone disclosed by *Pensjo* to allow users to scroll through the series of application icons displayed on *Pensjo's* touchscreen and launch an application by touching its icon.

174. A POSITA would have a reasonable expectation of success in modifying *Pensjo* to include the icon, swiping, and launching features of *Benoit*. As noted above, *Pensjo*'s mobile phone has the same hardware environment as *Benoit* because both include a touch sensitive display and a central processing unit. See, e.g., *Pensjo*, Abstract, ¶[0009]; *Benoit*, 1:1-10. Configuring *Pensjo* to include *Benoit*'s application icons and method of swiping/launching application icons would have been routine and conventional to a POSITA, as shown by the knowledge of a POSITA. *Benoit* itself evidences that the implementation is straightforward and would merely require software programming. Writing software code to implement functions taught by the prior art, e.g., *Benoit*'s application swiping and launching functions, was well within the skill of the art. This is consistent with the '144 patent itself, which discloses no special software programming or algorithms needed to achieve this claimed feature, confirming that such was well within the level of skill in the art at the time. See generally Ex. 1001.

2. Claim 3

- a. **3[a]: “[The] device of claim 1, wherein plurality of icons corresponding to plurality of applications are displayed on said display unit, and”**

175. *Pensjo* in light of *Benoit* renders claim 3 obvious, including 3[a]. *Pensjo* discloses a display touchscreen and a plurality of applications. *Pensjo*,

¶¶[0005], [0008], [0010]-[0011], [0014], Figs. 1, 3-5. *Pensjo* also discloses modifying the interface “depending on the applications used by the device,” including “a telephone application” and “an e-mail application.” *Pensjo*, ¶[0014]. *Pensjo*’s Figure 3 discloses a screen layout consistent with a resting or home screen, whereas Figure 4 discloses a telephone application in use, including a numeric keyboard and a telephone number typed onto the screen. I have included annotated versions of Figure 3 and Figure 4 below.

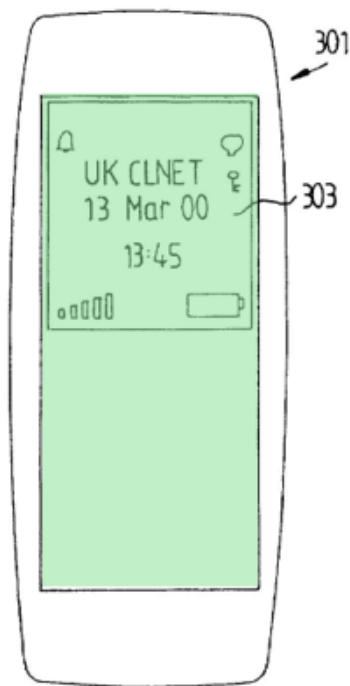


FIG. 3

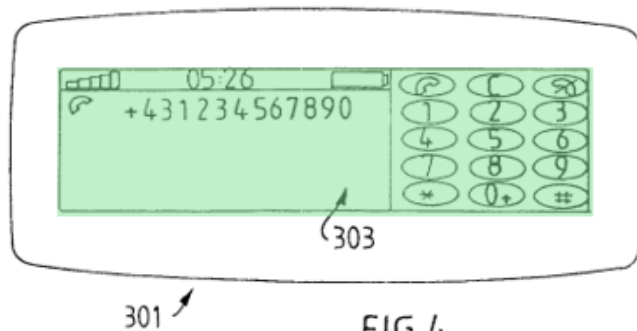


FIG. 4

Pensjo, Figs. 3-4; see also *Pensjo*, Figs. 1, 5. Accordingly, *Pensjo* contemplates a variety of applications.

176. The figures of *Pensjo* suggest, but do not themselves depict, a plurality of icons corresponding to a plurality of applications that are displayed on the display unit. This feature, however, was well known in the art. *Benoit* discloses “a series of icons on the screen” that permit “highlight[ing] the suitable icon for launching that program.” *Benoit*, Abstract. *Benoit* further teaches that it is desirable to display large icons corresponding to applications, making them “easily distinguishable.” *Benoit*, 2:17-18. I annotate Figure 3 of *Benoit* below.

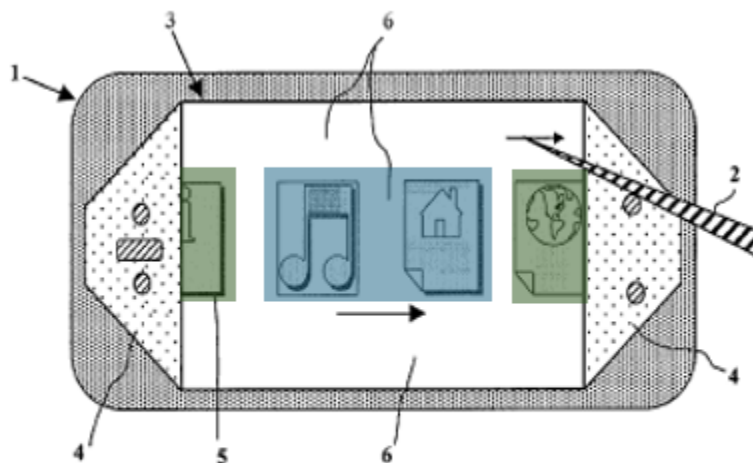


FIGURE 1

Benoit, Fig. 1, see also *Benoit*, Fig. 3.

177. It would have been obvious to a POSITA to modify *Pensjo* to include *Benoit*’s teaching of a plurality of icons corresponding to a plurality of applications that are displayed on the display unit. See Section XI.B.1. This would have allowed a user to identify and launch a desired program using the touchscreen. See

Section XI.B.1. A POSITA would have a reasonable expectation of success in incorporating this technology for the reasons that I note above and because it was well understood at the time of the invention.

- b. **3[b]: “wherein upon providing a sweeping action on said display unit, plurality of other icons corresponding to plurality of other applications are displayed on said display unit.”**

178. *Benoit* discloses 3[b]. *Benoit* that “[s]crolling is achieved by using the PDA’s stylus (or a finger) in the control area to indicate a move in the direction of the scroll.” *Benoit*, Abstract. *Benoit* depicts the **sweeping action**, for example, in Figure 1, which displays a plurality of other icons. I annotate the sweeping motion and the icons below in Figure 1 of *Benoit*.

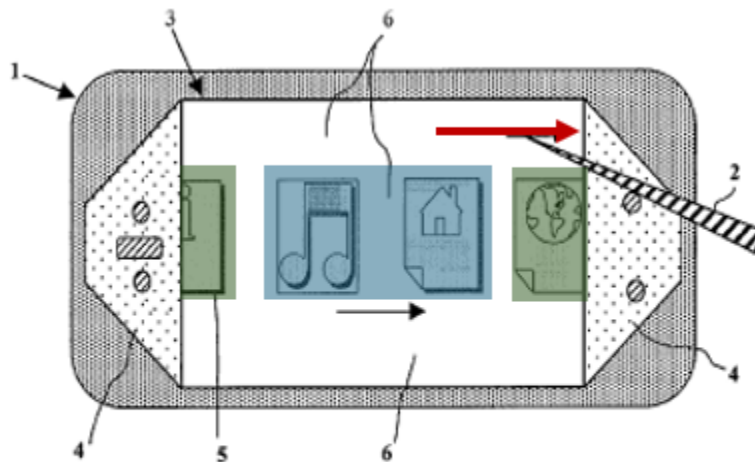


FIGURE 1

Benoit, Fig. 1; *see also Benoit*, Fig. 3. It would have been obvious to a POSITA to modify *Pensjo* to include this feature from *Benoit*. *See* Section XI.B.1. *Benoit* itself

suggests reasons for the modification to permit easier interfacing with the mobile device and prevent premature wear, amongst other reasons. *Benoit*, 2:9-16; see Section XI.B.1. A POSITA would have a reasonable expectation of success in modifying *Pensjo* to include the icon and swiping features of *Benoit* as they would involve a straightforward software modification already known in the art. See Section XI.B.1.

3. Claim 4: “The device of claim 3, wherein upon providing a predefine interaction with an icon, said corresponding application is opened on the display unit.”

179. *Pensjo* as modified by *Benoit* renders obvious opening a corresponding application on the display unit upon providing a predefined interaction with an icon. *Pensjo* does not expressly disclose how to launch the applications displayed on its touchscreen. However, *Benoit* discloses that “[t]o launch a program, one scrolls through a series of icons on the screen and then highlights the suitable icon for launching that program.” *Benoit*, Abstract. *Benoit* also teaches that “a brief touch on an icon launches an application linked to the icon.” *Benoit*, 3:5-8; see also *Benoit*, 5:9-16 (teaching that an icon may be “identified and selected,” and the icons are capable of “launching an application”). For the reasons discussed above in Section XI.B.1, it would have been obvious to a POSITA to configure *Pensjo* to implement *Benoit*’s teaching about launching an application by touching an icon corresponding to the application. In my opinion, a

POSITA would have been motivated to implement such application launching method because it is easy and simple for a user to operate, and is a natural way for opening an application after scrolling/swiping a series of application icons. The modification would have permitted a user to open an application in a predictable manner. *See, e.g., Benoit*, 3:5-8; Section XI.B.1. A POSITA would have a reasonable expectation of success in modifying *Pensjo* to include the opening feature of *Benoit* as it would involve a straightforward software modification already known in the art. *See* Section XI.B.1. *Pensjo* is capable of receiving a touch command and its central processing unit can be configured (e.g. by updating the software running in the central processing unit) to translate the touch command into a trigger signal for launching an application.

4. Independent Claim 15

a. 15[pre]: “A mobile phone device, comprising:”

180. *Pensjo* discloses 15[pre] for the same reasons as it discloses 1[pre].

b. 15[a]: “a body having a practically rectangular shape;”

181. *Pensjo* discloses 15[a] for the same reasons as it discloses 1[a].

c. 15[b]: “a processor; and”

182. *Pensjo* discloses a processor. *Pensjo* discusses hardware of the mobile phone, including its “control unit 111,” which a POSITA would understand to be a

processor, that “controls the screen display 103.” *Pensjo*, ¶[0009]. *Benoit* also discloses “a central processing unit.” *Benoit*, 3:22-24. Moreover, a processor would be obvious and inherent to run the display and other hardware in both *Pensjo* and *Benoit*.

- d. **15[c]: “a display unit, said display unit occupying practically the entire surface of the front surface of said device is integrated within said device;”**

183. *Pensjo* discloses and renders obvious 15[c] for the same reasons as it discloses 1[e].

- e. **15[d]: “wherein plurality of icons corresponding to a plurality of applications are displayed by said processor on said display unit; and”**

184. *Pensjo* in view of *Benoit* renders obvious 15[d] for the same reasons it renders obvious limitation 3[a]. It would have been obvious to a POSITA that a processor as disclosed in *Pensjo* performs the “display[ing]” because that was the standard way phones carried out processes at the time.

- f. **15[e]: “wherein upon identifying an input corresponding to a sweeping action provided on a touch sensitive surface of said device, said processor displays plurality of other icons corresponding to plurality of other applications on said display unit.”**

185. *Pensjo* discloses a “touch screen device.” *Pensjo*, ¶[0001]; see Sections IX.A, XI.A.2.f. The display has a touch sensitive surface.

186. Moreover, *Pensjo* and *Benoit* render obvious “wherein upon identifying an input corresponding to a sweeping action provided on a touch sensitive surface of said device, said processor displays [a] plurality of other icons corresponding to [a] plurality of other applications on said display unit,” for the reasons discussed in connection with 3[b] (and would have a reasonable expectation of success for the same reasons). It would have been obvious to a POSITA that a processor as disclosed in *Pensjo* performs the “display[ing] [a] plurality of other icons corresponding to [a] plurality of other applications on said display” because that was the standard way phones carried out processes at the time. Therefore, *Pensjo* in view of *Benoit* renders obvious 15[e].

187. As I explain above, it is thus my opinion that *Pensjo* in view of *Benoit* renders obvious claim 15.

5. Claim 16: “The device of claim 15, wherein said display unit is touch sensitive and wherein said sweeping action is provided on said display unit.”

188. As discussed in connection with 15[e], *Pensjo* discloses a touch sensitive display unit. Moreover, *Pensjo* and *Benoit* disclose that the sweeping action is performed on the surface of the touch sensitive display unit, for the reasons discussed in connected with 3[b]. Therefore, *Pensjo* in view of *Benoit* renders obvious claim 16.

6. **Claim 17: “The device of claim 15, wherein upon providing a predefined interaction with an icon, the corresponding application is opened on the screen.”**

189. Aside from its dependency on claim 15, claim 17 is substantially similar to claim 4, and thus is rendered obvious by *Pensjo* in view of *Benoit* for the reasons discussed for claims 15 and 4.

7. **Claim 18: “The device of claim 15, wherein said device does not include a physical key on the front surface of the device.”**

190. Aside from its dependency on claim 15, claim 18 is substantially similar to limitation 1[f]. And *Pensjo* discloses and renders obvious limitation 1[f]. Therefore, claim 18 is rendered obvious by *Pensjo* in view of *Benoit* for the reasons discussed for claim 15 and limitation 1[f].

8. **Claim 19: “The device of claim 15, wherein said components of the mobile phone are integrated within the body such that none of said components is noticeably extended out from said the body.”**

191. Aside from its dependency on claim 15, claim 19 is substantially similar to limitation 1[g]. And *Pensjo* discloses and renders obvious limitation 1[g]. Therefore, claim 19 is rendered obvious by *Pensjo* in view of *Benoit* for the reasons discussed for claim 15 and limitation 1[g].

C. Ground 3A: Claims 5, 9-11, and 14 Are Obvious over *Pensjo* in View of *Kobayashi* and *Jambhekar*

192. *Pensjo* in view of *Kobayashi* and *Jambhekar* renders obvious claims 5, 9-11, and 14.

1. Rationale to Combine *Pensjo* with *Kobayashi* and *Jambhekar*

193. It would have been obvious to a POSITA to modify *Pensjo* (as modified above) to include *Kobayashi*'s teaching of detecting the orientation of the mobile device and rotating the display accordingly (e.g., using side sensors and related hardware/software). *Pensjo* teaches an "alphabetic keyboard, which can be used for input of alphanumeric characters" (*Pensjo*, ¶[0005]), and *Pensjo* also discloses that its mobile device can be used in both portrait and landscape orientations (*see Pensjo*, Figs. 3-4, ¶¶[0010]-[0011]), but *Pensjo* does not depict the orientation of that keyboard nor any hardware to permit it to rotate based on the position of the device.

194. In light of teachings and suggestions in the prior art, a POSITA would have been motivated to use the detection and rotation technology of *Kobayashi* with the device of *Pensjo* to detect the orientation of the mobile device and rotate the display accordingly. *Kobayashi* teaches it is beneficial to have a display that can automatically adjust its orientation based on how it is held by a user. *Kobayashi*, 2:5-23, 18:2-19 ("In this way, the direction of display can be

automatically changed in accordance with the direction in which the user views the display.”). This would have been obvious and preferred rather than requiring the user to manually select a keyboard orientation or have a keyboard that only operates in, for example, landscape mode. These options are limited and cumbersome.

195. When orienting the screen for use in both portrait and landscape orientations, it would have been further obvious to utilize a virtual keyboard format that aligned with that same direction, as disclosed in *Jambhekar*. A POSITA would have been motivated to do this so that the user could input information on a virtual keyboard aligned with the screen direction (i.e., portrait-style keyboard for a portrait orientation and landscape-style keyboard for a landscape orientation). This would be beneficial because the keyboard would be aligned with the screen, allowing for a more natural and intuitive typing experience for the user. Making the change to *Pensjo* would merely entail applying known and predictable modifications to the hardware and software of *Pensjo*. In particular, in my experience, it was known at that time to have mobile devices that provide information about what the orientation of the device was and when it changed. The screen dimensions for a particular orientation were also provided to the programmer. Standard layout techniques were also well known to set the position and size of user interface elements, including virtual keyboards based on that

orientation and screen dimensions. Given all this, it would have been straightforward for a POSITA to implement the rotation and virtual keyboard teachings of *Jambhekar*.

196. A POSITA would also have found it obvious to modify *Pensjo/Kobayashi* with the virtual keyboard teachings of *Jambhekar* because all three references relate to mobile phones that provide applications (e.g., texting, e-mail, etc.) beyond the traditional phone-dialing functions. *Jambhekar* recognizes the tension between a traditional mobile phone's "small display and ... fixed data input keypad," and that a "wireless data service such as e-mail requires extensive display of received messages as well as extensive user data input from either a pen or a keyboard" (*Jambhekar*, 1:31-36), and sought to provide a phone user interface for "more convenient operation by the user" to navigate the various applications (*Jambhekar*, 1:45-49). A POSITA therefore would have been prompted by *Jambhekar*'s teaching to fuse a versatile virtual keyboard into *Pensjo*'s portrait and landscape display modes to allow a seamless user experience in viewing and inputting information in these modes.

197. A POSITA would have considered modifying the mobile phone of *Pensjo* with the detection and rotation teachings of *Kobayashi* and the virtual keyboard teachings of *Jambhekar* to be an example of (A) combining prior-art elements (e.g., modified *Pensjo* device) according to known methods (e.g., coding

detection and rotation as in *Kobayashi* using known sensors and displaying a virtual keyboard aligned with the screen direction as in *Jambhekar*) to yield predictable results; (B) use of a known technique (e.g., configuring a device with the detection and rotation teachings and hardware taught in *Kobayashi* and the orientation-aligned virtual keyboards of *Jambhekar*) to improve similar devices (e.g., modified *Pensjo* device) in the same way; (C) applying a known technique (e.g., configure a mobile device to detect rotation as in *Kobayashi* and to incorporate an orientation-aligned virtual keyboard as in *Jambhekar*) to a known device (e.g., modified *Pensjo* device) ready for improvement to yield predictable results; and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the mobile phone disclosed by *Pensjo*.

198. A POSITA would have a reasonable expectation of success in modifying the mobile phone of *Pensjo* with the detection and rotation teachings of *Kobayashi* and the virtual keyboards of *Jambhekar* given that it would involve straightforward application of software with known hardware (e.g., the touch sensors).

199. In my experience, it was well understood how to use sensors for detecting rotation in a mobile device (including both pressure sensors and gravity-based sensors) because this had already been achieved, and operating systems already did (or could have) provided that information to the programmer of the

device. Pressure sensors could be located on lateral sides of the device near a flat middle portion of the device. As taught by *Kobayashi*, it was already known prior to the date of the alleged invention to have pressure sensors fit within a mobile handset. *See Kobayashi*, 2:5-23, 18:2-19, Figs. 8a, 8b. In my experience, such sensors could be quite small (e.g., 10 mm or less) and thus comfortably fit within a thin phone. *See Ex. 1052*.

200. I note that a similar modification using gravity-based sensors instead of pressure sensors also would have been obvious in light of *Pensjo*, *Kobayashi*, *Jambhekar* for the same reasons that I note above. *Kobayashi* itself teaches a “sensor for sensing a direction of gravity,” *Kobayashi*, 1:19-25, and such was well known and could have been successfully implemented for purposes of detecting rotation. Gravity sensors would have been internal to the housing and would not have materially changed the form factor of the device.

201. And the software changes were also well within the level of skill in the art as the *Pensjo* already discloses a virtual keypad for numbers and contemplates an alphabetic keyboard, so adding virtual alphanumeric/QWERTY keyboards to align with the orientation of the device would be a relatively minor and straightforward extension to the existing input software. Writing software code to implement functions taught by the prior art, e.g., *Jambhekar*’s virtual keyboards for text input, was well within the skill of the

art. Further, *Pensjo* already provided the essential hardware environment (touchscreen, central processing unit, etc.) for implementing the modification.

2. Claim 5: “The device of claim 1, wherein said device is adapted to display text entered through a keyboard in landscape direction and in portrait direction on said display unit when the device is used, respectively, in landscape position and in portrait position.”

202. *Pensjo* in light of *Kobayashi* and *Jambhekar* renders this claim obvious. *Pensjo* teaches an “alphabetic keyboard” and using the device in both portrait and landscape orientations. *Pensjo*, ¶¶[0005], [0010]-[0011], Figs. 3-4. *Pensjo*’s keyboard is virtual because it appears on the touchscreen and allows input via touch instead of physical keys. *Pensjo*, ¶¶[0005], [0009], Fig. 4. However, *Pensjo* does not depict the orientation of its alphabetic keyboard nor rotating automatically based on the position of the device. As discussed in Section XI.C.1, a POSITA would have found it obvious to modify *Pensjo* to use the detection and rotation technology of *Kobayashi* (e.g., side sensors and related hardware/software) to detect the orientation of the mobile device and rotate the display automatically. See *Kobayashi*, 2:5-23, 18:2-19. And a POSITA would have found it obvious to further modify *Pensjo* to use the virtual landscape and portrait alphabetic keyboards disclosed in *Jambhekar* so the user could input information on a virtual keyboard aligned with the screen direction (i.e., portrait-style keyboard for a portrait orientation and landscape-style keyboard for a landscape orientation).

