UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

TCL CORPORATION; TCL COMMUNICATION TECHNOLOGY HOLDINGS LTD.; TCT MOBILE LIMITED; TCT MOBILE INC.; and TCT MOBILE (US), INC.,

Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON

Patent Owner.

---

Cases IPR2015-01674, IPR2015-01676, IPR2015-01761, IPR2015-01806

U.S. Patent No. RE43,931

---

**DECLARATION OF Jean Renard Ward**

# TABLE OF CONTENTS


I. Qualifications ..... 1

II. My Status as an Independent Expert Witness ..... 4

III. Materials Considered ..... 5

IV. Understanding of the Law ..... 6

A. A Person Having Ordinary Skill in the Relevant Field During the Relevant Timeframe ..... 6

B. Claim Construction ..... 8

C. Anticipation ..... 9

D. Obviousness ..... 9

V. Description of the Relevant Field at the Relevant Timeframe ..... 11

VI. The '931 Patent ..... 19

VII. Claim Interpretation ..... 25

VIII. Discussion of Relevant Prior Art ..... 26

A. Summary of Palatsi ..... 27

B. Summary of Moore ..... 28

C. Summary of Tiilikainen ..... 32

IX. Claims 1-12, 15-26, 29-31, 33-41, AND 45-69 Are Not Obvious over PALATSI in view of MOORE ..... 33

X. Claim 11 is Not Obvious Over PALATSI in View of MOORE ..... 53

XI. Claims 12 and 49 are Not Obvious Over PALATSI in View of MOORE and Tiilikainen ..... 58

XII. Availability for Cross-Examination ..... 59

XIII. Right to Supplement ..... 60

XIV. Jurat.....61

I, **Jean Renard Ward**, declare as follows:

## I. QUALIFICATIONS

1. I received an SBEE degree (combined program in Electrical Engineering and Computer Science) from the Massachusetts Institute of Technology as a member of the class of 1973.

2. I am a practicing engineer. For a number of years, I have primarily been doing consulting projects and contract development work under the business name of Rueters-Ward Services. I have worked professionally in the general field of software engineering for approximately 45 years, primarily in pen/touch computing, applications of public-key cryptography, and web development. In recent years, my major projects have concerned pen/touch computing: also referred to simply as pen computing. Pen computing refers to computing that makes use of a pen, stylus (including a finger), or other touch-sensitive tool, and a tablet or touchscreen. This is contrasted with computing that makes use of devices such as a physical keyboard or physical mouse.

3. During and immediately after my university studies, from 1973 to 1977, I worked at Data General Corporation on compilers and source-level emulation tools for a number of programming languages.

4. For the next approximately 17 years, I worked primarily on many aspects of pen computing at a number of development companies. From 1977 to

1987, I was heavily involved in the development of base technology and three generations of pen-computing products of Pencept Inc., a pioneering commercial company for pen-computing technology that I co-founded. Pencept filed for and was granted a number of patents for my work during that time. My contributions included developing novel techniques for gesture and handwriting recognition, new paradigms for pen- and stylus-based user interfaces, two generations of an applicative computer language for gesture and handwriting recognition, and engineering solutions to problems with touchscreens and digitizing tablets.

5. While at Pencept, I participated in the re-engineering of off-the-shelf commercial tablets that detected touch from an electronic stylus; the engineering evaluation of off-the-shelf tablet technologies, including at least one having a m transparent touchscreen sensors that responded both to finger touches and to touch by a specialized stylus; and the design of a custom electronic tablet responsive to an electromagnetic stylus.

6. During that time and in the years following, I authored or co-authored a number of peer-reviewed articles concerning pen-computing, generative models for handwriting variability, and digitizer/touchscreen technologies and error behaviors.