See Section XI.C.1. A POSITA would have a reasonable expectation of success in modifying the mobile phone of *Pensjo* with the detection and rotation teachings of *Kobayashi* and the virtual keyboards of *Jambhekar*. See Section XI.C.1. The result would have met the limitations of claim 5.

3. Independent Claim 9

a. 9[pre]: “A mobile phone, comprising:”

203. *Pensjo* discloses 9[pre] for the same reasons as it discloses 1[pre].

b. 9[a]: “a body having a practically rectangular shape, said body having a front surface, a back surface and four side surfaces,”

204. Limitation 9[a] is substantially similar to 1[a], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[a]. In my opinion, nothing about the modification with *Kobayashi* and *Jambhekar* would have changed the practically rectangular body. For example, *Kobayashi* discloses sensors 33 and 34 as sitting flush against the housing (*Kobayashi*, 17:27-18:16, Figs. 8a-8b, 9a-9b), thus permitting *Pensjo* to retain a configuration that remains practically rectangular shaped. For example, the housing could allow for a small flat portion where each pressure sensor is located as I note above. As an alternative, gravity sensors would have been internal to the housing.

- c. **9[b]: “wherein the length of the front surface of the mobile phone corresponds to the distance between the ear and the mouth of a user and”**

205. Limitation 9[b] is substantially similar to 1[b], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[b]. Nothing about the modification with *Kobayashi* and *Jambhekar* would have changed the length of the front surface.

- d. **9[c]: “wherein the width of the front surface of the mobile phone is significantly shorter than the length, and”**

206. Limitation 9[c] is substantially similar to 1[c], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[c]. Nothing about the modification with *Kobayashi* or *Jambhekar* would have changed the length of the front surface or the width of the mobile phone.

- e. **9[d]: “wherein said body has a thin thickness;”**

207. Limitation 9[d] is substantially similar to 1[d], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[d]. Nothing about the modification with *Kobayashi* and *Jambhekar* would have changed the mobile phone from having a thin thickness. It was already well known at that time to make pressure sensors of 10 mm or less. *See*, Ex. 1052.

f. 9[e]: “a touch sensitive display unit;”

208. *Pensjo* discloses 9[e]. *Pensjo* discloses “a portable touch screen device, such as a PDA (Personal Digital Assistant) or a smart phone.” *Pensjo*, ¶[0001]. *Pensjo* discloses “an exemplary mobile telephone 301 comprising a touch screen display 303.” *Pensjo*, ¶[0010]. The mobile phone has a large “touch screen display” that displays a user interface in both “landscape” and “portrait” configurations. *Pensjo*, ¶¶[0010]-[0011]; *see also Pensjo*, Figs. 3-4. *Kobayashi* and *Jambhekar* likewise disclose this feature. *See* Sections IX.C-IX.D.

g. 9[f]: “a virtual keyboard to enter text; and”

209. Limitation 9[f] is taught or rendered obvious by *Pensjo* in view of *Kobayashi* and *Jambhekar* for the same reasons discussed in connection with claim 5. A POSITA would have found it obvious to further modify *Pensjo/Kobayashi* to use the virtual landscape and portrait alphabetic keyboards disclosed in *Jambhekar* so the user could input information on a virtual keyboard aligned with the screen direction (i.e., portrait-style keyboard for a portrait orientation and landscape-style keyboard for a landscape orientation). *See* Section XI.C.1.

h. 9[g]: “a microphone and a speaker;”

210. *Pensjo* discloses 9[g] and renders it obvious. A POSITA would have understood that *Pensjo*’s device would have included a microphone and a speaker

because it is intended for use as a “smart phone” or a “mobile telephone.” *Pensjo*, ¶¶[0001], [0006]-[0007], [0010]-[0011], Figs. 1, 3-5. A POSITA would have understood that *Pensjo*’s smart phone or mobile telephone at the time of the invention included a microphone and speaker for conducting phone conversations.

211. A microphone and speaker would also have been obvious in light of the knowledge of a POSITA. Microphones and speakers were commonplace features in mobile phones to allow telephone conversations. *Yamaguchi*, ¶[0005] (discloses that “an ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations”); *Dutta*, ¶[0018] (“a microphone 215 is located at one end of the display, and a speaker 220 is located at the other end of the display”), Figs. 2A-2B. A POSITA would have known of using a microphone and speaker with a mobile phone, had a motivation to use them, and would have had a reasonable expectation of success in implementing them in light of the prior art.

i. 9[h]: “wherein said display unit, practically occupying the entire front surface of the mobile phone, is integrated within said mobile phone and”

212. Limitation 9[h] is substantially similar to 1[e], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[e]. Nothing about the modification with *Kobayashi* and *Jambhekar* would have changed the mobile phone from having a display unit that is practically occupying

the entire front surface of the mobile phone and is integrated within the mobile phone.

- j. **9[i]: “wherein said front surface of the mobile phone does not have a physical button and wherein said mobile phone does not have a physical keyboard to enter text, and”**

213. *Pensjo* discloses or renders obvious “wherein said front surface of the mobile phone does not have a physical button” for the same reasons discussed in connection with 1[f]. *Pensjo* further discloses that the mobile phone does not have a physical keyboard to enter text. *Pensjo* teaches that the touchscreen includes a virtual keyboard, thus removing the need for a physical keyboard. *Pensjo*, ¶¶[0005], [0009], [0011], [0014]. I include annotated versions of Figures 3 and 4 below.

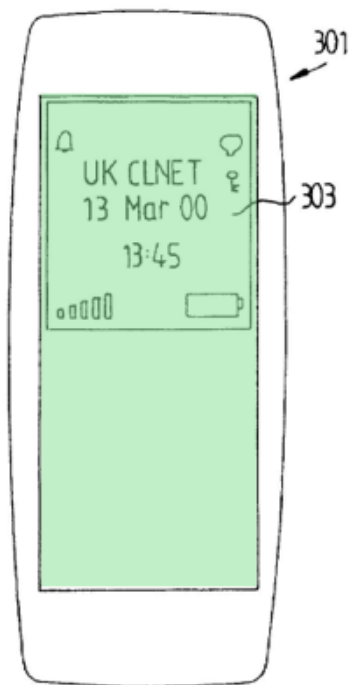


FIG. 3

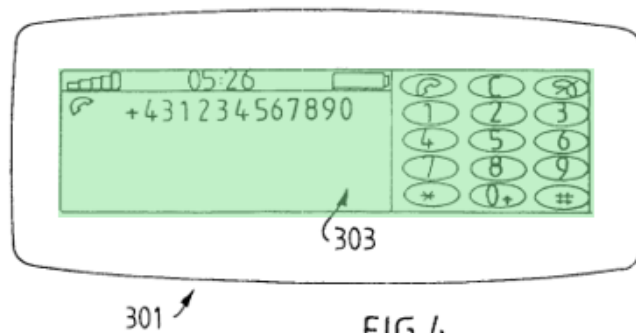


FIG. 4

Pensjo, Figs. 3-4; *see also Pensjo*, Figs. 1, 5. The design of Figures 3 and 4 shows the display with numeric virtual buttons displayed on the screen. *Pensjo* also teaches an alphabetic keyboard, noting that “removal of the pen from the pen holder may trigger the appearance of an alphabetic keyboard, which can be used for input of alphanumeric characters.” *Pensjo*, ¶[0005]. *Pensjo*’s disclosure of virtual keyboard’s and failure to disclose any physical keyboard would have indicated to a POSITA that *Pensjo* is disclosing a mobile phone that does not have a physical keyboard to enter text. Moreover, it would have been obvious to modify *Pensjo* in view of *Kobayashi* and *Jambhekar* to have a virtual keyboard and buttons for the same reasons discussed in connection with claim 5, further

obviating the need for a physical keyboard and physical buttons. A POSITA would have had a reasonable expectation of success in implementing this modification in light of the prior art.

- k. **9[j]: “wherein said display unit is adapted to display text, entered through the virtual keyboard, in landscape direction and in portrait direction when the mobile phone is used, respectively, in landscape position and in portrait position.”**

214. Limitation 9[j] is substantially similar to claim 5, and is obvious in light of *Pensjo/Kobayashi/Jambhekar* for the same reasons discussed in connection with claim 5.

215. As I explain above, it is thus my opinion that *Pensjo* in view of *Kobayashi* and *Jambhekar* renders obvious claim 9.

- 4. **Claim 10: “The mobile phone of claim 9, wherein the distance between said microphone and said speaker corresponds to the distance between the ear and the mouth of a user.”**

216. Claim 10 would have been obvious in light of *Pensjo* and the knowledge of a POSITA. The analysis is similar to that of 1[b]. *Pensjo* discloses a mobile phone device. *Pensjo*, ¶¶[0007], [0010]-[0011], Figs. 1, 3-5. Users at the time of the invention commonly used phone devices to conduct a call, and mobile telephones were known to have a microphone positioned near the mouth and the speaker positioned near the ear of a user, allowing the user to both speak and listen

during a call. *See, e.g., Yamaguchi*, ¶[0005]; *Dutta*, ¶[0003], Figs. 2A-2B. As such, a POSITA would have understood *Pensjo* to disclose—or would have found it obvious to modify *Pensjo* based on the knowledge of a POSITA to include—a distance between the microphone and the speaker corresponding to the distance between the ear and the mouth of a user. This modification would merely entail a simple and predictable alteration of the phone’s dimensions based on the knowledge of a POSITA. A POSITA would have known of this positioning of the microphone and speaker, had a motivation to use it, and would have had a reasonable expectation of success in achieving it in light of the prior art. *See* Section XI.A.2.c.

5. Claim 11: “The mobile phone of claim 9, wherein said practically rectangular shape has rounded corners.”

217. Claim 11 is substantially similar to claim 2, and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with claim 2. Nothing about the modification with *Kobayashi* and *Jambhekar* would have changed the practically rectangular shape having rounded corners.

6. Claim 14: “The mobile phone of claim 9, wherein said components of the mobile phone are integrated within the body such that none of said components is significantly extended out from the body.”

218. Claim 14 is substantially similar to 1[g], and is taught or rendered obvious by *Pensjo* for the same reasons discussed in connection with 1[g]. Nothing

about the modification with *Kobayashi* and *Jambhekar* would have changed the components of the mobile phone being integrated within the body such that none of said components is significantly extended out from the body.

D. Ground 4A: Claims 12 and 13 Are Obvious over *Pensjo* in View of *Kobayashi*, *Jambhekar*, and *Benoit*

219. In my opinion, *Pensjo* in view of *Kobayashi*, *Jambhekar*, and *Benoit* renders obvious claims 12 and 13.

1. Rationale to Combine *Pensjo*/*Kobayashi*/*Jambhekar* and *Benoit*

220. The rationale to modify the modified device of *Pensjo*, *Kobayashi*, and *Jambhekar* further with the teachings of *Benoit* is substantially the same as the rationale to modify *Pensjo* with *Benoit* explained above in Section XI.B.1. It would have been obvious to a POSITA to modify the *Pensjo*/*Kobayashi*/*Jambhekar* device to include *Benoit*'s teaching of a series of icons corresponding to a plurality of applications and swiping the screen to scroll through the series of icons. *Benoit* itself suggests reasons for the modification. *Benoit*, 2:9-24, 3:9-21. *Benoit*'s configuration allows for more screen real estate, improves wear of the screen, and allows for easier navigation. A POSITA would have known of using icons along with the swiping and launching features of *Benoit*, had a motivation to use them, and would have had a reasonable expectation of success in implementing them in light of the prior art.

2. Claim 12

- a. 12[a]: “The mobile phone of claim 9, wherein plurality of icons corresponding to plurality of applications are displayed on said display unit, and”**

221. Limitation 12[a] is substantially similar to 3[a], and is taught or rendered obvious by *Pensjo/Benoit* for the same reasons discussed in connection with 3[a]. Moreover, as discussed in Section XI.D.1, the combination uses *Benoit*’s teachings to improve the *Pensjo/Kobayashi/Jambhekar* mobile phone in the same way taught by *Benoit* and would have been obvious for the same reasons. Thus, *Pensjo* in view of *Kobayashi*, *Jambhekar*, and *Benoit* renders obvious 12[a].

- b. 12[b]: “wherein upon providing a sweeping action on said display unit, plurality of other icons corresponding to plurality of other applications are displayed on said display unit.”**

222. Limitation 12[b] is substantially similar to 3[b], and is taught or rendered obvious by *Pensjo/Benoit* for the same reasons discussed in connection with 3[b]. Moreover, as discussed in Section XI.D.1, the combination uses *Benoit*’s teachings to improve the *Pensjo/Kobayashi/Jambhekar* mobile phone in the same way taught by *Benoit* and would have been obvious for the same reasons. Thus, *Pensjo* in view of *Kobayashi*, *Jambhekar*, and *Benoit* renders obvious claim 12.

3. Claim 13: “The mobile phone of claim 12, wherein upon providing a predefine interaction with an icon, the corresponding application is opened on the screen.”

223. Claim 13 is substantially similar to claim 4, and is taught or rendered obvious by *Pensjo/Benoit* for the same reasons discussed in connection with claim 4. Moreover, as discussed in Section XI.D.1, the combination uses *Benoit*’s teachings to improve the *Pensjo/Kobayashi/Jambhekar* mobile phone in the same way taught by *Benoit* and would have been obvious for the same reasons. Thus, *Pensjo* in view of *Kobayashi*, *Jambhekar*, and *Benoit* renders obvious claim 13.

E. Ground 5A: Claim 20 Is Obvious over *Pensjo* in View of *Benoit*, *Kobayashi*, and *Jambhekar*

224. In my opinion, *Pensjo* in view of *Benoit*, *Kobayashi*, and *Jambhekar* renders obvious claim 20.

1. Rationale to Combine *Pensjo/Benoit* with *Kobayashi* and *Jambhekar*

225. The rationale to modify the modified device of *Pensjo/Benoit* further with the teachings of *Kobayashi* and *Jambhekar* is substantially the same as the rationale to modify *Pensjo* explained above in Section XI.C.1. It would have been obvious to a POSITA to modify *Pensjo/Benoit* to use the detection and rotation technology of *Kobayashi* so that *Pensjo/Benoit* could detect the orientation of the mobile device and rotate the display accordingly. *Kobayashi* teaches that it is beneficial to have a display that can automatically adjust to the orientation it is

being held in by the user. *Kobayashi*, 2:5-23, 18:2-19. When orienting the screen for use in both portrait and landscape orientations, it would have been further obvious to utilize a virtual keyboard format that aligned with that same direction, as disclosed in *Jambhekar*. In this way, the user could input information on a virtual keyboard aligned with the screen direction (i.e., portrait-style keyboard for a portrait orientation and a landscape-style keyboard for a landscape orientation). The keyboard would be aligned with the screen allowing for a more natural and intuitive typing experience for the user.

226. A POSITA would have a reasonable expectation of success in modifying the mobile phone of *Pensjo* with the sensors of *Kobayashi* and the virtual keyboards of *Jambhekar* given that it would involve straightforward application of software with known hardware (e.g., the touch sensors or gravity sensors).

2. **Claim 20: “The device of claim 15, wherein said display unit is adapted to display text entered through a keyboard in landscape direction and in portrait direction on said display unit when the device is used, respectively, in landscape position and in portrait position.”**

227. Aside from its dependency on claim 15, claim 20 is substantially similar to claim 5, and thus is obvious over *Pensjo* in view of *Benoit*, *Kobayashi*, and *Jambhekar* for the reasons discussed for claims 15 and 5.

XII. THE PRIOR ART FOR GROUNDS 1B-4B

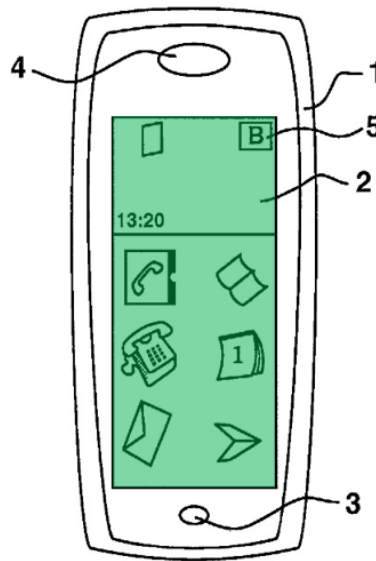
228. In forming my opinions, I found the following prior art relevant when considering whether the claims of the '144 patent would have been obvious to a POSITA.

Ex. 1022	<i>Bast</i> , European Patent Application Publication No. EP1336949A1, filed on February 18, 2003, and published on August 20, 2003.
Ex. 1023	<i>Wedel</i> , International Patent Application Publication No. WO 2004/070871, filed on February 4, 2004, and published on August 19, 2004.
Ex. 1025	<i>Jambhekar</i> , U.S. Patent No. 5,848,356 to Jambhekar, filed on October 2, 1995, and issued on December 8, 1998.
Ex. 1026	<i>Benoit</i> , French Patent Application Publication No. 2830093, filed on September 25, 2001, and published on March 28, 2003.

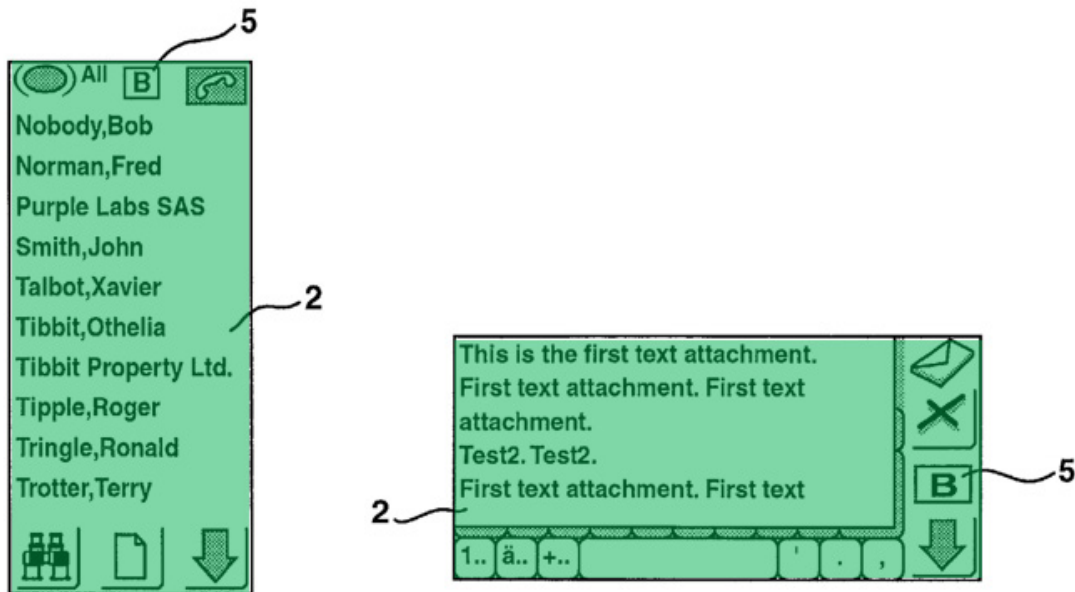
A. *Bast* (European Patent Application Publication No. 1336949)

229. European Patent Application Publication No. 1336949 (“*Bast*”; Ex. 1022), published August 20, 2003, from a European application filed February 18, 2003. I have been asked to assume that *Bast* is prior art to the '144 patent.

230. *Bast* discloses a mobile phone having a large **touchscreen 2**, which “is a rectangular screen that is as large as possible.” *Bast*, ¶[0010].



Bast, Fig. 1. “The information can be displayed on **screen 2** either in vertical mode (portrait mode), as shown in Figure 2, or in horizontal mode (landscape mode), as shown in Figure 3.” *Bast*, ¶[0011]. The mobile phone contains accelerometers “for detecting the tilt of the device,” and can “toggl[e] from one display mode to the other based on the detected tilt.” *Bast*, ¶[0001]; *see also* *Bast*, ¶¶[0015]-[0016].



Bast, Figs. 2-3.

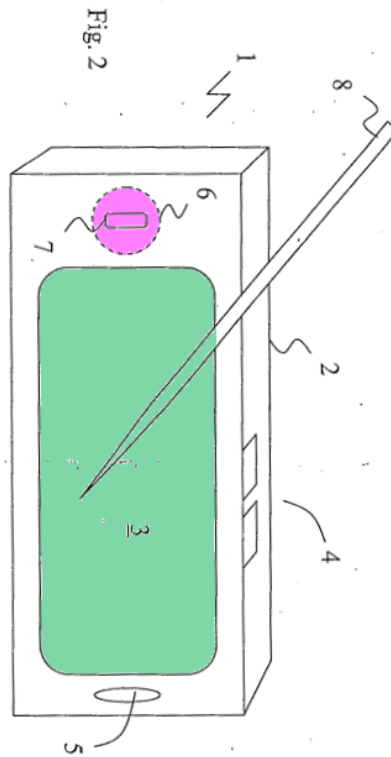
231. In my opinion, *Bast* is analogous prior art to the '144 patent because it is in the same field of endeavor as the '144 patent—a mobile device with a touchscreen. *Compare Bast*, ¶[0010], Fig. 1, with Ex. 1001, Claims 1, 9. *Bast* is also reasonably pertinent to the particular problem the patent at issue is concerned with because it deals with technologies relating to information input with a touch sensitive device. *Compare Bast*, Abstract, ¶¶[0001], [0010]-[0014], [0021], [0023]-[0024], Figs. 1-3, with Ex. 1001, 1:66-2:19, 21:60-63, 25:42-54, Claims 1, 9.

B. *Wedel* (International Patent Application Publication No. 2004/070871)

232. International Patent Application Publication No. 2004/070871 (*“Wedel”*; Ex. 1023), published August 19, 2004, from an international application

filed February 4, 2004. I have been asked to assume that *Wedel* is prior art to the '144 patent.

233. *Wedel* discloses in Figure 2 a state-of-the-art mobile terminal 1 (e.g., mobile phone) with a “display 3 occup[ying] a larger portion of the front side of the terminal.” *Wedel*, 2:3-5, Fig. 2. The terminal’s front surface is made free of physical keys “to allow for the display 3 to occupy a larger portion of the front side of terminal 1.” *Wedel*, 2:8-10. Instead, “the functions of the keypad [] have been included in a graphical user interface applicable to the display 3, rendering a data input interface having less keys.” *Wedel*, 2:6-8. “A specific tool 8 may be provided for inputting data on a touch-sensitive screen of the display 3.” *Wedel*, 2:10-11. “[T]erminal 1 also includes a microphone 5 and a speaker 6, preferably arranged at opposite ends of the terminal 1.” *Wedel*, 2:1-3. “[A] terminal output 7 is mounted on the front of the terminal above the display with the speaker 6 immediately behind the output 7.” *Wedel*, 2:15-17. The terminal also has a built-in antenna (not show in Figure 2). *Wedel*, 2:21-22.



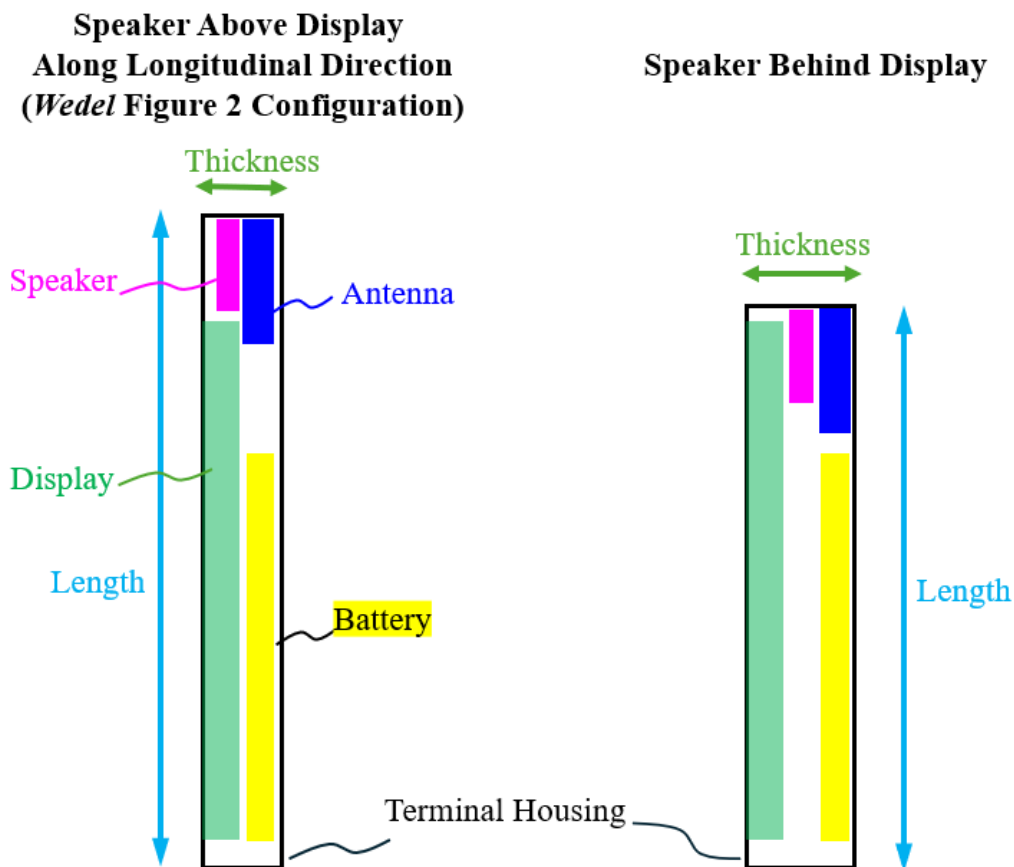
Wedel, Fig. 2 (rotated clockwise 90 degrees).

234. *Wedel* proposes a combined speaker and antenna arrangement to reduce the dimensions of the state-of-the-art terminal in Figure 2. *Wedel*, Abstract, 3:4-15, 3:19-21. I illustrate this arrangement in the following schematic drawings (side cross-sectional view of the mobile terminal). Specifically, *Wedel* explains that the **speaker** and **antenna** are generally located at the upper portion of the terminal, while a battery is located at the lower portion. *Wedel*, 2:1-3, 2:15-17, 2:21-22, Fig. 2. *Wedel* discloses that the terminal in Figure 2 “has the **speaker** position in the upper parts of the front of the terminal above the **display**,” thereby making the terminal “longer in its longitudinal extension than what would have

been the case if only the **display** ... had defined the **length** of the terminal 1.”

Wedel, 2:17-21, 2:27-29. On the other hand, “[p]lacing the **speaker 6** behind the **display 3**” can reduce the terminal’s **length** but would “increase the **thickness** of the terminal 1 since it would have to compete with the **antenna** for the relevant space.”

Wedel, 2:23-25. “Therefore, both the **antenna** design and the **speaker** design, and their relative position, will affect the dimensions of the terminal.” *Wedel*, 3:6-7.



235. To “meet[] the general market demand for small size and light weight terminals,” *Wedel* proposes to modify the terminal in Figure 2 to integrate the **speaker** into the **antenna** “in a way that does not impede **antenna** performance.”

Wedel, 3:19-21, 3:25-27. Figure 11 shows an integrated structure in which a **speaker 41** is positioned inside the cavity of a **planar antenna element 31**. *Wedel*, 10:29-12:21, Fig. 11. The **antenna-speaker** assembly is mounted on a “[s]upport structure 100 [that] is preferably a **Printed Circuit Board (PCB)** carried in a chassis or housing of ... [the] terminal.” *Wedel*, 11:11-13. This way, the “terminal or housing ... may be designed with a **thickness** basically defined by the distance between the [antenna’s] flexible film and the support structure, e.g.[,] a **PCB**, since the thickness contribution from the **speaker** has been eliminated.” *Wedel*, 13:5-8.

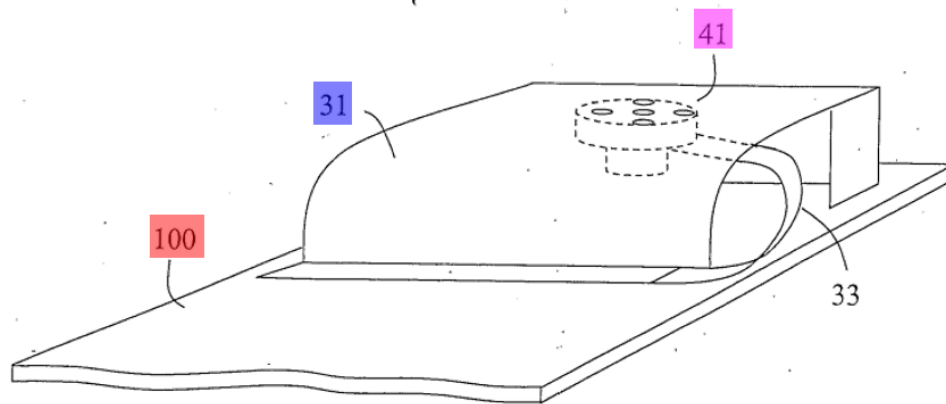


Fig. 11

Wedel, Fig. 11.

236. In my opinion, *Wedel* is analogous prior art to the '144 patent because it is in the same field of endeavor as the '144 patent—a mobile device with a touchscreen. Compare *Wedel*, 2:3-11, Fig. 2, with Ex. 1001, Claims 1, 9. *Wedel* is also reasonably pertinent to the particular problem the patent at issue is concerned

with because it deals with technologies relating to information input with a touch sensitive device. *Compare Wedel*, 1:26-2:11, Fig. 2, *with Ex. 1001*, 1:66-2:19, 21:60-63, 25:42-54, Claims 1, 9.

C. *Benoit* (French Patent Application Pub. No. 2830093)

237. I have reviewed *Benoit* and provided an overview of it in Section IX.B. In my opinion, *Benoit* is analogous prior art to the '144 patent. *See* Section IX.B.

D. *Jambhekar* (U.S. Patent No. 5,848,356)

238. I have reviewed *Jambhekar* and provided an overview of it in Section IX.D. In my opinion, *Jambhekar* is analogous prior art to the '144 patent. *See* Section IX.D.

XIII. SUMMARY OF GROUNDS 1B-4B

239. Based on my review of the materials set forth above, including my application of the knowledge of a POSITA, it is my opinion that claims 1-5 and 7-20 of the '144 patent would have been obvious to one of ordinary skill in the art.

240. In particular, it is my opinion that claims 1-5 and 7-20 of the '144 patent would have been obvious to a POSITA based on the combinations shown below.

Ground	Claims	Basis	Prior Art
1B	1, 2, 7, 8	Obviousness	<i>Bast</i> in view of <i>Wedel</i>
2B	3, 4, 15-19	Obviousness	<i>Bast</i> in view of <i>Wedel</i> and <i>Benoit</i>
3B	5, 9-11, 14	Obviousness	<i>Bast</i> in view of <i>Wedel</i> and <i>Jambhekar</i>
4B	12, 13, 20	Obviousness	<i>Bast</i> in view of <i>Wedel</i> , <i>Jambhekar</i> , and <i>Benoit</i>

XIV. GROUNDS 1B-4B: CLAIMS 1-5 AND 7-20 WOULD HAVE BEEN OBVIOUS TO A POSITA

241. In my opinion, claims 1-5 and 7-20 would have been obvious to one skilled in the art at the earliest possible priority date of the '144 patent.

A. Ground 1B: Claims 1, 2, 7, and 8 Are Obvious over *Bast* in View of *Wedel*

242. In my opinion, *Bast* in view of *Wedel* renders obvious claims 1, 2, 7, and 8.

1. Rationale to Combine *Bast* and *Wedel*

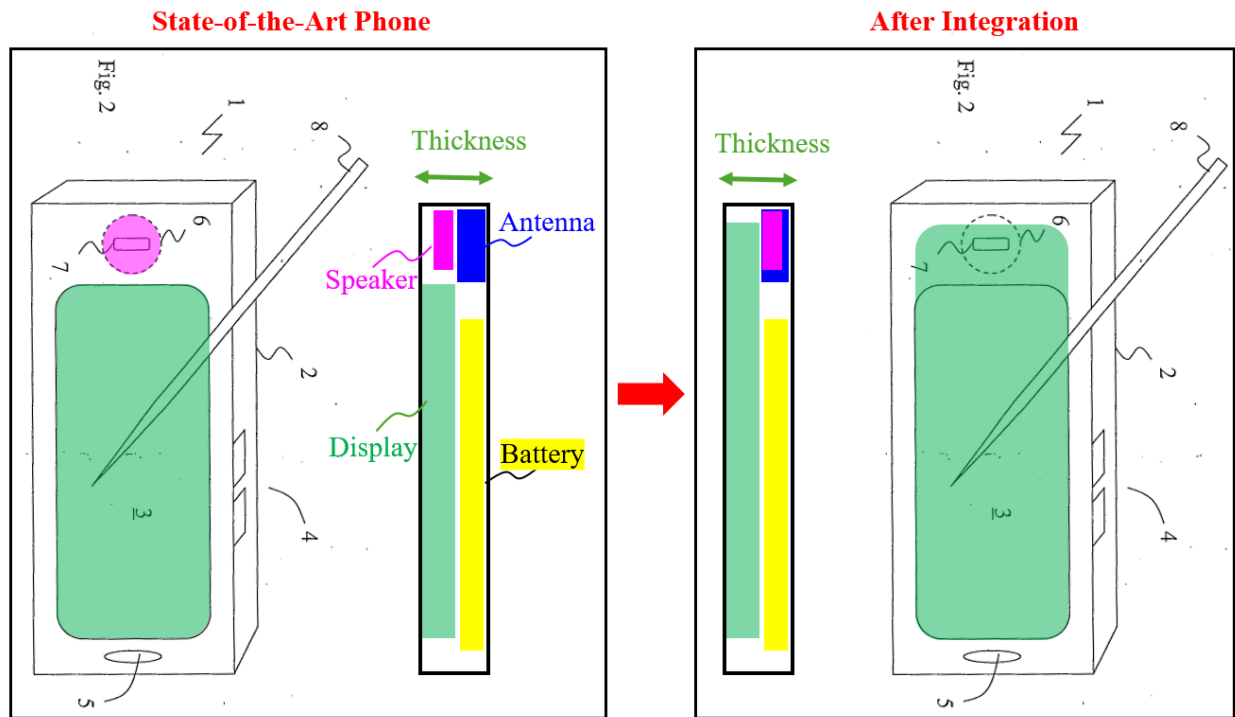
243. In my opinion, it would have been obvious to a POSITA to apply *Wedel*'s teaching to make *Bast*'s touchscreen as large as possible while keeping the phone's size as small as possible. There had been a long recognized need and continuing effort in the art to make the mobile phones smaller and portable, while making their display as large as possible. *See, e.g., Dutta*, ¶[0002] ("With the ever

greater usage of portable devices, such as, for example, personal digital assistants (PDAs) and mobile phones to access the Internet, the limitations that arise due to the small displays are increasingly significant.”); *Gupta*, ¶[0004] (There was a “need for a small communications device that merges the functions of a personal digital assistant and a telephone, cellular or otherwise, while still providing a display that is large enough for practical information viewing and a keypad that is easy to use.”); *Rydbeck*, 1:11-19 (“The evolution of wireless communication devices incorporating cellular/digital wireless telephones is undergoing two potentially conflicting trends. One trend is toward miniaturization of the cellular telephone body and the other is toward a demand for larger visual displays thereon. There is, therefore, a need to configure pervasive computing devices such as smaller, miniaturized, or ‘pocket-sized’ wireless telephones in a manner which allows for larger displays over conventional devices.”); *Jambhekar*, 1:31-36 (“For example, in a portable radiotelephone often there is a small display and a fixed data input keypad. On the other hand, a wireless data service such as e-mail requires extensive display of received messages as well as extensive user data input from either a pen or a keyboard.”). The same was also reflected in *Bast* and *Wedel*.

244. Specifically, *Bast* teaches that “[m]obile phones ... increasingly perform functions previously associated with a laptop computer,” so “[t]he screen size is therefore essential.” *Bast*, ¶[0002]. *Bast* therefore strives to make its

touchscreen “as large as possible” and “use[] all the available space.” *Bast*, ¶¶[0003], [0010]. On the other hand, *Bast* recognizes that mobile phones are “[s]mall terminals” and “size is a crucial element” in their design. *Bast*, ¶¶[0005]-[0006]. Thus, in my opinion, a POSITA working on improving *Bast* would have been searching for solutions to enlarge the touchscreen size without increasing the phone’s dimensions.

245. To that end, *Wedel* teaches a way to enlarge the touchscreen without increasing the phone’s thickness. Specifically, as I illustrate in the following schematic drawings, *Wedel* teaches that in the state-of-the art mobile phones (e.g., the mobile phone shown in *Wedel*’s Figure 2), the **speaker** is placed above the **touchscreen** along the longitudinal direction, thus preventing the **touchscreen** from taking more area on the front surface of the phone housing. *Wedel*, 2:15-21. *Wedel* proposes to integrate the **speaker** into the **antenna** located in the back portion of the phone, thereby allowing the **touchscreen** to be made bigger without adding to the thickness of the phone. *Wedel*, Abstract, 1:26-28, 2:21-25, 13:5-8.



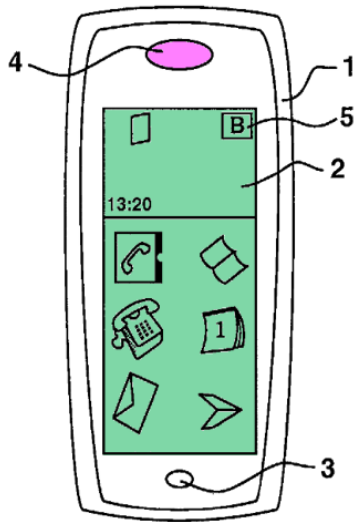
In my opinion, led by *Wedel*'s teaching, a POSITA would have modified *Bast* to place its speaker behind its screen, so as to allow the touchscreen to use more space on the front surface of the phone housing.

246. A POSITA would understand doing so would fulfill *Bast*'s design goal of making "[t]he touch screen ... as large as possible to enable[] the input and display of data." *Bast*, ¶[0010]. As a result of *Wedel*'s teachings of how to place a speaker behind a screen without increasing a phone's thickness, this would be achieved without increasing the phone housing's dimensions. The modification would thus be consistent with *Bast*'s recognition that "size is a crucial element" in mobile phone design.

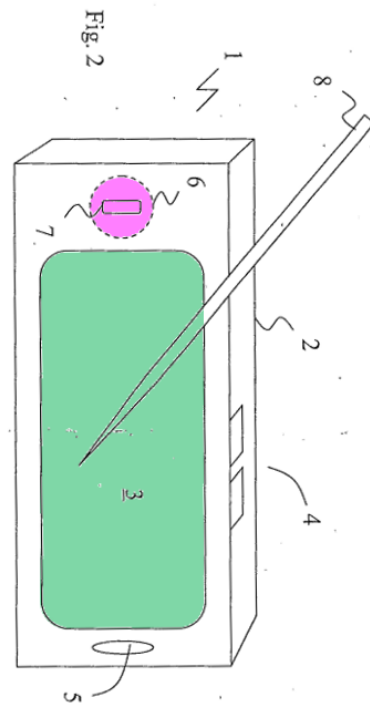
247. In my opinion, a POSITA would have considered the *Bast/Wedel* combination to be an example of (A) combining prior-art elements (e.g., *Bast*'s mobile phone and *Wedel*'s integrated antenna-speaker assembly behind a screen) according to known methods to yield predictable results (e.g., a touchscreen that is larger relative to the phone's size); (B) use of a known technique to improve similar devices in the same way (e.g., *Wedel*'s speaker placement teachings to *Bast*'s mobile phone); (C) applying a known technique to a known device ready for improvement (e.g., *Wedel*'s speaker placement teachings to *Bast*'s mobile phone) to yield predictable results; and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the mobile phone disclosed by *Bast* to arrive at a small device with a touchscreen practically occupying the entire front surface of the housing.

248. In my opinion, a POSITA would also have had a reasonable expectation of success for combining the teachings of *Bast* and *Wedel*. *Wedel* discloses that its integrated antenna-speaker assembly can be used to improve the state-of-the-art mobile phone shown in Figure 2, which has a substantially similar architecture as the one in *Bast*'s Figure 1. Compare *Bast*, ¶[0010], Fig. 1, with *Wedel*, 2:3-11, Fig. 2. Namely, both mobile phones have a substantially rectangular-shaped housing, within which the speaker, large touchscreen, and microphone are located at the same relative locations. *Bast*, ¶¶[0003], [0010], Fig.

1; *Wedel*, 2:1-3, 2:10-11, 2:21-22, Fig. 2. Due to the structural similarity between *Bast*'s phone and the state-of-the-art phone that *Wedel* expressly intends to improve, a POSITA would have understood that *Wedel*'s proposed adjustment to these components can be applied to *Bast*'s phone in the same way.