7. These articles are listed in my CV, which is Appendix A to this declaration. I was an invited speaker at an international research conference on

handwriting recognition in Montreal, Canada. I also made presentations concerning gesture input for Pencept and its competitors to the Graphical Kernel System (GKS) and Programmer's Hierarchical Interactive Graphics System (PHIGS) standardization committees for computer graphics systems, and organized and chaired a panel discussion concerning real-world problems of handwriting recognition technology at another academic conference. I was also invited to visit and speak to the research groups in pen computing at a number of major computer technology companies, including IBM in the United States and the AEG-Telefunken Research Center in Germany.

8. In 1989, I joined the Freestyle development group at Wang Laboratories as a Software Architect. Freestyle was a direct-manipulation pen-computing system that integrated stylus- and voice-input and annotations. During my tenure there, Wang filed for and later was granted U.S. and international patents for my work on simulating virtual keyboard and mouse input from stylus user input on a touch-sensitive tablet. In addition, I was the lead engineer for Wang on a joint hardware project with for a low-power, touchscreen technology using a capacitive stylus for a line of highly-portable handheld computers.

9. In 1991, at the end of Freestyle development, I joined Slate Corporation, a company formed to develop pen-centric applications for both the new Pen-Point (GO Corporation) and Pen Windows (Microsoft) operating systems.

During that time, I was Slate's representative and the co-chair of a number of meetings involving GO Corporation, Microsoft, and other companies concerning the JOT cross-platform storage-level standard for compressed electronic ink data, and was the primary author of the first draft for that standard. I made presentations regarding the history of pen computing to technical groups interested in the topic. I also conducted tutorials on touchscreen/pen interfaces and technology at two annual meetings of the Society for Information Display, the leading engineering society for display technologies.

10. From approximately 1993 onward, my professional work has been primarily as an independent developer and consultant in the areas of applications of public-key cryptography and computer security, in addition to pen/touch computing.

11. A copy of my curriculum vitae with full descriptions of my education, professional achievements, and qualifications is attached to this declaration as Appendix A. It includes a listing of additional relevant industry experience, publications, and presentations.

## II. MY STATUS AS AN INDEPENDENT EXPERT WITNESS

12. I have done no work (indirectly or directly) for either Petitioner or Patent Owner until Oblon hired me as an expert witness to work with it on this IPR.

13. I am aware that the named inventors on U.S. Patent No. RE43,931 ("the '931 patent") are Mr. John Joseph Hayes, Jr. and Mr. Curtis Wayne Thornton. I do not recognize Mr. Hayes, Jr.'s name or Mr. Thornton's name, and I believe that I have never met either of them.

14. I have no financial interest in either Petitioner or Patent Owner.

15. Oblon hired me through an expert witness provider named Cahn Litigation Services ("Cahn"). Cahn is being compensated at the rate of $575/hr for my time in connection with this IPR proceeding. Cahn in turn pays me at the rate of $450/hr.

## III. MATERIALS CONSIDERED

16. In forming my opinions expressed herein, I considered the following items, in addition to my own personal knowledge and experience:

- The '931 patent and its prosecution history (Exhibits 1001 and 1006);
- Petitions IPR2015-01674, IPR2015-01676, IPR2015-01761, and IPR2015-01806 filed by TCL;
- Exhibit 1205, the Declaration of Dr. Andrew Wolfe;
- All remaining Exhibits cited in the Petitions;
- Exhibit 2003 the April 11, 2016 Deposition of Dr. Wolfe;
- Exhibit 1087, U.S. Patent No. 5,892,475 to Palatsi;

- Exhibit 1012, U.S. Patent No. 4,566,001 to Moore et al.;
- Exhibit 1088, EP Patent Application No. 0,721,272 to Tiilikainen; and
- All Exhibits submitted in the concurrent Patent Owner Response submitted by Ericsson.

## IV. UNDERSTANDING OF THE LAW

17. For the purposes of this declaration, I have been informed about certain aspects of patent law that are relevant to my analysis and opinions, as set forth in this section of my declaration.

### A. A Person Having Ordinary Skill in the Relevant Field During the Relevant Timeframe

18. Counsel has informed me that the disclosures of patents and prior art references are to be viewed from the perspective of a mythical person of ordinary skill in the relevant field (sometimes by lawyers referred to as "the relevant art") at the relevant timeframe (a "POSITA"). Counsel has informed me that, for purposes of this IPR proceeding, I should interpret the term POSITA as referring to a mythical person to whom an expert in the relevant field could have assigned a routine task with reasonable confidence that the task would be successfully carried out.

19. I have been asked to provide my opinion regarding the "level of ordinary skill in the art" at the time of the invention, which I have been told is on or before December 30, 1997.

20. I understand that the hypothetical person of ordinary skill in the art is considered to have the normal skills and knowledge of a person in a certain technical field. I understand that factors that may be considered in determining the level of ordinary skill in the art include: (1) the education level of the inventor; (2) the types of problems encountered in the art; (3) the prior art solutions to those problems; (4) rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the education level of active workers in the field. I also understand that "the person of ordinary skill" is a hypothetical person who is presumed to be aware of the universe of available prior art.

21. I also understand the level of ordinary skill in the art can be evidenced by the prior art. Accordingly, I have also considered the prior art discussed herein in determining the level of ordinary skill in the art.

22. In determining who a POSITA would be, I considered the ''931 patent, the types of problems encountered in the art of handheld radio telephone devices and handheld devices, the prior art solutions to those problems, and the educational level of workers active in the field. Based on these factors, I have concluded that a POSITA during the relevant timeframe would probably have had

a bachelor's degree in electrical engineering or computer engineering, at least 2-3 years of hands-on experience working with hand held contact-sensitive user interface devices, and direct knowledge of the types of user interfaces used in mobile phones and handheld devices in 1997. I note that this is different from TCL and Dr. Wolfe's definition, which inexplicably requires the POSITA to be ignorant of small touch-input devices and mobile phones.

23. Based on my experience, I have an understanding of the capabilities of a POSITA in the relevant field. I have supervised and directed many such persons over the course of my career. Further, I, myself, had at least those capabilities at the time the '931 patent was effectively filed. Indeed, given my education and extensive industry experience, I exceed the education and work experience levels of a POSITA, but I nonetheless provide my opinions herein from the viewpoint of a POSITA unless I state otherwise.

**B. Claim Construction**

24. I understand that "claim construction" is the process of determining a patent claim's meaning. I also have been informed and understand that the proper construction of a claim term is the meaning that a POSITA would have given to that term during the relevant timeframe.

25. I understand that claims in IPR proceedings are to be given their broadest reasonable interpretation in light of the specification, which is what I have done when performing my analysis in this declaration.

26. Counsel has also explained to me what the terms "claim" and "specification" mean in this context. While I am not a patent lawyer, I believe that I have a reasonable grasp of those concepts.

**C. Anticipation**

27. I understand that a patent claim is unpatentable as anticipated if a POSITA during the relevant timeframe would have understood a single prior art reference to teach every limitation contained in the claim. The disclosure in a reference does not have to be in the same words as the claim, but all of the requirements of the claim must be described in enough detail, or necessarily implied by or inherent in the reference, to enable a POSITA looking at the reference to make and use at least one embodiment of the claimed invention.

**D. Obviousness**

28. I understand that a patent claim is unpatentable as obvious if subject matter within the definition provided by the claim would have been obvious to a POSITA as of the time of the invention at issue. I understand that the following factors must be evaluated to determine whether the claimed subject matter was obvious: (1) the scope and content of the prior art; (2) the difference or differences,

if any, between the subject matter defined by the claim of the patent under consideration and what is disclosed in the prior art; (3) the level of ordinary skill in the relevant field at the time of the patent's earliest priority date or, possibly, at an earlier time; and (4) so-called "objective evidence of non-obviousness". However, counsel has told me that, for the present, I can ignore both the possibility that obviousness is to be determined at a date earlier than the patent's earliest priority date and the possibility that Ericsson will submit objective evidence of non-obviousness.