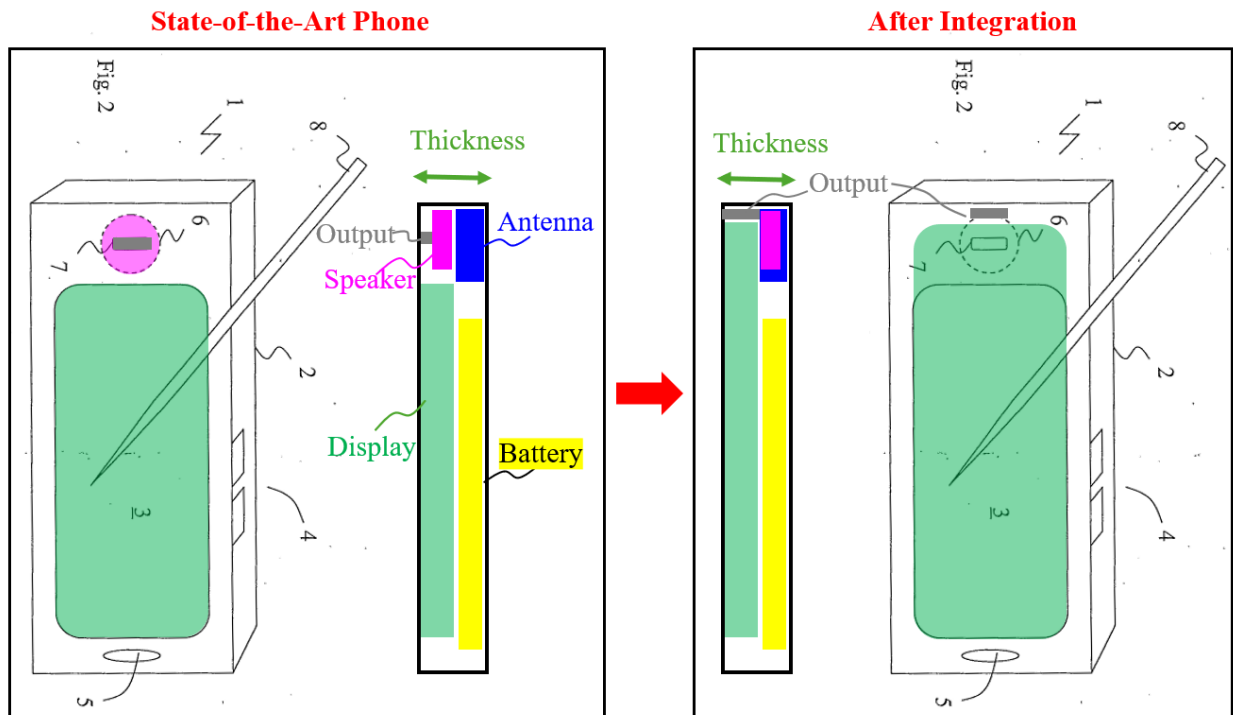


Bast, Fig. 1.



Wedel, Fig. 2

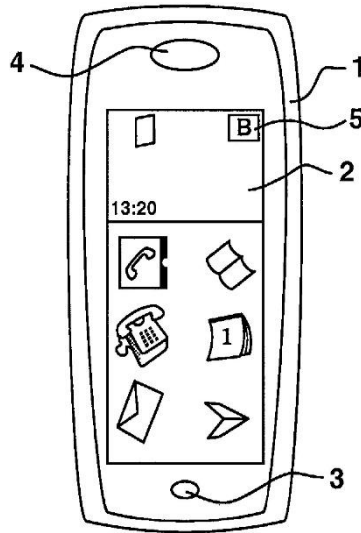
249. Additionally, it was well within the skill of the art to rearrange the output to allow the sound generated by the speaker-antenna assembly to transmit to the outside of the phone housing. For example, as I illustrate below, a POSITA would understand that one option is to reposition the output to the top portion of the phone. The output can be as simple as a hole that connects the speaker to the outside air.



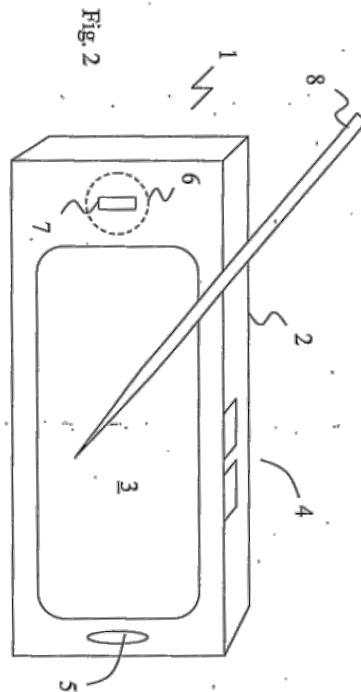
2. Independent Claim 1

a. 1[pre]: “A mobile phone device, comprising:”

250. *Bast* discloses 1[pre] by disclosing a mobile device that “combines the functions of a personal digital assistant (PDA) and a mobile telephone.” *Bast*, ¶[0010]; *see also Wedel*, 7:19-24 (“the combined antenna and speaker design ... is mainly described ... in the implementation in a mobile phone”).



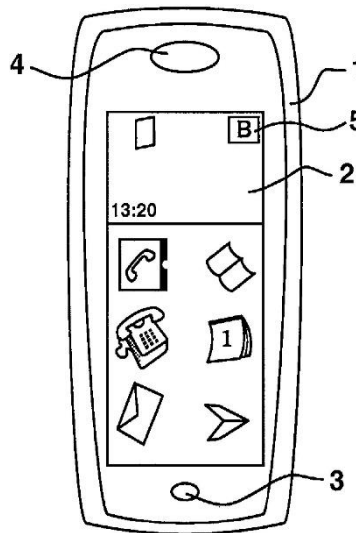
Bast, Fig. 1. Similarly, Figure 2 of *Wedel* also discloses a mobile phone. *Wedel*, 7:19-24 (“the combined antenna and speaker design ... is mainly described ... in the implementation in a mobile phone”).



Wedel, Fig. 2.

- b. **1[a]: “a practically rectangular-shaped housing within which the components of a mobile phone are integrated, said housing having a front surface, a back surface and four side surfaces,”**

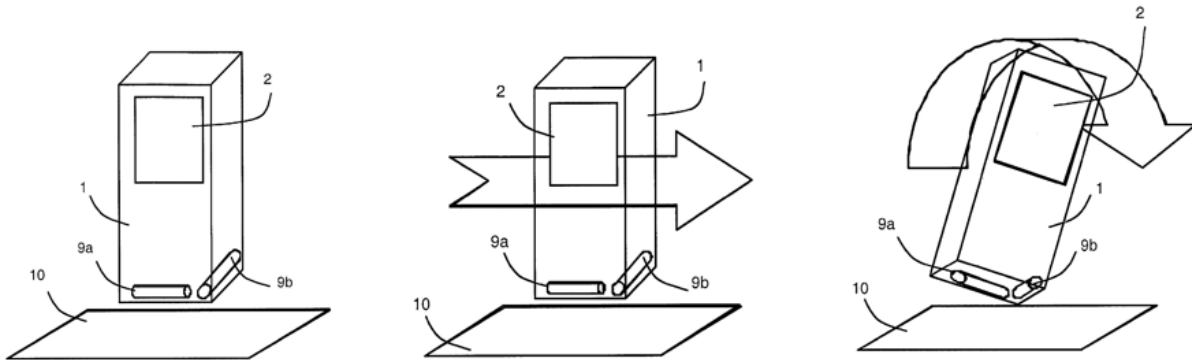
251. In my opinion, *Bast* discloses 1[a] because *Bast* discloses that its “phone retains a substantially rectangular shape,” as shown in Figure 1. *Bast*, ¶[0003].



Bast, ¶[0010], Fig. 1. The mobile phone’s components, e.g., microphone 3 and speaker 4, are integrated within the housing. *Bast*, ¶[0010], Fig. 1.

252. In my opinion, a POSITA would understand that because *Bast*’s phone has a substantially rectangular shape, it has a front surface, a back surface, and four side surfaces. For example, *Bast*’s Figures 6, 8, and 9 provide oblique

views showing a rectangular-shaped mobile phone having a front surface and four side surfaces.



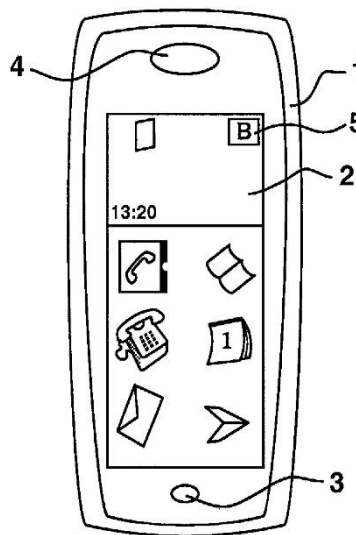
Bast, ¶[0009], Figs. 6, 8, 9. A POSITA would understand that these surfaces are also present in the mobile phone in Figure 1. *Bast*, ¶[0003] , Fig. 1. *Bast*’s figures do not depict its back surface, but a housing including a back surface would be obvious to a POSITA (e.g., to retain and protect components of the phone as was routine and conventional in the art). A POSITA would have a reasonable expectation of success in using a housing having a front surface, a back surface, and four side surfaces, as this was the standard practice for mobile phone housings at the time of the invention.

- c. **1[b]: “wherein the length of the front surface approximately corresponds to the distance between the ear and the mouth of a user and”**

253. In my opinion, *Bast* discloses 1[b] because *Bast* discloses that the phone’s “substantially rectangular shape” is chosen “[f]or ergonomic reasons,

particularly related to the distance between the user's mouth and ear.” *Bast*,

¶[0003]. A POSITA would understand that this means the front surface of the mobile phone in *Bast*'s Figure 1 has a length approximately corresponding to a user's ear-to-mouth distance, such that the speaker 4 and microphone 3 at the opposite ends of the housing along the longitudinal direction can be positioned in proximity to an average user's ear and mouth respectively, when the terminal is used to make a phone call.

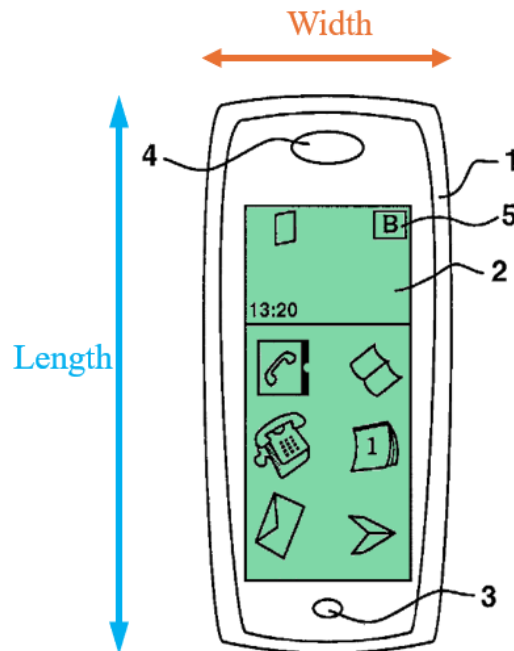


Bast, Fig. 1; *see also Dutta*, ¶[0003] (“the ideal size of a mobile phone is determined by the typical ear-to-mouth distance of the average user”); *Yamaguchi*, ¶[0005] (“[A]n ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations”); *Rydbeck*, 8:57-59

(“a microphone located such that it is positioned proximate a user’s mouth when the user has said speaker adjacent his or her ear”).

d. 1[c]: “wherein the width of the front surface is substantially shorter than the length and”

254. In my opinion, *Bast* discloses 1[c] because *Bast* discloses “the phone retains a **substantially** rectangular shape.” *Bast*, ¶[0003] (emphasis added). A POSITA would understand that “a substantially rectangular shape” has a width substantially shorter than its length. As I annotate in the following Figure 1, the **width** of the mobile phone’s front surface is substantially shorter than the **length**.



Bast, Fig. 1.

255. Moreover, a POSITA would understand that the substantial difference between the phone housing’s **width** and **length** is also suggested by *Bast*’s design

for the **touchscreen** display. First, *Bast* teaches that the **touchscreen** is “substantially rectangular” to “enabl[e] a display in portrait mode ... and in landscape mode.” *Bast*, ¶[0001]; *see also Bast*, ¶¶[0004], [0011], [0025], Claim 1. A POSITA would understand that this means the **touchscreen**’s width is substantially shorter than its length, because otherwise there would have been no meaningful viewing difference between the portrait and landscape display modes. Second, *Bast* teaches that the “rectangular **screen** ... is as large as possible” and “uses all the available space” (*Bast*, ¶¶[0003], [0010]), so a POSITA would understand that the shape of the **touchscreen** tracks the shape of the housing’s front surface. It follows that the housing’s front surface, like the **touchscreen**, has a **width** substantially shorter than its **length**.

e. 1[d]: “wherein the housing has a thin thickness; and”

256. In my opinion, *Bast* discloses 1[d] or otherwise renders it obvious when combined with the knowledge of a POSITA for the reasons discussed here and for claim 8.

257. First, *Bast* alone discloses 1[d] in light of the applicant’s admissions. I noted while reviewing the ’144 patent’s prosecution history that the applicant stated the following:

[T]he cited prior art, Kubes, describes a mobile phone device ...
wherein the antenna of the device is significantly extended out from

the housing of the device, making it difficult to use in different positions (e.g., landscape position) and very cumbersome for portability. In addition, Kubes describes that the device has a standard 12-key keypad (having the digit keys 0 to 9), which confirms that Kubes'[s] device was adapted/designed to be used in portrait position only, like any other mobile handset at the time of Kubes'[s] invention. Note that Kubes'[s] device is also very thick, which again confirms that the device was designed for use with one hand in vertical/portrait position only.

Ex. 1004, 362. The applicant is thus stating that a “thick” device is one that is designed “for use with one hand in the vertical/portrait position only.” Ex. 1004, 362.

258. *Bast*, by contrast, teaches a mobile phone device capable of use “in [both] portrait mode (vertical) and landscape mode (horizontal)” and “with one hand” (*Bast*, Abstract, ¶[0006]), consistent with the applicant’s apparent understanding of a “thin” device.

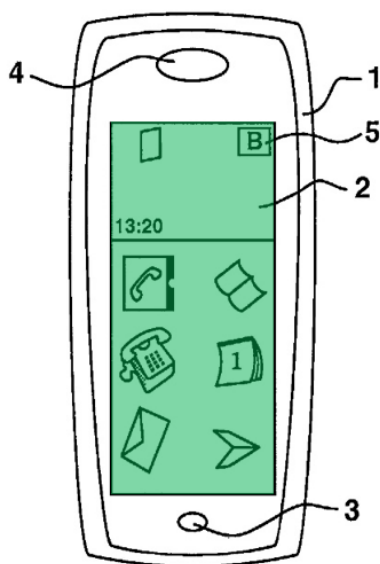


Figure 1

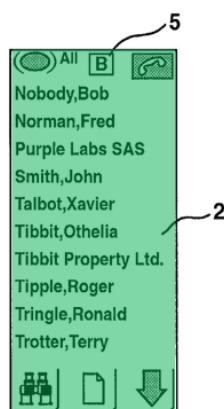


Figure 2

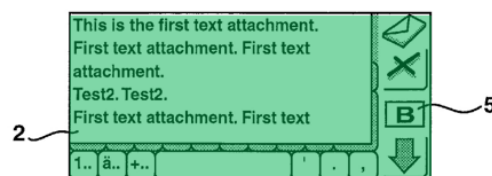


Figure 3

Bast, Figs. 1-3. Therefore, applicant's own admissions confirm that *Bast* discloses 1[d].

259. Moreover, the '144 patent does not describe whether and how the “thin thickness” would be affected by the mobile phone’s internal components. *See generally* Ex. 1001. But, even if the '144 patent and *Bast* differ by their designs inside the phone housing, a POSITA would understand such difference does not prevent *Bast*’s housing from having the same “thin thickness” as contemplated by the '144 patent. This is because *Bast* uses “miniaturized” components “integrated” within a housing. *Bast*, ¶¶[0005], [0015]. Such components, including the accelerometers used by *Bast* for switching between the portrait and landscape modes, would not add to the thickness of *Bast*’s housing because they “are sufficiently small so as to have no direct impact on the volume of the device in

which they are integrated.” *Bast*, ¶[0015]. Moreover, a POSITA would understand *Bast*’s housing thickness is unchanged by its combination with *Wedel*’s teaching because, as discussed in Section XIV.A.1, moving *Bast*’s speaker into an existing antenna does not increase the device’s thickness. Therefore, in my opinion, *Bast*’s one-hand usability in both portrait and landscape positions discloses its mobile phone housing “has a thin thickness” in a way consistent with how the feature is contemplated by the ’144 patent, and this consistence is unaffected by *Bast*’s internal design or its combination with *Wedel*.

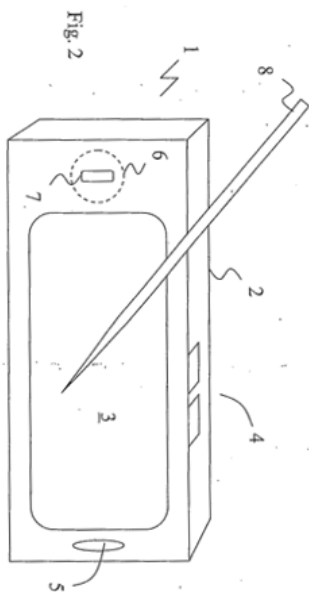
260. Second, even assuming that *Bast* did not already disclose a housing that has a thin thickness, modifying it to have such would merely entail a simple and predictable alteration of the phone’s dimensions based on the knowledge of a POSITA. At the time of the alleged invention, it was well known to make housings thin because there had long been “a demand for a size such that the device can fit in a clothing pocket or the like from the perspective of making the device ‘easily portable anywhere’” and “a demand for a series of manipulations to be performable with one hand from the perspective of making the mobile-communication-information terminal device ‘easy to manipulate.’” *Yamaguchi*, ¶[0007]; see Section VI.A. Particularly, mobile phones with large touchscreens had been routinely made thin to fit into a pocket. For example, *Wedel*’s Figure 2 shows a state-of-the-art “pocket[-]size[d] phone[.]” that has a large touchscreen and has

“dimensions” suitable for fitting into a pocket. *Wedel*, 1:14-17, 2:3-5, 2:10-11, Fig.

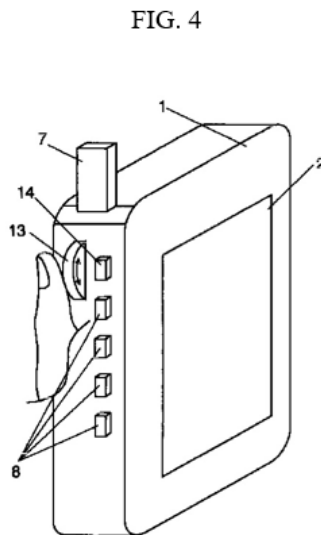
2. *Yamaguchi* describes a touchscreen mobile device suitable for “storing ... in a clothing pocket[and] holding ... with one hand,” that may have a “depth 15–25 mm”. *Yamaguchi*, ¶[0015], Fig. 4; *see also id.*, ¶¶[0009]-[0010], [0017], [0036].

And *Rydbeck* discloses a “smaller, miniaturized, or ‘pocket-sized’ wireless telephone[] ... which allows for [a] larger display[] over conventional devices.”

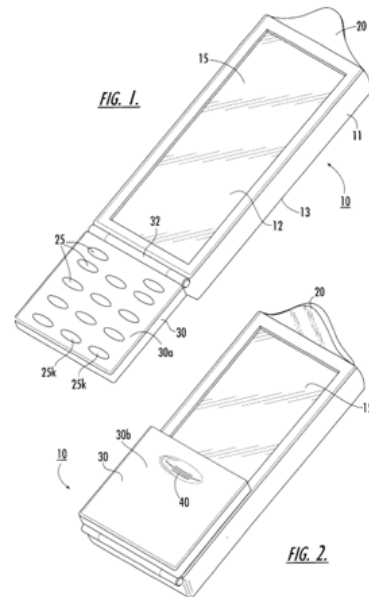
Rydbeck, 1:11-19, Figs. 1-2; *see also id.*, 2:60-62, 4:24-44, 10:29-30.



Wedel, Fig. 2.



Yamaguchi, Fig. 4.

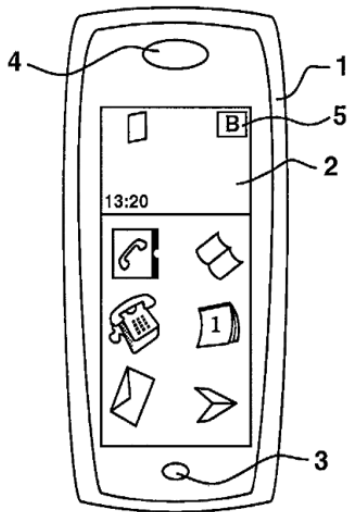


Rydbeck, Figs. 1-2.