29. Counsel has informed me that prior art references can be combined to support a finding that a claim is unpatentable for obviousness when there was an apparent reason for one of ordinary skill in the art, at the time of the invention, to combine the references and that such apparent reasons include, but are not limited to: (A) identifying a teaching, suggestion, or motivation to combine prior art references; (B) combining prior art methods according to known methods to yield predictable results; (C) substituting one known element for another to obtain predictable results; (D) using a known technique to improve a similar device in the same way; (E) applying a known technique to a known device ready for improvement to yield predictable results; (F) trying a small number of identified, predictable potential solutions, with a reasonable expectation of success; and (G) identifying that known work in one field of endeavor may prompt variations of it

for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the relevant field.

30. Moreover, I have been informed by counsel that so-called "objective indicia of non-obviousness" (also known as "secondary considerations") like the following can be considered when assessing obviousness: (1) commercial success; (2) long-felt but unresolved needs; (3) copying of the invention by others in the field; (4) initial expressions of disbelief by experts in the field; (5) failure of others to solve the problem that the inventor solved; and (6) unexpected results. I also understand that evidence of objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter.

## V. DESCRIPTION OF THE RELEVANT FIELD AT THE RELEVANT TIMEFRAME

31. I have carefully reviewed the '931 patent and the relevant materials listed above.

32. Based on my review of these materials, I believe that the relevant field for purposes of the '931 patent is user interface technology for hand-held radiotelephones. I have been informed that the relevant timeframe is on or before December 30, 1997.

33. As described in Section IV.A above and as shown in my CV, I have extensive experience in user interface technology, and I have extensive knowledge of user interface technology used in mobile phones. Based on my experience, education, and training (both academic and professional), I am well-versed in the relevant field in the relevant timeframe.

34. When the '931 patent was filed in December 1997, mobile phones primarily used push-button keys and a monochrome display as components of a user interface. The focus on mobile phone technology was simply on allowing the user to perform basic telephone call functionality rather than perform all functions of a computer as we see in the smartphones of today. In these types of phones scrolling was performed by pressing a key, such as pressing one number key to scroll up and then another number key to scroll down. Other phones included softkeys on the side of or directly below the screen, corresponding to up and down arrows. The following graphic illustrates exemplary mobile phones and their approximate dimensions, many made by Nokia, which were commercially available immediately before and after December 1997.

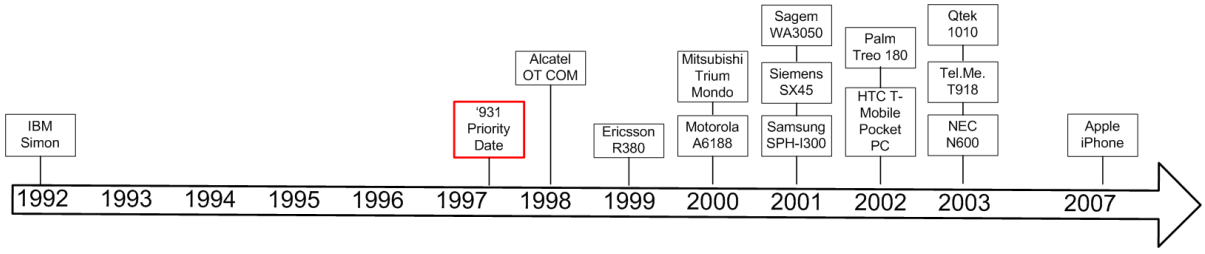
| Model | Nokia 1610 | Nokia 2160 | Mitsubishi D203 | Nokia 8110 | Nokia 252 | Nokia 550 |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **Release Date** | 1996 | 1996 | 1997 | 1998 | 1998 | 1998 |
| **Phone Dimensions (mm)** | 168 x 58 x 28 | 139 x 55 x 25 | 123 x 40 x 26 | 141 x 48 x 25 | 143 x 48 x 21 | 143 x 48 x 21 |
| **Touch screen?** | No | No | No | No | No | No |

Ex. 2005-2010.

35. The IBM Simon, shown below, first released in 1992 and made available for sale in 1994, is the one mobile phone device that I am aware of which was made commercially available prior to December 30, 1997 and which used a contact-sensitive touchscreen. Ex. 2012.

36. The Simon only spent 6 months on the market and only sold approximately 50,000 units worldwide. *Id*. at 3. The Simon, sometimes referred to as a "brick," was also larger than many of the mobile phones shown above, as it had dimensions of 8 x 2.5 x 1.5 inches and weighed over a pound. *Id*. at 2. The Simon primarily received single touch inputs to buttons displayed on the screen, and it did not receive a moving contact input to cause displayed rows of graphical objects to scroll. Ex. 2013. Rather, the Simon presented users with arrows and buttons on the touchscreen that the user clicked one at a time. *Id*. at 12; Ex. 2012 at 2-3.

37. The chart below shows a list of mobile phones of which I am aware that were released between 1992 and 2003 which included a contact-sensitive user interface. For perspective, the chart also illustrates that it was not until 2007 that the popular Apple iPhone was released. I am not aware of any commercially available mobile phone, which included a contact-sensitive user interface, other than the IBM Simon, released before December 30, 1997.

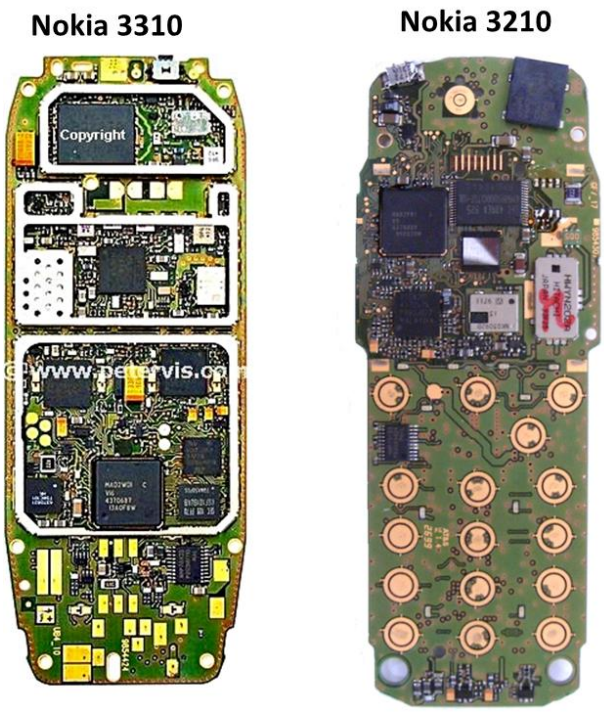



Ex. 2011, 2014-2024, 2040-2041.

38. An example of a non-radiotelephone hand-held device that was popular prior to December 1997 is the Palm Pilot 1000, shown below with a monochrome resistive touch screen display having an approximately 57 mm (2.25 inches) length and width with a 160 x 160 pixel resolution. Ex. 2026. Scrolling on the Palm Pilot 1000 was done by the user "poking" on two scroll buttons: it did not perform a scrolling operation in response to a moving contact to the touchscreen. Ex. 2042. The Palm Pilot 1000 accepted pen strokes with a stylus in a "Graffiti" area, which is separate from the display screen. *Id.* at 4-5. I suspect that the Graffiti area was kept separate from the display screen since it was a known problem that the stylus causes scratches to the surface of a touchscreen (Ex. 2046 at ¶¶8-9), and the Graffiti area itself would accumulate scratches over time (Ex. 2047). While smaller than that of a laptop, the display on the Palm Pilot was noticeably larger than found on cell phones typical of 1997, which are shown in the chart above.


39. As of December 1997, I am aware of no commercially available portable hand held devices that accepted a moving contact, such as a sliding gesture or a swipe, to a contact sensitive surface to deliberately scroll through displayed rows, as separate graphical objects, of content. As evidenced by numerous commentaries in the commercial press regarding later hand-held devices, one-handed operation on portable hand held devices proved to be extremely valuable in the hand held industry. Ex. 2065-2069.

40. With regard to the hardware configuration of a mobile phone, the hardware is primarily disposed on a printed circuit board (PCB) as illustrated below for examples of mobile phones released in the 1990s/early 2000s.