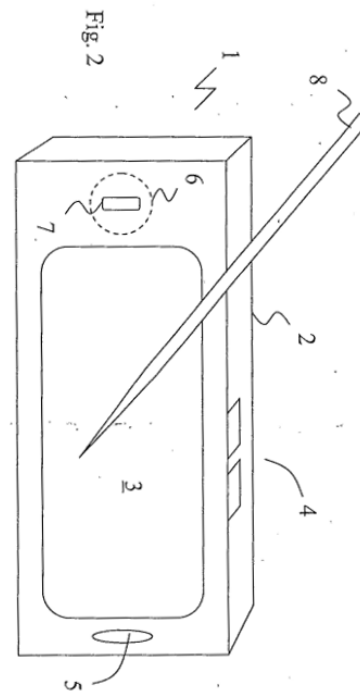
261. A POSITA would have found it obvious to use such slim design for *Bast*'s mobile phone because it would improve portability (allowing storage in a pocket) and the ability to comfortably hold the phone in a single hand and interface with the device. *See, e.g., Yamaguchi*, ¶¶[0009]-[0010], [0015] (touchscreen phone with a size suitable for storing in a pocket); *Dutta*, ¶¶[0002]-[0003] (touchscreen phone providing an ergonomically favorable grip, which requires that the device is thin so that a user's hands can wrap around its edges), Figs. 2A-2B. A POSITA would have known that the thin housing helps achieve *Bast*'s goals of both making the touchscreen "as large as possible" and the phone suitable for "use[] with one hand." *Bast*, ¶¶[0006], [0010], Namely, it allows the touchscreen to have a larger width while still making the phone ergonomically favorable for being gripped by one hand.

262. A POSITA would also have had a reasonable expectation of success in making *Bast*'s housing thin. As shown in Section VI.A, the mobile phones were continually made thinner. And as discussed above, the prior art (e.g., *Wedel*, *Yamaguchi*, *Rydbeck*, etc.) teaches various mobile phones that have large touchscreens and made in pocket sizes. Thus, a POSITA would have reasonably expected that the form factor of *Bast*'s phone housing can be modified in a similar way as these prior-art devices. For example, *Wedel* teaches this was made possible by the increasingly miniaturized phone components, like speakers and antennas.

Wedel, 1:19-21. In particular, *Wedel* discloses the use of “a low[-]profile, built[-]in, radio antenna” in the state-of-the-art phone in Figure 2. *Wedel*, 9:29-31; *see also Wedel*, 2:30-3:1. *Bast* and *Wedel* are contemporaneous patent applications. *Bast*, p. 1 (filed in 2003); *Wedel*, p. 1 (claiming priority to a U.S. provisional application (Ex. 1047) filed in 2003). And *Bast* uses substantially the same architecture as the state-of-the-art phone in *Wedel*’s Figure 2, as they both have a rectangular-shaped housing integrated with a large touchscreen, speaker, and microphone. *Compare Bast*, Fig. 1, *with Wedel*, Fig. 2. Thus, it would have been obvious to a POSITA to configure *Bast*’s phone housing like the thin, pocket-sized phones taught in *Wedel*.



Bast, Fig. 1.



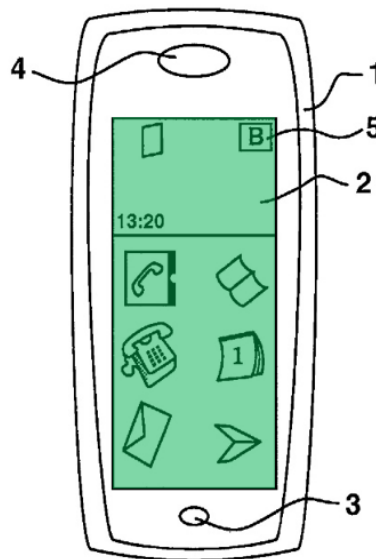
Wedel, Fig. 2.

- f. **1[e]: “a display unit integrated within the front surface of said housing wherein said display unit practically covers the entire front surface of said housing;”**

263. In my opinion, *Bast* discloses or *Bast/Wedel* renders obvious 1[e].

Bast discloses that its “housing 1 [is] equipped, on the front face, with a **large screen 2**, which can be a **touch screen**,” “to enable[] the input and display of data.”

Bast, ¶[0010].

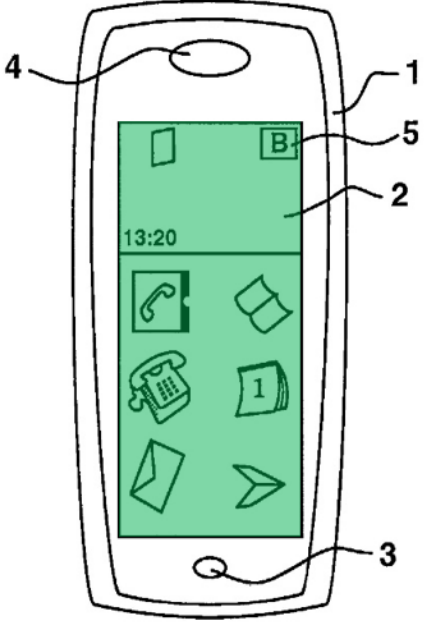
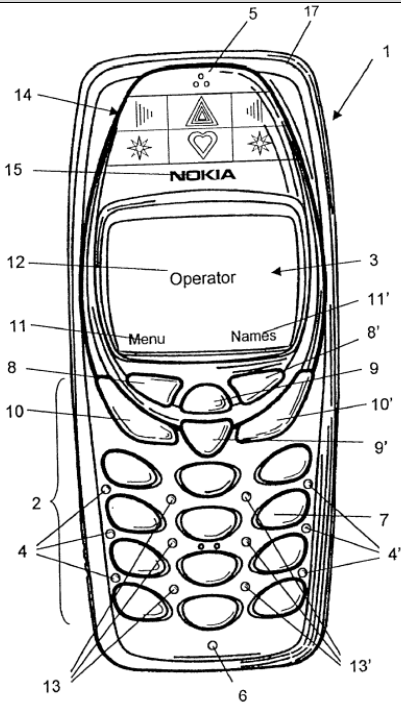


Bast, Fig. 1. A POSITA would understand *Bast*’s touchscreen practically covers the entire front surface of the housing because *Bast* expressly teaches making the display area “as large as possible” and “use[] all the available space” on the housing’s front surface. *Id.*, ¶¶[0010], [0003]. A POSITA would understand this was achieved in *Bast* by using the touchscreen for both display and input, as illustrated by *Bast*’s Figure 1. At the time of the alleged invention, it was widely

understood that the physical keyboards are the main competitor of the display for the precious space on the housing front surface:

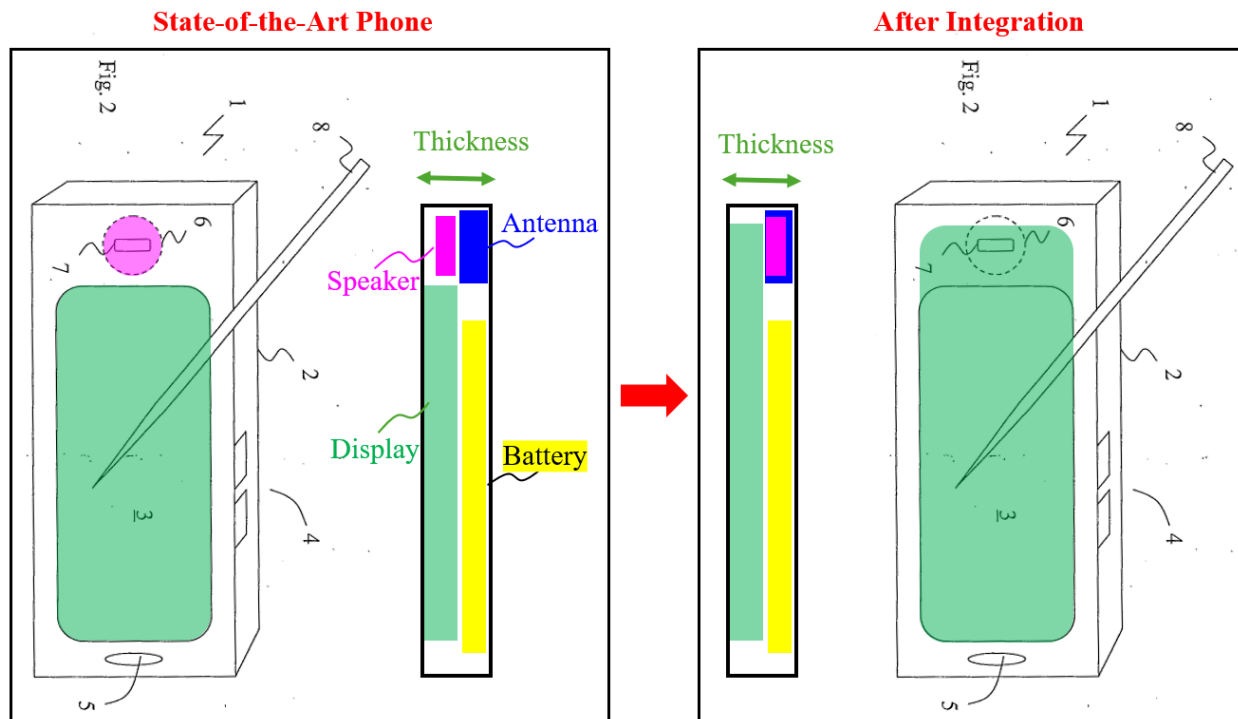
A typical user interface includes a speaker, a microphone, a display and a data input device such as a keypad. For some radio communication services, a small display and a small data input area is required. For example, in a portable radiotelephone often there is a small display and a fixed data input keypad. On the other hand, a wireless data service such as e-mail requires extensive display of received messages as well as extensive user data input from either a pen or a keyboard.

Jambhekar, 1:27-36. Since *Bast*'s touchscreen eliminated the need to place any physical keys for input on the front surface of the phone housing, a POSITA would understand that *Bast*'s touchscreen practically uses all the possibly available real estate on the front surface of the housing. *See also Wedel*, 2:8-10 (discussing removing keys from the front surface "to allow for the display 3 to occupy a larger portion of the front side of terminal 1"). By comparison, screens of other phones of the era, such as certain Nokia models (e.g., the Nokia 3310), had much smaller screens only covering a small portion of the front surface. This is because the Nokia models have physical keys on the front surface, thereby preventing the screen from practically covering the entire front surface of the phone housing.

Drawing from <i>Bast</i>	Nokia Phone Disclosed in <i>Messel</i>
 <i>See Bast, Fig. 1.</i>	 <i>See Messel, Fig. 1a.</i>

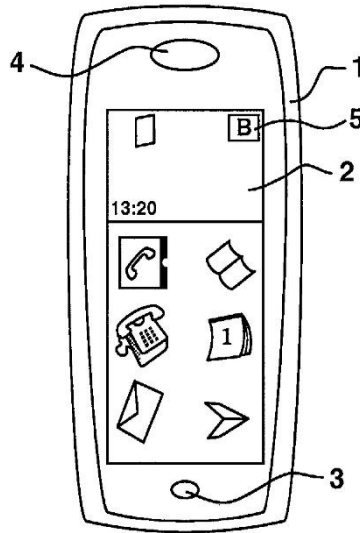
264. Moreover, in view of *Wedel*'s teaching, it would have been obvious to a POSITA at the time of the alleged invention to continue to expand the screen of *Bast* consistent with Figure 1 to provide even more viewing area for content and to increase the touchable area for data input (e.g., by selecting icons or typing on a virtual keyboard). To achieve that goal, as discussed in Section XIV.A.1, it would have been obvious to apply *Wedel*'s teaching to *Bast*, so that the speaker on *Bast*'s phone is placed behind its screen. As I illustrate in the following drawings, in the

resulting *Bast/Wedel* phone, the **display** would be even bigger than in Figure 1 of *Bast* and practically cover the entire front surface of the phone's housing, as taught by *Wedel*.



g. 1[f]: “wherein said mobile phone device does not include a physical key on the front surface, and”

265. In my opinion, *Bast* discloses 1[f]. First, *Bast*'s Figure 1 shows that the mobile phone's front surface has no physical keys. *Bast*, ¶[0010].

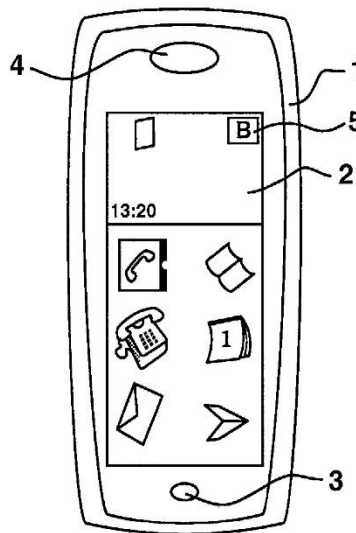


Bast, Fig. 1. Moreover, a POSITA would have understood that *Bast*'s phone is designed to not require any physical keys. Like the buttonless design well known in the art (*see* Section VI.B), *Bast* discloses that the “touch screen 2 is ... [used] to enable[] the input and display of data, ... and the display of program and function icons, settings icons, a virtual keypad for numbering[,] etc.” *Bast*, ¶[0010]. *Bast* also discloses that a user can switch between the portrait and landscape display modes by “tilt[ing]” the phone or pressing “a virtual toggle button.” *Bast*, Abstract, ¶¶[0001], [0012], [0024]. Therefore, no physical key is required to input data or control the phone's settings and functions. And, rather than disturb *Bast*'s buttonless input/output interface, the combination of *Bast* with *Wedel* encourages its retention. *Wedel* teaches removing physical keys from the phone's front surface

“to allow for the display 3 to occupy a larger portion of the front side of terminal 1.” *Wedel*, 2:8-10.

- h. **1[g] “wherein said components of the mobile phone are integrated within said housing such that none of said components is noticeably extended out from said housing.”**

266. In my opinion, *Bast* discloses 1[f]. First, *Bast*’s figures show that it adopts a mobile phone architecture in which no components are noticeably extended out from the housing. For example, like the ’144 patent’s Figure 68a, *Bast*’s Figure 1 shows that the mobile phone has no components (such as antenna or buttons) noticeably extended out from the housing.



Bast, Fig. 1; compare *Bast*, Fig. 1, with Ex. 1001, Fig. 68a. The only components exposed on the front surface are not noticeably extended out because the touchscreen 2 is flat, and the speaker 4 and microphone 3 at best are recessed

rather than extended out from the housing. And *Bast* does not suggest that the phone's back surface has any noticeably extended components. Even if the back surface had components (e.g., a camera), a POSITA would reasonably expect them to be recessed within the housing in the same way as the camera described by Keyless. Ex. 1034, 33 (Keyless's infringement contentions for the '144 patent argued that a camera protruding from the back of a phone "does not noticeably extend out from the housing" because the camera's surrounding "housing extends outward over and around the camera" such that "the cover for the camera, which is part of the housing, is recessed slightly within the housing").

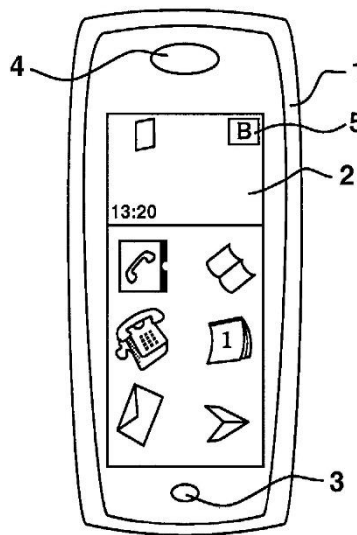
267. Second, although *Bast* discloses that the mobile phone may have "[a] small mechanical switch (not shown) disposed at the base of the housing" for manually calibrating the terminal's orientation (*Bast*, ¶[0020]), the mechanical switch's omission from the drawings indicates to POSITAs that it is not "noticeably" extended out. *Bast*, Figs 1, 6, 8, 9. Additionally, *Bast* discloses that the manual calibration mode and mechanical switch are optional because the phone can also be calibrated automatically. *Bast*, ¶¶[0018]-[0019], [0021]. A POSITA would have found it advantageous to provide the automatic calibration mode only because it not only reduces the manufacturing cost but also simplifies the mobile phone's usage.

268. As I explain above, it is thus my opinion that *Bast* in view of *Wedel* renders obvious claim 1.

3. Claim 2: “The device of claim 1, wherein said practically rectangular shape has rounded corners.”

269. In my opinion, *Bast* discloses the additional limitations of claim 2.

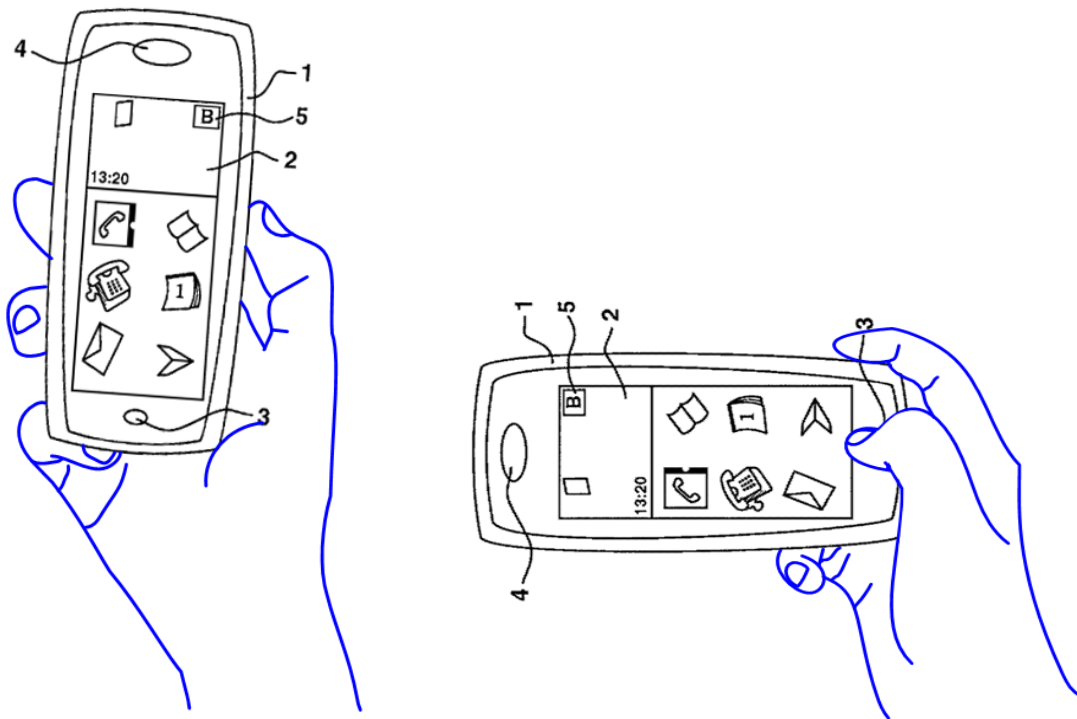
Figure 1 of *Bast* (shown below) depicts the housing with rounded corners.

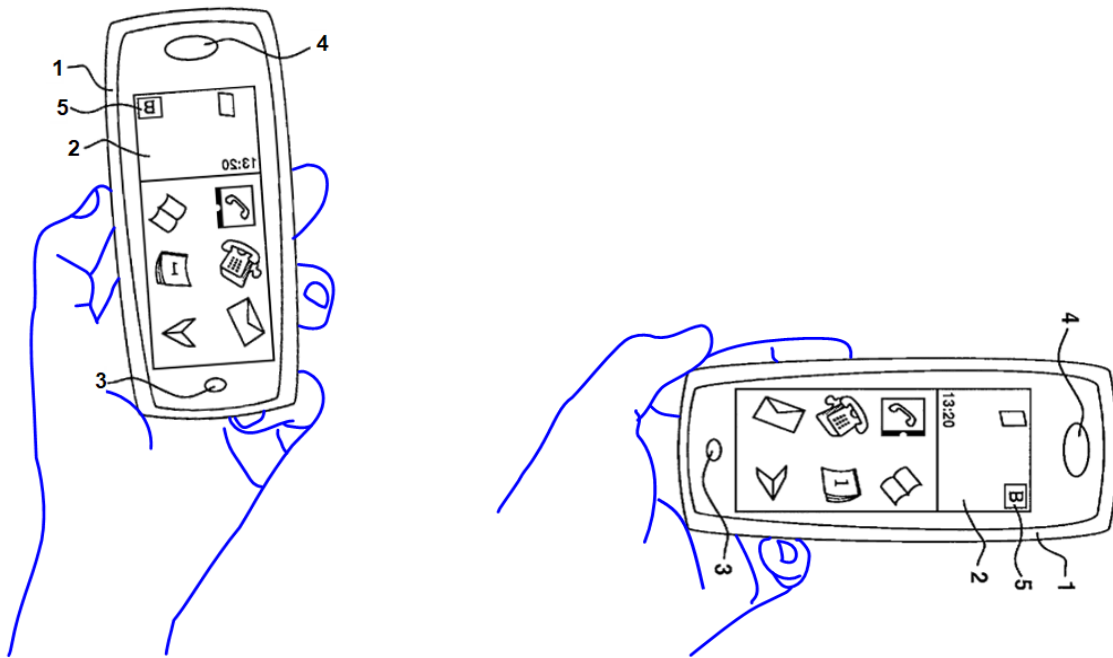


Bast, Fig. 1.