Ex. 2075, Ex. 2076.

41. Needless to say, the size of a mobile phone PCB is much smaller than a desktop motherboard and as shown above the circuitry becomes quite congested. For perspective, the popular ATX desktop computer motherboard size released by Intel in 1995 was 12 × 9.6 inches (305 × 244 mm). Ex. 2070.

42. Additionally, processor sizes used for desktop computers and mobile phones greatly differed. For instance, the Pentium Pro processor released by Intel in 1995 has a die surface area of 307 $mm^2$ and 5,500,000 transistors, compared to the ARM700 processor, widely used in mobile phones in the late 1990s, which has a die surface area of 68.51 $mm^2$ and 578,977 transistors. Ex. 2064.

43. Key design considerations for a mobile phone include maintaining a reduced handset size so that the device could be easily carried in a pocket or handbag. Ex. 2071 at 84. Additionally, it was desired to use a minimalist design on the user interface in which soft-keys were used to trigger actions on a phone. *Id*. at 30. This need for a minimalist approach is even described in TCL's primary reference Palatsi. Ex. 1087 at 1:21-25. Devices of the late 1990s and early 2000s were constrained in terms of processing capability, memory costs, and display capabilities. Ex. 2071 at 33. It was known that adding additional components to a mobile phone required additional processing capabilities to perform their functions. *Id*. at 99. Additionally, because improvements in battery technology are modest, innovative techniques at all levels of design were necessary which permit use of the limited available energy as efficiently as possible, which is a key differentiator between mobile handset solutions and traditional desktop solutions. *Id*. at 99 and 122; Ex. 2073 at 30. Thus, since it was understood to minimize any increase in overall handset size due to the presence of additional electronics, achieving the integration of additional electronics has implications for the overall handset design, as well as chipset and operating system integration, which causes the integration of new functionality to take longer than usual. Ex. 2070 at 155.

## VI. THE '931 PATENT

44. The '931 patent provides a novel solution to the problem of having a large list of graphical objects (such as telephone numbers) displayed on a radiotelephone that need to be scrolled through quickly, but the conventional input devices on radiotelephones are "arrow" keys or devices that take up space and have moving parts. Ex. 1001 at 1:39-67.

45. The '931 patent overcomes the afore-mentioned problem by use of a contact-sensitive transducer that accepts a moving contact to scroll displayed rows of items, such as telephone numbers. The use of the contact-sensitive transducer offers numerous advantages. First, by utilizing the contact-sensitive transducer as an input device, the inventors of the radiotelephone of the '931 patent were able to minimize the thickness of the phone "[b]ecause a contact-sensitive transducer may be configured to have a thin profile." *Id.* at 2:30-31. Second, "[b]ecause characteristic types of contact with the transducer can be detected, such as swiping motions or taps, the transducer may be used to perform display movements such as scrolling or cursor movement, as well as for selection of items displayed on the display." *Id.* at 2:34-38. Third, the use of contact-sensitive transducer improves the reliability of the input device due to the lack of moving parts in the transducer. *Id.* at 2:38-40. Fourth, the contact-sensitive transducer can be contacted by the thumb of the same hand holding the device (see claim 34).

46. Claims 1, 16, 30, 33, 58, and 64 of the ‘931 patent each recite:

Claim 1. A radiotelephone, comprising:

a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite edges of the front surface and extending from the respective opposite edges of the front surface to respective opposite edges of the rear surface, the housing configured to be held in a user's hand such that the rear surface confronts the user's palm;

a radiotelephone communications transceiver, supported by the housing;

a display, supported by the housing, that displays an image at the front surface of the housing;

a contact-sensitive transducer, supported by the housing and having a contact-sensitive surface disposed at at least one of the first and second side surfaces said front surface, which produces an output signal that characterizes in response to moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, responsive to the output signal and operatively associated with the display and the radiotelephone communications transceiver, which controls at least one of the display and the radiotelephone communications transceiver according to and which scrolls displayed rows along an axis of the display based upon the output signal of the contact-sensitive transducer, the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller

is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user.

Claim 16. An apparatus, comprising:

a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite edges of the front surface and extending from the respective opposite edges of the front surface to respective opposite edges of the rear surface, the housing configured to be held in a user's hand such that the rear surface confronts the user's palm;

a display, supported by the housing, that displays an image at the front surface of the housing;

a contact-sensitive transducer, supported by the housing and having a contact-sensitive surface disposed at at least one of the first and second side surfaces on said front surface, which produces an output signal that characterizes moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, selectively responsive to the output signal and operatively associated with the display, which is configured to control scroll displayed rows along an axis of the display according to based on the output signal of the contact-sensitive transducer, the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user.

Claim 30. An apparatus, comprising:

a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite sides of the front surface and extending from the respective opposite sides of the front surface to respective opposite sides of the rear surface, the housing configured to be held in a user's hand such that the rear surface confronts the user's palm;

a display, supported by the housing, that displays an image at a front surface of the housing;

a contact-sensitive transducer, supported by the housing, which produces an output signal that characterizes in response to moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, responsive to the output signal and operatively associated with the display, which scrolls displayed rows along an axis of the display based on the output signal of the contact-sensitive transducer, the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user.

Claim 33. In an apparatus including a housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite edges of the front surface and extending from the respective opposite edges of the front surface to respective opposite edges of the

rear surface, a display that displays an image at the front surface, and a controller that controls the display, the method of providing user input comprising the steps of:

holding the housing in a user's hand such that the rear surface confronts the user's palm and the display projects away from the user's palm;

providing user input to the controller using a contact-sensitive transducer having a contact-sensitive surface disposed at said front surface of the housing, the transducer being operable to produce an output signal that characterizes contact with the contact-sensitive surface of the contact-sensitive transducer; and

providing user input to the controller to select a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to a user input.

Claim 58. An apparatus for providing user input to a hand-held electronic device, comprising:

a housing for containing the electronics for performing the intended user functions of the device, said housing having a front surface, a rear surface and first and second side surfaces adjoining respective opposite sides of the front surface and extending from the respective opposite sides of the front surface to respective opposite sides of the rear surface, the housing configured to be held in a user's hand such that the rear surface confronts the user's palm;

a display located on the front surface of the housing for displaying user-interface information for the electronic device, said information including an image of rows of menu selectable items;

a contact-sensitive transducer, supported by the front surface of the housing, which produces an output signal that characterizes moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, responsive to the output signal and operatively associated with the display, which scrolls displayed rows of said menu selectable items along an axis of the display based upon the output signal of the contact-sensitive transducer to enable selection of a particular item by the user to provide input to the electronic device, the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user.

Claim 64. An apparatus, comprising:

a housing having a front surface and a rear surface, the housing configured to be held in a user's hand such that the rear surface confronts the user's palm;

a display, supported by the housing, that displays an image at a front surface of the housing;

a contact-sensitive transducer, supported by a front surface of the housing, which produces an output signal that characterizes

moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer; and

a controller, responsive to the output signal and operatively associated with the display which scrolls displayed rows along an axis of the display based on the output signal of the contact-sensitive transducer, the controller having a first mode wherein the controller is responsive to contact with the contact-sensitive transducer and a second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to user input.

47. Each of independent claims 16, 30, 33, 58, and 64 recites certain features that are analogous to those of claim 1 shown above. My opinion regarding claim 1 is applicable to the similar features of independent claims 16, 30, 33, 58, and 64 for substantially similar reasons.

## VII. CLAIM INTERPRETATION

48. In proceedings before the USPTO, I understand that the claims of an unexpired patent are to be given their broadest reasonable interpretation in view of the specification from the perspective of one skilled in the art during the relevant timeframe. I have been informed that the '931 patent has not expired. In comparing the claims of the '931 patent to the known prior art, I have carefully considered the '931 patent and the '931 patent file history based upon my experience and knowledge in the relevant field. In my opinion, the broadest

reasonable interpretations of the claim terms of the '931 patent are generally consistent with the terms' ordinary and customary meaning, as one skilled in the relevant field would understand them.