270. Even assuming that *Bast* did not already disclose rounded corners, a POSITA would have found it obvious to make the corners rounded “[f]or ergonomic reasons,” as taught by *Bast*. *Bast*, ¶[0003]. Specifically, in addition to making the phone’s shape correspond to “the distance between the user’s mouth and ear,” *Bast*’s Figure 1 also shows that the phone’s housing has curved sides such that it can be easily gripped by a user’s hand. *Bast*, ¶[0003], Fig. 1. Moreover,

Bast aims to design a phone that allows “the user to change the tilt of the device without changing their grip.” *Bast*, ¶[0006]. As I illustrate in the following drawings, to grip *Bast*’s phone with one hand (in either portrait or landscape direction), a user’s hand muscle and finger joints need to tightly press against the phone’s corners. And, when the user changes the phone’s orientation with the same hand (right or left), the corners of the phone would inevitably slide through the palm and fingers.





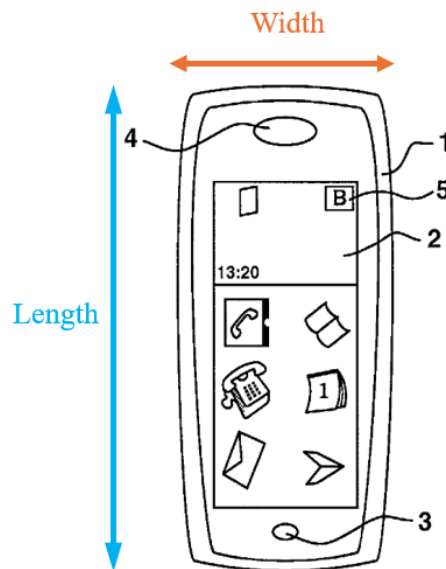
A POSITA would have appreciated that having rounded corners in these cases would be ergonomically more friendly—making the phone more comfortable for a user to hold and making it easier to tilt the phone with one hand. Moreover, rounded corners were well known and widely used in the art. *See* Section VI (*see* figures in *Beatty, Gupta, and Mouton*); *Dutta*, Figs. 2A-2B (showing a rectangular-shaped mobile phone with rounded corners). Therefore, a POSITA would have been motivated to modify *Bast*'s phone housing to have rounded corners.

271. A POSITA would also have a reasonable expectation of success in doing so, because it would have been a negligible change to the housing's shape and external appearance, particularly because *Bast*'s Figure 1 shows that the phone already has streamlined side surfaces. And doing so would have had only

negligible effect on the internal space of the housing, so it would not affect the components integrated therein. Finally, the rounded corners could be easily manufactured by slightly curving the corners of the mold for the housing.

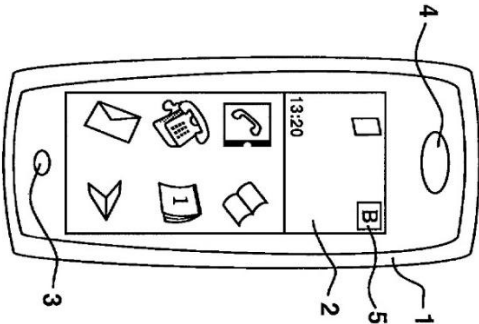
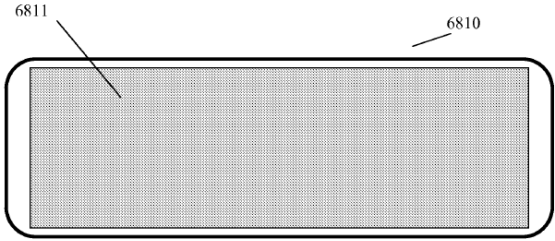
4. Claim 7: “The device of claim 1, wherein the width of the device is approximately half of said length.”

272. In my opinion, *Bast* discloses or otherwise renders obvious the additional limitations of claim 7 when combined with the knowledge of a POSITA. For example, *Bast* discloses a mobile phone depicting a **width** of the front surface that is approximately half of the **length**.



Bast, Fig. 1.

273. The relative width and length dimensions of phones depicted in the drawings of *Bast* are consistent with the relative width and length dimensions of phones depicted in the drawings of the '144 patent.

Drawing from Bast	Drawing from '144 Patent
 <i>Bast</i>, Fig. 1.	 Fig. 68a Ex. 1001, Fig. 68a.

274. In my opinion, a POSITA would have thus understood *Bast* to disclose a width of the device that is approximately half of the length.

275. Even assuming that *Bast* did not already disclose a width of the device that is approximately half of the length, a POSITA would have found it obvious to modify *Bast* to include these relative dimensions, which were well known to POSITAs at the time of the alleged invention. *See, e.g., Rydbeck*, 4:39-43 (teaching that “pocket[-]” or “palm”-sized mobile devices “[t]ypically[] ... are less than about 8-10 inches in length and less than about 4 inches in width”); *Yamaguchi*, ¶¶[0034], [0036] (teaching a mobile phone 100-150mm in length, 60-75mm in width, and 15-25mm in depth); Ex. 1045, 188 (disclosing that a rectangular, touchscreen mobile device has 117mm in length and 59mm in width, i.e., a 50.4% width/length ratio); *see also* Ex. 1045, 9, 123.

276. Modifying *Bast* to have the dimensions of claim 7 would merely entail a simple and predictable alteration of the phone's dimensions based on the knowledge of a POSITA. A POSITA would have found it obvious to use such dimensions because it would improve portability (allowing storage in a pocket) and the ability to comfortably hold the phone in a single hand and interface with the device. *See, e.g.*, Section VI.A; *Rydbeck*, 4:39-43; *Yamaguchi*, ¶¶[0009], [0015]. Moreover, having the width of the device be approximately half of the length is consistent with a form factor that is comfortable for holding the phone during telephone calls. For example, such dimensions permit *Bast*'s "ergonomic" design of correlating the housing length to a user's mouth-to-ear distance while still allowing the device to be comfortably held in a user's hand. *See, e.g.*, *Yamaguchi*, ¶¶[0005] ("In addition, by adjusting one's grip on the main device 1, an ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations."), [0015] ("the device body has dimensional ratios of length 100–150 mm, width 60–75 mm, and depth 15–25 mm; thus, the invention has the effect of improved portability and ease of manipulation, such as when storing the device in a clothing pocket, holding the device with one hand, and manipulating the various buttons"), [0034] ("length 100–150 mm, width 60–75 mm, and depth 15–25 mm, such that a hand can hold a bottom-surface portion and both side-surface portions of the device body 1 when holding the

device body 1”), [0036] (“the dimensional ratios of the device body are length 100–150 mm, width 60–75 mm, and depth 15–25 mm, thereby enabling a series of manipulations to be performed with one hand and enabling the device body to fit in a clothing pocket or the like”). A POSITA would have known of this size ratio, had a motivation to use it, and would have had a reasonable expectation of success in achieving it.

5. Claim 8: “The device of claim 1, wherein the thickness of the device is less than 20 percent of said width.”

277. In my opinion, *Bast/Wedel* renders obvious the additional limitations of claim 8. A POSITA would have found it obvious to use a thickness of the device that is less than 20 percent of the width.

278. In particular, a POSITA would also have found it obvious to modify the shape and size of the *Bast/Wedel* device based on *Wedel* and the knowledge of a POSITA. *Wedel* teaches a technique for making “pocket[-]size[d] phones” (*Wedel*, 1:14-17, 1:19-21, 3:19-27, 9:29-31, 13:5-8), and it was well known that pocket-sized phones can have the claimed thickness ratio. For example, more than four years before *Bast*, *Yamaguchi* taught a mobile phone that is approximately 75mm in width and as thin as 15mm in depth, thus having a thickness that is about 20 percent of said width (I note my explanation above on this point above in Section XI.A.5). *Yamaguchi*, ¶¶[0015], [0034], [0036]. *Yamaguchi* notes “a

demand for a size such that the device can fit in a clothing pocket or the like from the perspective of making the device ‘easily portable anywhere.’” *Yamaguchi*, ¶[0007].

279. Mobile devices disclosed after *Yamaguchi*—but still prior to claim 8’s effective filing date January 22, 2017 (*see* Section VII.C.3)—continued to emphasize the importance of decreasing the thickness of mobile devices, thus creating a motivation to decrease below a thickness that is 20 percent of the width. *See, e.g., Dutta*, ¶[0002]; Section VI.A. It was well known before January 22, 2017, that mobile phones with touchscreens and lacking physical keys on the front surface could have less than a 20% thickness/width ratio. *E.g., Ex. 1046* (disclosing a 2015 touchscreen mobile device that is 72.2mm in width and 8.8mm in thickness, i.e., a 12.2% thickness/width ratio).

280. A POSITA would have been motivated to configure *Bast/Wedel*’s mobile phone to be thin (including having a thickness that is less than 20 percent of the width) to make the phone easier to slip into a pocket and be gripped by one hand, both features described by *Bast* and *Wedel* as being desired by customers. *Bast*, ¶[0006]; *Wedel*, 1:14-17. A POSITA would have a reasonable expectation of success in doing so given *Wedel*’s teachings of using miniaturized components (e.g., the low-profile, built-in, planar antenna) and improving their integration (e.g., the integrated antenna-speaker assembly). *Wedel*, 1:6-9, 1:19-21, 2:30-3:1,

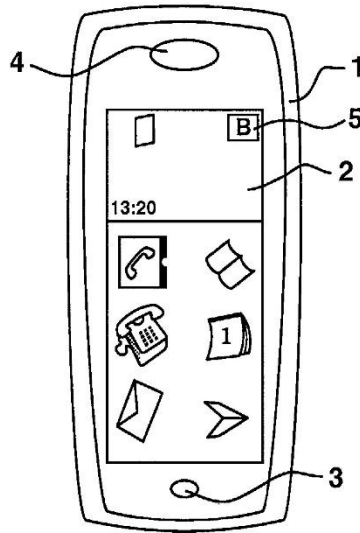
3:19-21, 9:29-31, 13:5-8. I note that the '144 patent itself discloses no special arrangement of the internal components needed to achieve any of its claimed dimensions or size ratios, confirming that such was well within the level of skill in the art at the time. *See generally* Ex. 1001.

B. Ground 2B: Claims 3, 4, and 15-19 Are Obvious over *Bast* in View of *Wedel* and *Benoit*

281. In my opinion, *Bast* in view of *Wedel* and *Benoit* renders obvious claims 3, 4, and 15-19.

1. Rationale to Combine *Bast*, *Wedel*, and *Benoit*

282. In my opinion, it would have been obvious to apply *Benoit*'s teaching about navigating and launching applications on a PDA to *Bast/Wedel*'s mobile phone. Specifically, *Bast/Wedel*'s mobile phone "combines the functions of a personal digital assistant (PDA)" and can "display a desktop in the form of icons corresponding to the various applications programmed in the terminal." *Bast*, ¶[0010].



Bast, Fig. 1. It therefore would have been a logical decision for a POSITA working on improving *Bast/Wedel* to consult *Benoit*'s teaching of navigating and launching applications on a PDA. *Benoit*, 1:4-6. During this effort, a POSITA would have found it obvious to modify *Bast/Wedel* to include *Benoit*'s teaching of (1) swiping the screen to scroll through the application icons, and (2) briefly touching an icon to launch an application linked to the icon. Doing so would simplify the process of navigating and launching applications in *Bast/Wedel*'s device, thereby improving user experience. Moreover, it would extend the control area for application navigation, "so as to distribute the touch points and prevent the premature wear of the touch screen over the defined areas." *Benoit*, 2:9-16.

283. In my opinion, applying *Benoit*'s teaching to *Bast/Wedel* would have yielded a predictable result. *Benoit* discloses that its application navigating and

launching method “can be applied to any communication tool comprising a touch screen and a data processing unit.” *Benoit*, 1:6-7. *Bast/Wedel*’s mobile phone has the same hardware environment because it comprises a touch sensitive display and a central processing unit. *Bast*, ¶¶[0010], [0013]. Thus, it is ready for improvement according to *Benoit*’s known technology. Namely, a POSITA would merely need to update *Bast/Wedel*’s software to implement *Benoit*’s teaching of swiping the screen to scroll through the series of application icons and briefly touching an icon to launch the corresponding application.

284. A POSITA would have considered modifying *Bast/Wedel* with the teaching of *Benoit* to be an example of (A) combining prior-art elements (e.g., *Bast/Wedel*’s mobile phone and *Benoit*’s human-machine interface for a PDA) according to known methods to yield predictable results (e.g., configure *Bast/Wedel*’s software such that the application icons displayed on *Bast/Wedel*’s touchscreen can be scrolled by a user by touching the touchscreen and moving in the intended scroll direction); (B) use of a known technique (e.g., *Benoit*’s teaching of scrolling application icons and launching an application by touching its icon) to improve similar devices (e.g., *Bast/Wedel*’s mobile phone capable of displaying a series of application icons) in the same way; (C) applying a known technique to a known device ready for improvement (e.g., *Bast/Wedel*’s mobile phone that has all the necessary hardware such as a large touchscreen and central processing unit) to

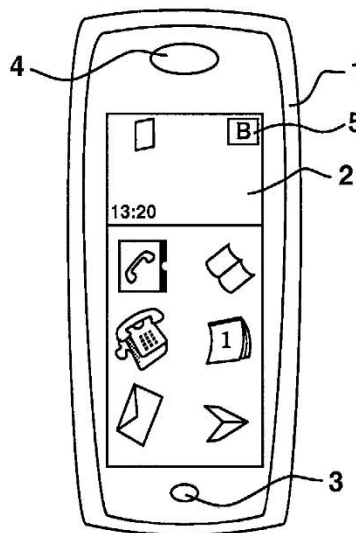
yield predictable results (e.g., configure the central processing unit to enable *Benoit's* application navigating and launching method on the touchscreen); and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the mobile phone disclosed by *Bast/Wedel* to allow users to scroll through the series of application icons displayed on *Bast/Wedel's* touchscreen and launch an application by touching its icon.

285. A POSITA would have a reasonable expectation of success in updating *Bast/Wedel's* software to incorporate *Benoit's* features of swiping and launching applications. As noted above, *Bast/Wedel's* mobile phone has the same hardware environment as *Benoit* because both include a touch sensitive display and a central processing unit. *See, e.g., Bast*, ¶¶[0010], [0013]; *Benoit*, 1:1-10. Configuring *Bast/Wedel* to include *Benoit's* features of swiping and launching applications would have been routine and conventional to a POSITA, as shown by the knowledge of a POSITA. *Benoit* itself evidences that the implementation is straightforward and would merely require software programming. Writing software code to implement functions taught by the prior art, e.g., *Benoit's* application swiping function, was well within the skill of the art. This is consistent with the '144 patent itself, which discloses no special software programming or algorithms needed to achieve this claimed feature, confirming that such was well within the level of skill in the art at the time. *See generally* Ex. 1001.

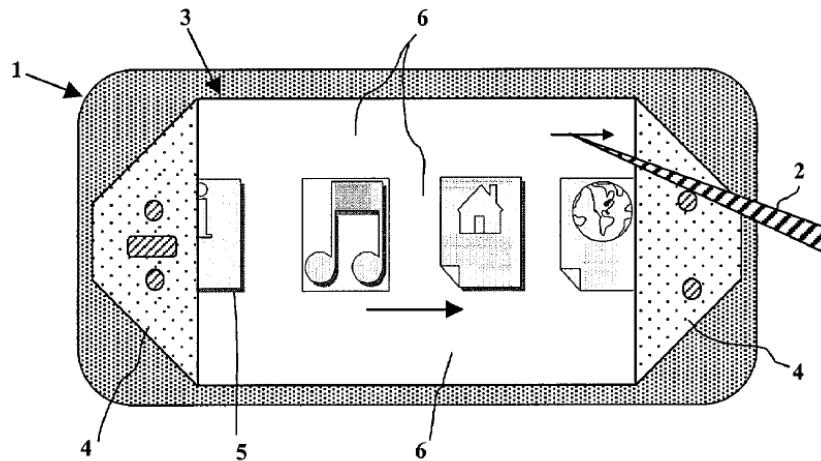
2. Claim 3

- a. 3[a]: “[The] device of claim 1, wherein plurality of icons corresponding to plurality of applications are displayed on said display unit, and”**

286. Claim 3 depends from claim 1. As discussed in Section XIV.A.2, *Bast* in view of *Wedel* renders obvious claim 1. Moreover, in my opinion, *Bast* discloses that the additional limitations of 3[a]. *Bast* discloses the mobile phone has a touchscreen configured to “display a desktop in the form of icons corresponding to the various applications programmed in the terminal.” *Bast*, ¶[0010].



Bast, Fig. 1. Similarly, *Benoit* discloses a touchscreen interface displaying a series of icons representing applications. *Benoit*, 4:13-20.



Benoit, Fig. 1.

- b. 3[b]: “wherein upon providing a sweeping action on said display unit, plurality of other icons corresponding to plurality of other applications are displayed on said display unit.”

287. In my opinion, *Bast* in view of *Wedel* and *Benoit* renders obvious the additional limitations of 3[b]. *Benoit* discloses a method for scrolling the application icons by using a stylus or a finger on the touchscreen “to indicate a move in the direction of the scroll.” *Benoit*, Abstract. As shown in *Benoit*’s Figure 1, this can be done by “a touch followed by a directional movement.” *Benoit*, 2:21-3:2. Here, as shown by the following color annotations in Figure 1, the **touch and directional movement** constitute a **sweeping action**. A **first plurality of icons** would be displayed pre-scroll (i.e., before the sweeping action), while a **second plurality of applications** would be displayed post-scroll (after the sweeping action).

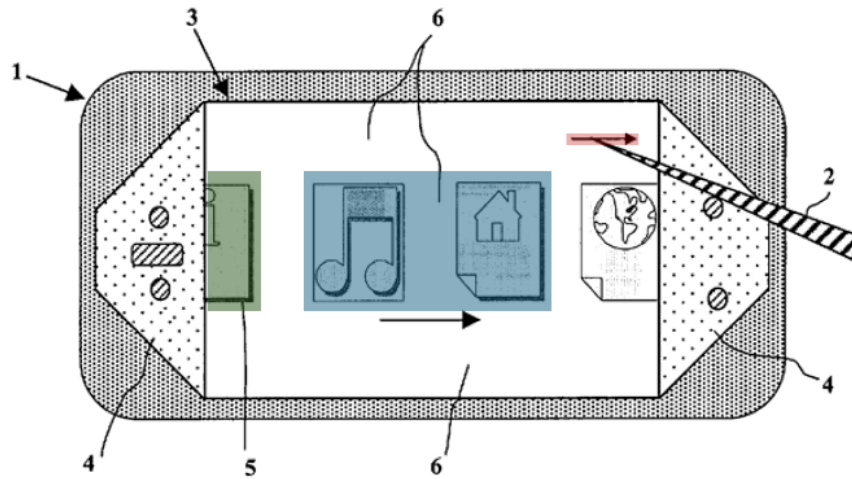


FIGURE 1

Benoit, Fig. 1; see also *Benoit*, Fig. 3.

288. For the reasons discussed in Section XIV.B.1, it would have been obvious to a POSITA to modify *Bast/Wedel* to include this feature from *Benoit*. See Section XIV.B.1. Moreover, a POSITA would have been particularly interested in adopting *Benoit*'s teaching to provide a convenient way of navigating the application icons when there are too many of them to fit in *Bast/Wedel*'s screen.

3. Claim 4: "The device of claim 3, wherein upon providing a predefine interaction with an icon, said corresponding application is opened on the display unit."

289. Claim 4 depends from claim 3. As discussed in Section XIV.B.2, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 3. Moreover, in my opinion, *Bast* in view of *Wedel* and *Benoit* also renders obvious the additional limitations of

claim 4. *Bast* does not expressly disclose how to launch the applications displayed on its touchscreen (*Bast*, ¶[0010], Fig. 1), but *Benoit* discloses that “a brief touch on an icon launches an application linked to the icon.” *Benoit*, 3:5-8; *see also Benoit*, 5:1-2, 5:9-16 (teaching that an icon may be “identified and selected” and the icons are capable of “launching an application”), 5:22-23 (“An application launch command is characterized by a brief touch of the stylus on the icon.”). For the reasons discussed in Section XIV.B.1, it would have been obvious to a POSITA to configure *Bast/Wedel* to implement *Benoit*’s teaching about launching an application by touching an icon corresponding to the application. *See* Section XIV.B.1. Moreover, in my opinion, a POSITA would have been motivated to implement such application launching method because it is easy and simple for a user to operate, and is a natural way for opening an application after scrolling/swiping a series of application icons. A POSITA would also have a reasonable expectation of success for doing so because *Bast/Wedel*’s touchscreen is capable of receiving a touch command and its central processing unit can be configured (e.g. by updating the software running in the central processing unit) to translate the touch command into a trigger signal for launching an application.

4. Independent Claim 15

a. 15[pre]: “A mobile phone device, comprising:”

290. *Bast* discloses 15[pre] for the same reasons discussed for 1[pre].

b. 15[a]: “a body having a practically rectangular shape;”

291. *Bast* discloses 15[a] for the same reasons discussed for 1[a].

c. 15[b]: “a processor; and”

292. *Bast* discloses 15[b] because *Bast* discloses that the mobile phone includes a central processing unit.

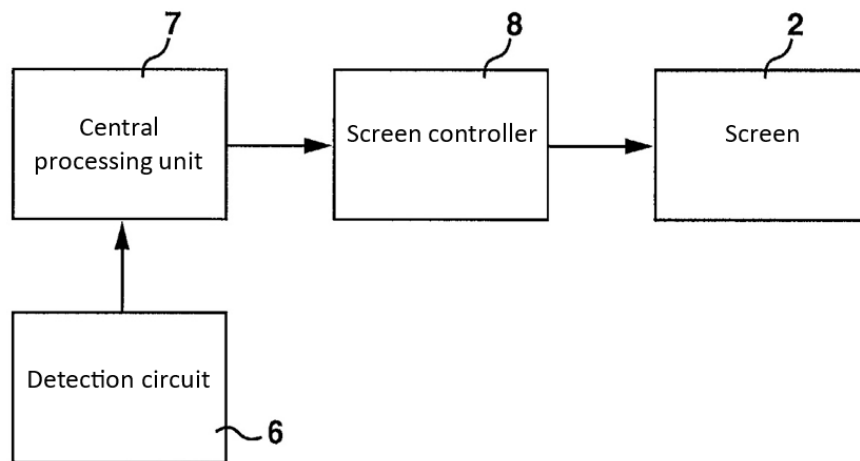


Figure 4

Bast, Fig. 4. *Bast* teaches that the central processing unit is used to control the display of the portrait and landscape modes. *Bast*, ¶¶[0013]-[0014], [0016], [0019]-[0023].

d. 15[c]: “a display unit, said display unit occupying practically the entire surface of the front surface of said device is integrated within said device;”

293. *Bast/Wedel* renders obvious 15[c] for the same reasons discussed for 1[e].

- e. **15[d]: “wherein plurality of icons corresponding to a plurality of applications are displayed by said processor on said display unit; and”**

294. *Bast* discloses 15[d]. For the same reasons discussed for 3[a], both *Bast* and *Benoit* disclose that a plurality of icons corresponding to a plurality of applications can be displayed on a touchscreen. *See* Section XIV.B.2.a. Moreover, *Bast* teaches that its central processing unit transmits images to a screen controller for displaying in the portrait or landscape mode. *Bast*, ¶[0013].

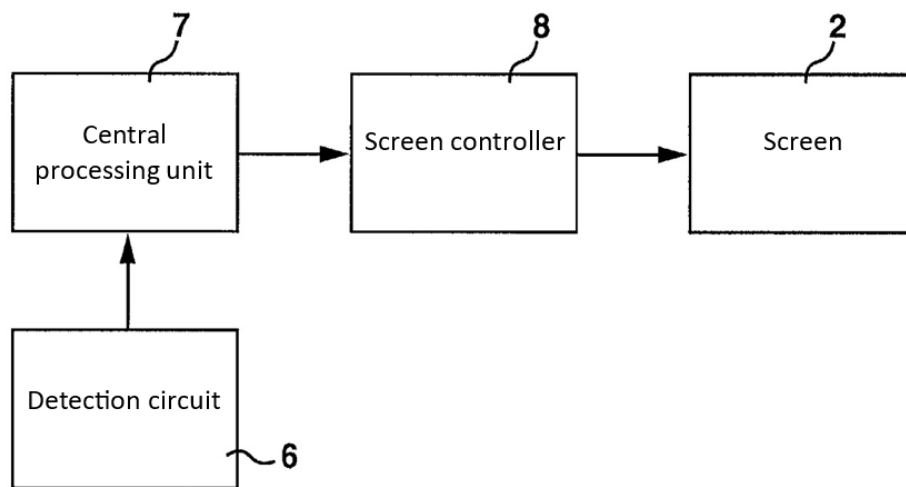


Figure 4

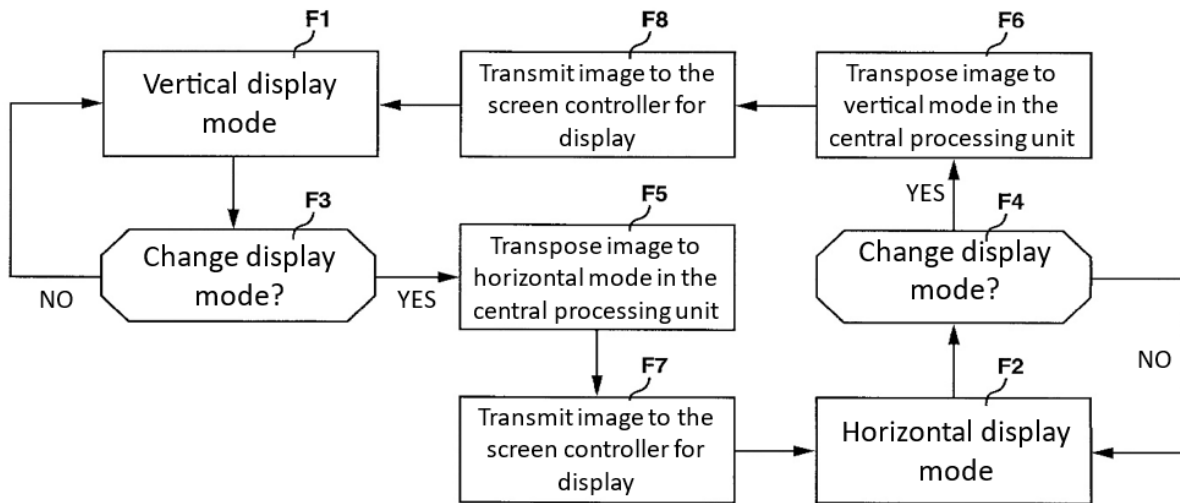


Figure 5

Bast, Figs. 4-5. Therefore, a POSITA would understand that the central processing unit is used to display the application icons.

- f. **15[e]: “wherein upon identifying an input corresponding to a sweeping action provided on a touch sensitive surface of said device, said processor displays plurality of other icons corresponding to plurality of other applications on said display unit.”**

295. *Bast/Wedel/Benoit* renders obvious 15[e]. As discussed for 1[e], *Bast* discloses a touchscreen for displaying information. See Section XIV.A.2.f.

Moreover, *Bast/Wedel/Benoit* renders obvious “wherein upon identifying an input corresponding to a sweeping action provided on a touch sensitive surface of said device, said processor displays [a] plurality of other icons corresponding to [a] plurality of other applications on said display unit,” for the reasons discussed in connection with 3[b]. It would have been obvious to a POSITA that a processor as

disclosed in *Bast* performs “display[ing] [a] plurality of other icons corresponding to [a] plurality of other applications on said display” because that was the standard way phones carried out processes at the time. Therefore, *Bast/Wedel/Benoit* renders obvious 15[e].

296. As I explain above, it is thus my opinion that *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15.

5. Claim 16: “The device of claim 15, wherein said display unit is touch sensitive and wherein said sweeping action is provided on said display unit.”

297. Claim 16 depends from claim 15. As discussed in Section XIV.B.4, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15. Moreover, in my opinion, *Bast/Wedel/Benoit* renders obvious the additional limitations of claim 16. As discussed in connection with 15[e], *Bast* discloses a touch sensitive display unit, and *Benoit* discloses that the sweeping action is made by touching and making a directional movement on the touch sensitive display unit. *See* Section XIV.B.4.f.

6. Claim 17: “The device of claim 15, wherein upon providing a predefined interaction with an icon, the corresponding application is opened on the screen.”

298. Claim 17 depends from claim 15. As discussed in Section XIV.B.4, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15. Moreover, the

additional limitations of claim 17 are substantially similar to those of claim 4, and they are disclosed by *Bast* for the same reasons discussed for claim 4.

7. Claim 18: “The device of claim 15, wherein said device does not include a physical key on the front surface of the device.”

299. Claim 18 depends from claim 15. As discussed in Section XIV.B.4, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15. Moreover, the additional limitations of claim 18 are substantially similar to those of 1[f], and thus they are disclosed by *Bast* for the same reasons discussed for 1[f].

8. Claim 19: “The device of claim 15, wherein said components of the mobile phone are integrated within the body such that none of said components is noticeably extended out from said the body.”

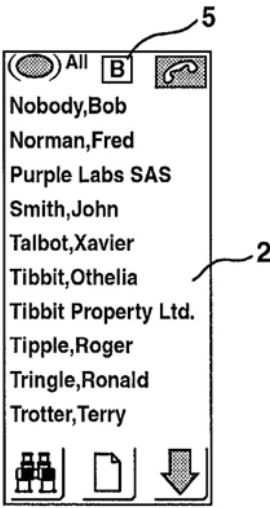
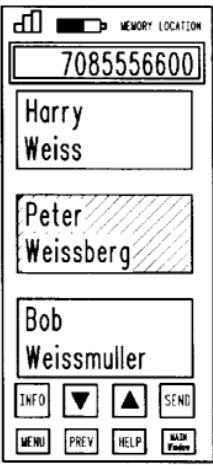
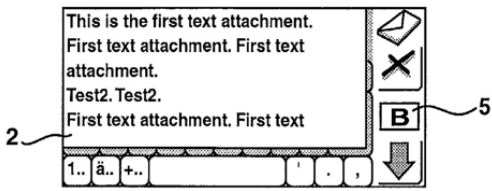
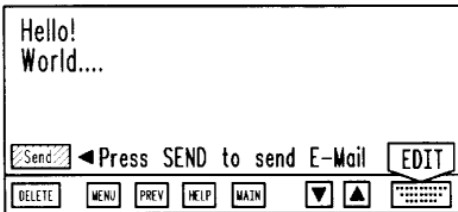
300. Claim 19 depends from claim 15. As discussed in Section XIV.B.4, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15. Moreover, the additional limitations of claim 19 are substantially similar to those of 1[g], and they are disclosed by *Bast* for the same reasons discussed for 1[g].

C. Ground 3B: Claims 5, 9-11, and 14 Are Obvious over *Bast* in View of *Wedel* and *Jambhekar*

301. In my opinion, *Bast* in view of *Wedel* and *Jambhekar* renders obvious claims 5, 9-11, and 14.

1. Rationale to Combine *Bast*, *Wedel*, and *Jambhekar*

302. In view of *Jambhekar*'s teaching, a POSITA would have been motivated to provide virtual keyboards in *Bast/Wedel*'s portrait and landscape modes to facilitate text input. Particularly, both *Bast/Wedel* and *Jambhekar* disclose mobile phones having a touchscreen with portrait and landscape display modes. *Bast*, Abstract, ¶[0001], Figs. 2-3; *Jambhekar*, 4:23-25, 4:44-52, Figs. 4-8. *Bast/Wedel* discloses that its portrait mode is "most suitable for viewing a directory" with "a large number of short pieces of information constituting a list, such as a name list," while its landscape mode "is more suitable for viewing text" and "images." *Bast*, ¶[0011]. Likewise, *Jambhekar* uses the portrait mode for telephone functions, such as looking up the phone book directory, and uses the landscape mode for messaging functions, such as viewing and entering a text message. *Jambhekar*, 4:44-52, 6:1-2, 7:41-42.

Mode	<i>Bast</i>	<i>Jambhekar</i>
Portrait	 Figure 2	 FIG. 5 H
Landscape	 Figure 3	 FIG. 8 C

Because *Bast/Wedel* and *Jambhekar* both use the portrait and landscape modes for the same purpose, a POSITA would have considered *Jambhekar*’s teaching—providing virtual keyboards in the portrait and landscape modes to enable text input in these display modes—relevant to improving *Bast/Wedel*’s mobile phone.

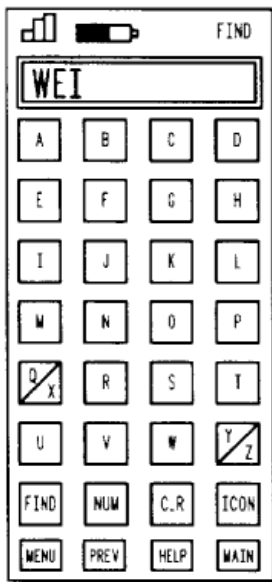


FIG. 5G

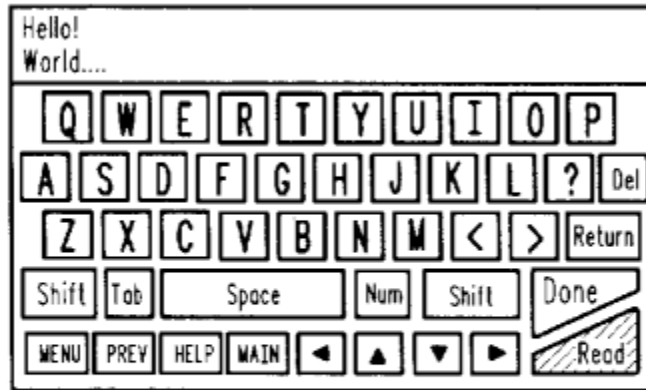


FIG. 8B

Jambhekar, Figs. 5G, 8B.

303. Making this modification to *Bast/Wedel* would be a logical extension of its existing input methods. For example, *Bast/Wedel* already uses “a virtual keypad for numbering.” *Bast*, ¶[0010]. A POSITA would have contemplated expanding it to virtual alphanumeric and/or QWERTY keyboards for text input, as they were routinely used in the art. *See* Section VI. Doing so would be appealing because some customers preferred to use keyboards similar to those used with computers. Moreover, *Bast/Wedel* enables users to “writ[e] by means of a stylus.” *Bast*, ¶[0010]. *Bast* does not describe how the stylus can be used, but it would have been obvious to write by using the stylus to click a virtual keyboard, as *Jambhekar* teaches that “a stylus or writing implement” can be used together with its virtual

keyboards. *Jambhekar*, 2:45-47. Additionally, to the extent *Bast*'s stylus was originally designed for use as a handwriting tool, it would have been desirable to configure *Bast/Wedel* to offer *Jambhekar*'s virtual alphanumeric and/or QWERTY keyboards as an alternative input method, so that customers can have more choices. At the time of the '144 patent, it was common to provide both handwriting means and virtual keyboards in a mobile phone. *Jambhekar*, 5:43-47, 8:22-24, Figs. 5G, 8B, 10C, 11B. These virtual keyboards can serve as a back-up when the handwriting means fails.

304. Moreover, applying *Jambhekar*'s teaching to *Bast/Wedel* would improve its functions. Both *Bast/Wedel* and *Jambhekar* are directed to sophisticated mobile phones that provide applications (e.g., texting, e-mail, etc.) beyond the traditional phone-dialing functions. *Bast*, ¶¶[0001], [0010]; *Jambhekar*, 1:21-24. *Jambhekar* recognized the tension between the mobile phone's "small display and ... fixed data input keypad" and a "wireless data service such as e-mail [that] requires extensive display of received messages as well as extensive user data input from either a pen or a keyboard," (*Jambhekar*, 1:32-37), and sought to provide a phone user interface for "more convenient operation by the user" to navigate the various applications. *Jambhekar*, 1:46-50. A POSITA therefore would have been prompted by *Jambhekar*'s teaching to fuse a versatile virtual keyboard

into *Bast/Wedel*'s portrait and landscape display modes to allow a seamless user experience in viewing and inputting information in these modes. *See* Section VI.C.

305. For example, as illustrated by *Jambhekar*, when making a phone call, *Bast/Wedel*'s "virtual keypad for numbering" may not be enough if a user needs to enter the contact's name to search for the corresponding phone number in the phone directory. *Bast*, ¶[0010].

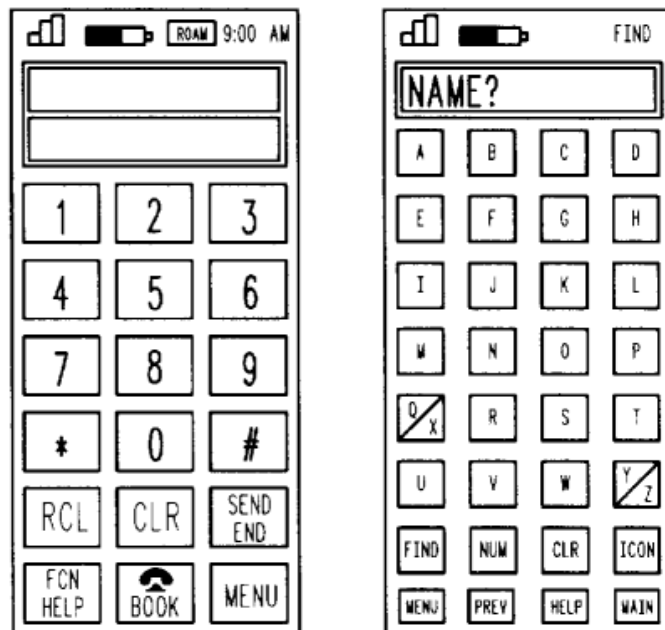


FIG. 5E **FIG. 5F**

Jambhekar, 6:21-23, Figs. 5E-5F. Thus, it would have been obvious to also provide a virtual QWERTY keyboard in *Bast/Wedel* as a supplement to the virtual numerical keypad to allow a user to more easily enter a contact's name or other queries.

306. In my opinion, a POSITA would have considered modifying *Bast/Wedel*'s mobile phone to incorporate *Jambhekar*'s virtual keyboards to be an example of (A) combining prior-art elements (e.g., *Bast/Wedel*'s mobile touchscreen phone) according to known methods (e.g., the orientation-aligned virtual keyboards of *Jambhekar*) to yield predictable results; (B) use of a known technique (*Jambhekar*'s virtual keyboards in portrait and landscape directions) to improve similar devices (*Bast/Wedel*'s mobile phone capable of detecting the housing orientation and rotating the display between portrait and landscape directions) in the same way; (C) applying a known technique (*Jambhekar*'s virtual keyboards in portrait and landscape directions) to a known device ready for improvement (e.g., *Bast/Wedel*'s mobile phone that has all the necessary hardware, such as a large touchscreen and central processing unit, and is capable of displaying information in portrait and landscape modes) to yield predictable results; and/or (D) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify *Bast/Wedel*'s mobile phone to provide virtual alphanumerical or QWERTY keyboards for inputting text in the portrait and landscape display modes.

307. In my opinion, a POSITA would have had a reasonable expectation of success for implementing *Jambhekar*'s virtual keyboards in *Bast/Wedel*'s portrait and landscape display modes. This would only require combining prior-art

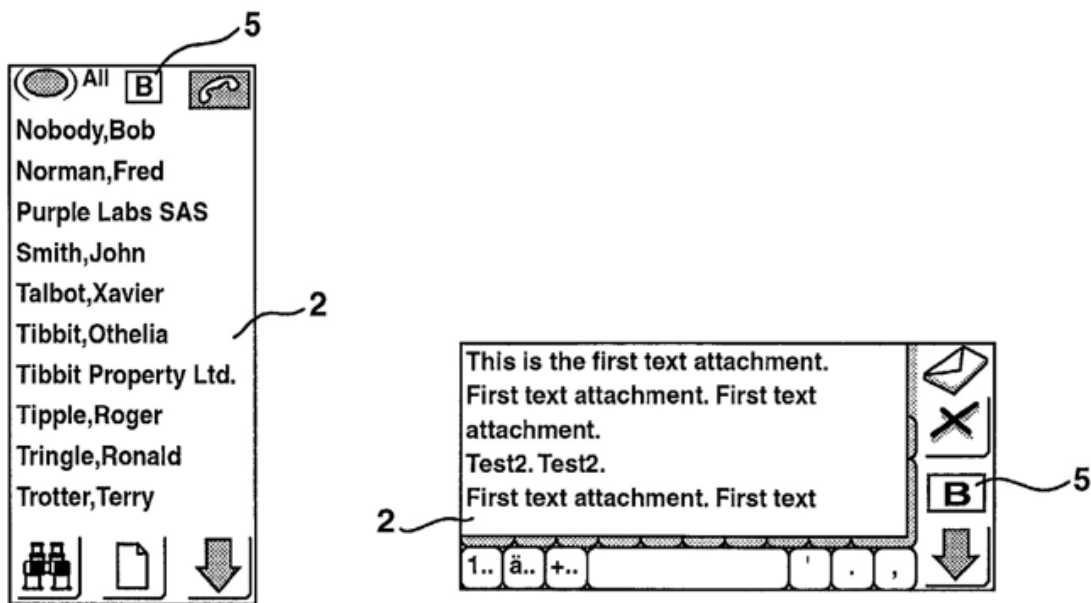
elements and applying *Jambhekar*'s known technique to improve similar devices (*Bast/Wedel*'s mobile phone with touchscreen) in the same way. Moreover, the modification would only involve updating *Bast/Wedel*'s input software, without requiring any change to *Bast/Wedel*'s physical architecture. Since *Bast/Wedel* already enables a virtual keypad for numbers, adding the virtual alphanumeric/QWERTY keyboards would be a relatively minor and straightforward extension to the existing input software. Writing software code to implement functions taught by the prior art, e.g., *Jambhekar*'s virtual keyboards for text input, was well within the skill of the art. Further, *Bast/Wedel* already provided the essential hardware environment (touchscreen, central processing unit, screen controller, etc.) for implementing the modification. *Bast*, ¶¶[0010], [0013], Figs. 1, 4.

2. **Claim 5: “The device of claim 1, wherein said device is adapted to display text entered through a keyboard in landscape direction and in portrait direction on said display unit when the device is used, respectively, in landscape position and in portrait position.”**

308. Claim 5 depends from claim 1, which is rendered obvious by *Bast* in view of *Wedel*. See Section XIV.A.2. Moreover, in my opinion, *Bast/Wedel/Jambhekar* renders obvious the additional limitations of claim 5. Specifically, *Bast* discloses a mobile phone having a touchscreen “enabling a display in portrait mode when the device is vertical and in landscape mode when

the device is horizontal.” *Bast*, ¶[0001]; *see also Bast*, Abstract, ¶[0023]-[0024].

As shown in Figures 2 and 3, *Bast* teaches that the portrait and landscape modes are suitable for displaying different types of text information. *Bast*, ¶[0011] (“The vertical display is, for example, the most suitable for viewing a directory. This is because it enables a large number of short pieces of information constituting a list, such as a name list, to be displayed one after another. Likewise, the horizontal display is more suitable for viewing text because it minimizes the number of line breaks and enables more comfortable reading. It is also more suitable for viewing images that are more wide than tall.”).



Bast, Figs. 2-3. Additionally, for the reasons discussed in Section XIV.C.1, it would have been obvious to implement *Jambhekar*’s virtual keyboards in

Bast/Wedel's portrait and landscape display modes to provide a convenient way for users to enter text information in these modes.

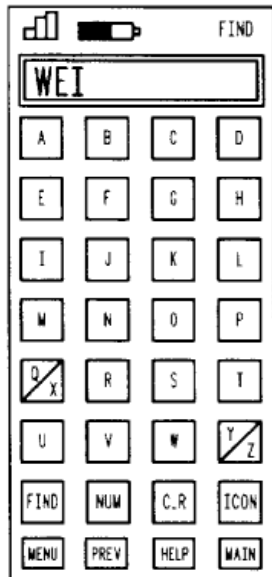


FIG. 5G

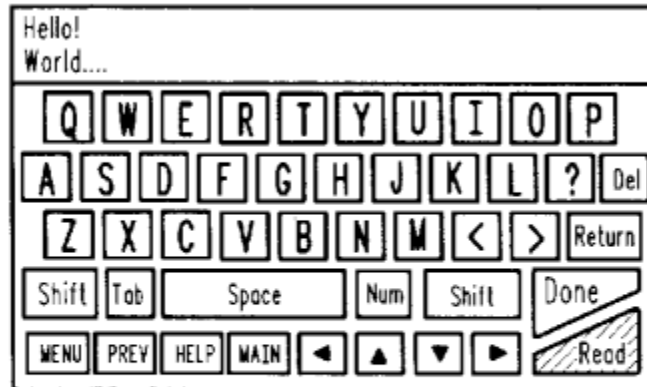


FIG. 8B

Jambhekar, Figs. 5G, 8B. Therefore, it is my opinion that *Bast/Wedel/Jambhekar* renders obvious claim 5.

3. Independent Claim 9

a. 9[pre]: “A mobile phone, comprising:”

309. *Bast* discloses 9[pre] for the same reasons as it discloses 1[pre].

b. 9[a]: “a body having a practically rectangular shape, said body having a front surface, a back surface and four side surfaces,”

310. 9[a] is substantially similar to 1[a], and is disclosed or rendered obvious by *Bast* for the same reasons discussed in connection with 1[a].

- c. **9[b]: “wherein the length of the front surface of the mobile phone corresponds to the distance between the ear and the mouth of a user and”**

311. 9[b] is substantially similar to 1[b], and is disclosed by *Bast* for the same reasons discussed in connection with 1[b].

- d. **9[c]: “wherein the width of the front surface of the mobile phone is significantly shorter than the length, and”**

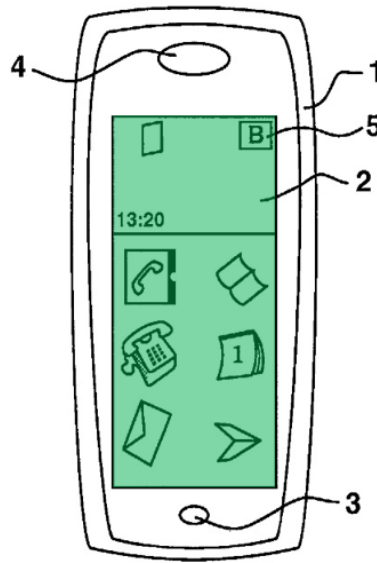
312. 9[c] is substantially similar to 1[c], and is disclosed by *Bast* for the same reasons discussed in connection with 1[c].

- e. **9[d]: “wherein said body has a thin thickness;”**

313. 9[d] is substantially similar to 1[d], and is disclosed by *Bast* or rendered obvious by *Bast* when combined with the knowledge of a POSITA for the same reasons discussed in connection with 1[d] and claim 8.

- f. **9[e]: “a touch sensitive display unit;”**

314. *Bast* discloses 9[c] because *Bast* teaches that the mobile phone has a “touch screen 2.” *Bast*, ¶[0010].



Bast, Fig. 1.

g. 9[f]: “a virtual keyboard to enter text; and”

315. *Bast/Wedel/Jambhekar* renders obvious 9[f]. *Jambhekar* teaches providing virtual keyboards in portrait and landscape display modes to enable text input.

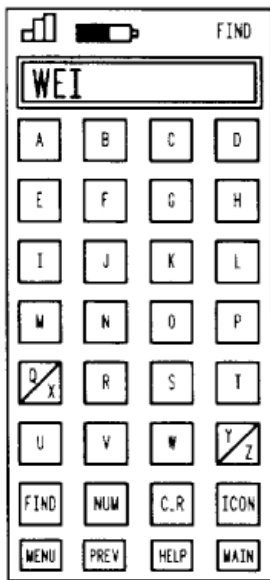


FIG. 5G

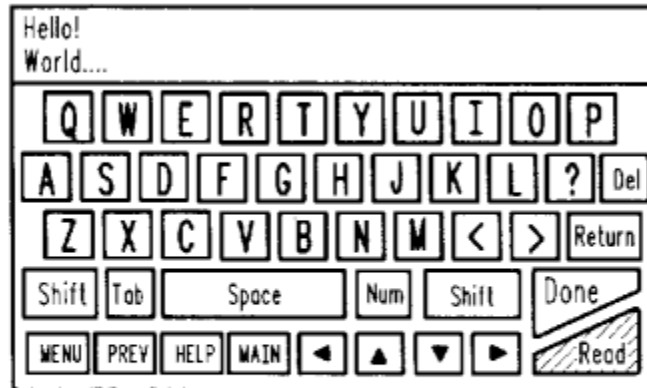
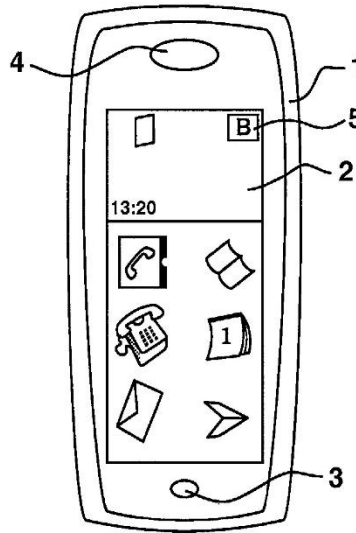


FIG. 8B

Jambhekar, Figs. 5G, 8B. And, for the reasons discussed in Section XIV.C.1, a POSITA would have found it obvious to implement these virtual keyboards in *Bast/Wedel*'s portrait and landscape display modes as well.

h. 9[g]: “a microphone and a speaker;”

316. *Bast* discloses 9[g] because *Bast* discloses that the mobile phone “includes a microphone 3 and a speaker 4.” *Bast*, ¶[0010].



Bast, FIG. 1.

- i. **9[h]: “wherein said display unit, practically occupying the entire front surface of the mobile phone, is integrated within said mobile phone and”**

317. 9[h] is substantially similar to 1[e], and is rendered obvious by *Bast* in view of *Wedel* for the same reasons discussed in connection with 1[e].

- j. **9[i]: “wherein said front surface of the mobile phone does not have a physical button and wherein said mobile phone does not have a physical keyboard to enter text, and”**

318. *Bast* discloses 9[i]. For the reasons discussed in Section XIV.A.2.g for 1[f], *Bast*’s mobile phone does not have a physical button on the front surface, and it is designed to not require any physical key for inputting data or controlling the phone’s settings and functions. Particularly, *Bast* discloses “[t]he touch screen 2 is ... [used] to enable[] the input and display of data, particularly writing by means

of a stylus,” and the touch screen displays “function icons, settings icons, a virtual keypad for numbering etc.” *Bast*, ¶[0010]. Thus, a POSITA would understand that *Bast*’s mobile’s touchscreen (and virtual buttons or virtual keyboards displayed thereon) is sufficient for input and thus does not require any physical input buttons. Moreover, for the reasons discussed in Section XIV.C.1, it would have been obvious to combine *Jambhekar*’s teaching with *Bast/Wedel* to provide virtual keyboards in the portrait and landscape display modes, to enable text input. In view of this, a POSITA would have found it unnecessary to include any physical keyboard in the phone. Without the physical keyboard, the phone would be thinner and less bulky, thereby meeting *Bast/Wedel*’s demand for pocket size phones. See Section VI.B; *Wedel*, 1:14-17.

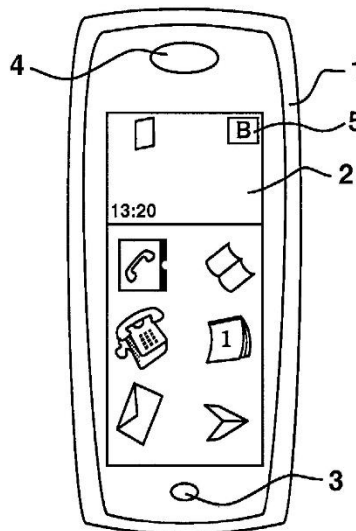
- k. **9[j]: “wherein said display unit is adapted to display text, entered through the virtual keyboard, in landscape direction and in portrait direction when the mobile phone is used, respectively, in landscape position and in portrait position.”**

319. 9[j] is substantially similar to claim 5, and is rendered obvious by *Bast/Wedel/Jambhekar* for the same reasons discussed in connection with claim 5.

320. As I explain above, it is thus my opinion that *Bast* in view of *Wedel* and *Jambhekar* renders obvious claim 9.

4. Claim 10: “The mobile phone of claim 9, wherein the distance between said microphone and said speaker corresponds to the distance between the ear and the mouth of a user.”

321. Claim 10 depends from claim 9. As discussed in Section XIV.C.3, *Bast* in view of *Wedel* and *Jambhekar* renders obvious claim 9. Moreover, in my opinion, *Bast* discloses the additional limitations of claim 10. Specifically, for the reasons discussed in Section XIV.A.2.c for 1[b], in view of *Bast*’s teaching regarding ergonomic design, a POSITA would understand that the speaker 4 and microphone 3 in *Bast*’s mobile phone are positioned in proximity to an average user’s ear and mouth respectively, such that the phone’s length approximately corresponds to a user’s ear-to-mouth distance.



Bast, ¶[0003], Fig. 1; *see also Dutta*, ¶[0003] (“the ideal size of a mobile phone is determined by the typical ear-to-mouth distance of the average user”); *Yamaguchi*,

¶[0005] (“an ear is placed near the speaker part 5 or the mouth is placed near the microphone part 6 to perform audio input/output operations”); *Rydbeck*, 8:57-60 (“a microphone located such that it is positioned proximate a user's mouth when the user has said speaker adjacent his or her ear”).

322. The modification taught by *Wedel* moves *Bast*'s speaker behind the screen of the phone, but does not require changing the speaker's position in the longitudinal direction. Accordingly, the *Bast/Wedel/Jambhekar* mobile phone would retain the same speaker-to-microphone distance taught in *Bast*.

5. Claim 11: “The mobile phone of claim 9, wherein said practically rectangular shape has rounded corners.”

323. Claim 11 depends from claim 9. As discussed in Section XIV.C.3, *Bast* in view of *Wedel* and *Jambhekar* renders obvious claim 9. Moreover, the additional limitations of claim 11 are substantially similar to those of claim 2, and they are disclosed or rendered obvious by *Bast* for the same reasons discussed in connection with claim 2.

6. Claim 14: “The mobile phone of claim 9, wherein said components of the mobile phone are integrated within the body such that none of said components is significantly extended out from the body.”

324. Claim 14 depends from claim 9. As discussed in Section XIV.C.3, *Bast* in view of *Wedel* and *Jambhekar* renders obvious claim 9. Moreover, the

additional limitations of claim 14 are substantially similar to those of 1[g], and they are disclosed by *Bast* for the same reasons discussed in connection with 1[g].

D. Ground 4B: Claims 12, 13, and 20 Are Obvious over *Bast* in View of *Wedel*, *Jambhekar*, and *Benoit*

325. In my opinion, *Bast* in view of *Wedel*, *Jambhekar*, and *Benoit* renders obvious claims 12, 13, and 20.

1. Rationale to Combine *Bast*, *Wedel*, *Jambhekar*, and *Benoit*

326. For the reasons discussed in Sections XIV.C.1 and XIV.B.1 respectively, it would have been obvious to modify *Bast/Wedel*'s mobile phone to implement *Jambhekar*'s virtual keyboards and *Benoit*'s method of swiping the screen to scroll through the series of application icons. In my opinion, a POSITA would have been motivated to add both functions to *Bast/Wedel*'s mobile phone to merge their respective benefits. *See* Sections XIV.B.1, XIV.C.1. The resulting product would be able to meet the customers' diverse requirements. A POSITA would have a reasonable expectation of success for doing so because it only involves combining prior-art elements according to known methods—updating *Bast/Wedel*'s software to carry out the respective functions taught by *Jambhekar* and *Benoit*. At the time of the '144 patent, it was common to update the phone software to add new features cumulatively. And, because the functions taught by *Jambhekar* and *Benoit* do not have any overlap or conflict, a POSITA would

reasonably expect the software update to be a straightforward and routine task, as writing software code to implement discrete functions identified in the prior art was well within the skill of the art.

2. Claim 12

- a. 12[a]: “The mobile phone of claim 9, wherein plurality of icons corresponding to plurality of applications are displayed on said display unit, and”**

327. The limitations of 12[a] are substantially similar to those of 3[a], and they are disclosed by *Bast* for the same reasons discussed for 3[a].

- b. 12[b]: “wherein upon providing a sweeping action on said display unit, plurality of other icons corresponding to plurality of other applications are displayed on said display unit.”**

328. The limitations of 12[b] are substantially similar to those of 3[b], and they are rendered obvious by *Bast/Wedel/Benoit* for the same reasons discussed for 3[b]. Moreover, as discussed in Section XIV.D.1, it would have obvious to combine the respective teachings of *Jambhekar* and *Benoit* with *Bast/Wedel*’s mobile phone.

3. **Claim 13: “The mobile phone of claim 12, wherein upon providing a predefine interaction with an icon, the corresponding application is opened on the screen.”**

329. The additional limitations of claim 13 are substantially similar to those of claim 4, and they are disclosed by *Bast* for the same reasons discussed for claim 4.

4. **Claim 20: “The device of claim 15, wherein said display unit is adapted to display text entered through a keyboard in landscape direction and in portrait direction on said display unit when the device is used, respectively, in landscape position and in portrait position.”**

330. Claim 20 depends from claim 15. As discussed in Section XIV.B.4, *Bast* in view of *Wedel* and *Benoit* renders obvious claim 15. Moreover, the additional limitations of claim 20 are substantially similar to those of claim 5, and they are rendered obvious by *Bast* in view of *Wedel* and *Jambhekar* for the same reasons discussed for claim 5. Moreover, as discussed in Section XIV.D.1, it would have obvious to combine the respective teachings of *Jambhekar* and *Benoit* with *Bast/Wedel*'s mobile phone.

XV. CONCLUSION

331. For the reasons set forth in Sections XI (Grounds 1A-5A) and XIV (Grounds 1B-4B), it is my opinion that one skilled in the art would have found claims 1-5 and 7-20 of the '144 patent obvious.

332. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

333. 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.

Respectfully submitted,

Dated: February 14, 2025



Benjamin B. Bederson, Ph.D.

CLAIMS APPENDIX

1. **1[pre]** A mobile phone device, comprising:
 - 1[a]** a practically rectangular-shaped housing within which the components of a mobile phone are integrated, said housing having a front surface, a back surface and four side surfaces,
 - 1[b]** wherein the length of the front surface approximately corresponds to the distance between the ear and the mouth of a user and
 - 1[c]** wherein the width of the front surface is substantially shorter than the length and
 - 1[d]** wherein the housing has a thin thickness; and
 - 1[e]** a display unit integrated within the front surface of said housing wherein said display unit practically covers the entire front surface of said housing;
 - 1[f]** wherein said mobile phone device does not include a physical key on the front surface, and
 - 1[g]** wherein said components of the mobile phone are integrated within said housing such that none of said components is noticeably extended out from said housing.
2. The device of claim 1, wherein

said practically rectangular shape has rounded corners.

3. **3[a]** [The] device of claim 1, wherein

plurality of icons corresponding to plurality of applications are displayed on

said display unit, and

3[b] wherein upon providing a sweeping action on said display unit,

plurality of other icons corresponding to plurality of other applications

are displayed on said display unit.
4. The device of claim 3, wherein

upon providing a predefine interaction with an icon, said corresponding

application is opened on the display unit.
5. The device of claim 1, wherein

said device is adapted to display text entered through a keyboard in

landscape direction and in portrait direction on said display unit when

the device is used, respectively, in landscape position and in portrait

position.
7. The device of claim 1, wherein

the width of the device is approximately half of said length.

8. The device of claim 1, wherein
the thickness of the device is less than 20 percent of said width.
9. **9[pre]** A mobile phone, comprising:
 - 9[a]** a body having a practically rectangular shape, said body having a front surface, a back surface and four side surfaces,
 - 9[b]** wherein the length of the front surface of the mobile phone corresponds to the distance between the ear and the mouth of a user and
 - 9[c]** wherein the width of the front surface of the mobile phone is significantly shorter than the length, and
 - 9[d]** wherein said body has a thin thickness;
 - 9[e]** a touch sensitive display unit;
 - 9[f]** a virtual keyboard to enter text; and
 - 9[g]** a microphone and a speaker;
 - 9[h]** wherein said display unit, practically occupying the entire front surface of the mobile phone, is integrated within said mobile phone and wherein said front surface of the mobile phone does not have a physical button and

9[i] wherein said mobile phone does not have a physical keyboard to enter text, and

9[j] wherein said display unit is adapted to display text, entered through the virtual keyboard, in landscape direction and in portrait direction when the mobile phone is used, respectively, in landscape position and in portrait position.

10. The mobile phone of claim 9, wherein
the distance between said microphone and said speaker corresponds to the distance between the ear and the mouth of a user.
11. The mobile phone of claim 9, wherein
said practically rectangular shape has rounded corners.
12. **[12a]** The mobile phone of claim 9, wherein
plurality of icons corresponding to plurality of applications are displayed on said display unit, and
[12b] wherein upon providing a sweeping action on said display unit,
plurality of other icons corresponding to plurality of other applications are displayed on said display unit.

13. The mobile phone of claim 12, wherein
upon providing a predefine interaction with an icon, the corresponding
application is opened on the screen.
14. The mobile phone of claim 9, wherein
said components of the mobile phone are integrated within the body such
that none of said components is significantly extended out from the
body.
15. **15[pre]** A mobile phone device, comprising:
15[a] a body having a practically rectangular shape;
15[b] a processor; and
15[c] a display unit, said display unit occupying practically the entire surface
of the front surface of said device is integrated within said device;
15[d] wherein plurality of icons corresponding to a plurality of applications
are displayed by said processor on said display unit; and
15[e] wherein upon identifying an input corresponding to a sweeping action
provided on a touch sensitive surface of said device, said processor

displays plurality of other icons corresponding to plurality of other applications on said display unit.

16. The device of claim 15, wherein
said display unit is touch sensitive and wherein said sweeping action is
provided on said display unit.
17. The device of claim 15, wherein
upon providing a predefined interaction with an icon, the corresponding
application is opened on the screen.
18. The device of claim 15, wherein
said device does not include a physical key on the front surface of the
device.
19. The device of claim 15, wherein
said components of the mobile phone are integrated within the body such
that none of said components is noticeably extended out from said the
body.

20. The device of claim 15, wherein
said display unit is adapted to display text entered through a keyboard in
landscape direction and in portrait direction on said display unit when
the device is used, respectively, in landscape position and in portrait
position.