49. I agree with TCL's interpretation of "contact sensitive transducer" and "graphical object". Petition at 11-13. Specifically, TCL proposes that the phrase "contact sensitive transducer…which produces an output signal" should be construed as "*a device that converts physical contact of an object with the device to an electrical signal*." TCL also proposes that the term "graphical object(s)" should be construed as "*visual element(s) including image(s) and/or row(s) of alphanumeric characters*."

50. It is my understanding that any claims terms that are not construed specifically above are presumed to take on their ordinary and customary meaning.

## VIII. DISCUSSION OF RELEVANT PRIOR ART

51. I have been asked to consider the teachings of the prior art cited in the petition in view of the knowledge held by one of ordinary skill, and whether the skilled practitioner would have interpreted or combined the references as applied in the petition.

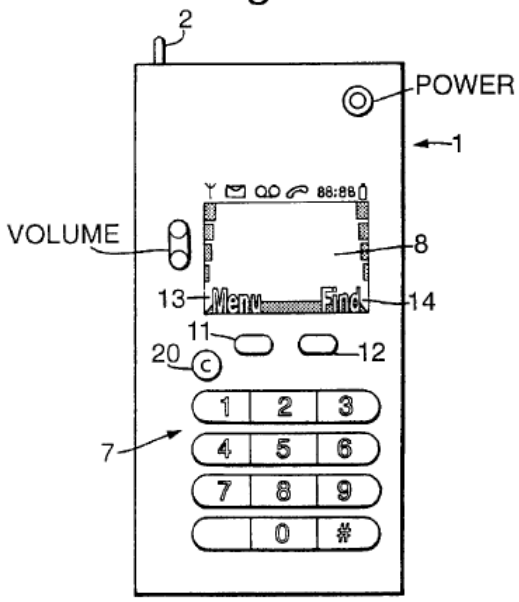
52. As I explain below, it is my opinion that claims 1-12, 15-26, 29-31, 33-41, and 45-69 of the '931 patent would not have been obvious over Palatsi in

view of Moore, nor would claims 12 and 49 have been obvious over Palatsi in view of Moore and Tiilikainen.

**A. Summary of Palatsi**

53. Palatsi discloses a user interface for a telephone device. Ex. 1087 at Abstract. Palatsi describes a need for portable, hand-held, telephones to be smaller, making it necessary to reduce the size of their keypads. *Id*. at 1:5-28. An embodiment of Palatsi is shown in Fig. 2 below.

Fig.2.




54. I note that Palatsi does not teach providing scrolling functionality ***with a finger swipe***. Rather, the portable telephone in Fig. 2 of Palatsi includes two "soft" keys 11 and 12 disposed above a keyboard 7. The functions of the "soft" keys can vary and the current functions are indicated by corresponding soft key zones 13 and 14 of the display. *Id*. at 2:18-37.

55. One of the objectives of Palatsi is to avoid using dedicated arrow keys and a separate "select" key. *Id*. at 2:43-46. Thus, as illustrated in Fig. 3, Palatsi describes that the processor of the telephone monitors the time period since either of the soft keys was last pressed. *Id.* at 3:2-4. When a certain set time has elapsed, the soft key zone 13 corresponding to key 11 changes to display "OK." *Id.* at 3:4-6. Pressing key 11 will then select the currently-displayed menu item and cause the processor to take the appropriate action corresponding to that item. *Id*. at 3:7-9.

**B. Summary of Moore**

56. Moore discloses a display terminal which has touch strips extending along the adjacent and horizontal edges of the screen. Ex. 1012 at Abstract. Fig. 1 of Moore shows a terminal that has a cathode ray tube unit 10 with a rectangular screen 12, a keyboard 14, and touch sensitive strips 16 and 18 extending horizontally and vertically along two edges of a bezel surrounding the rectangular screen. *Id*. at 2:15-22.

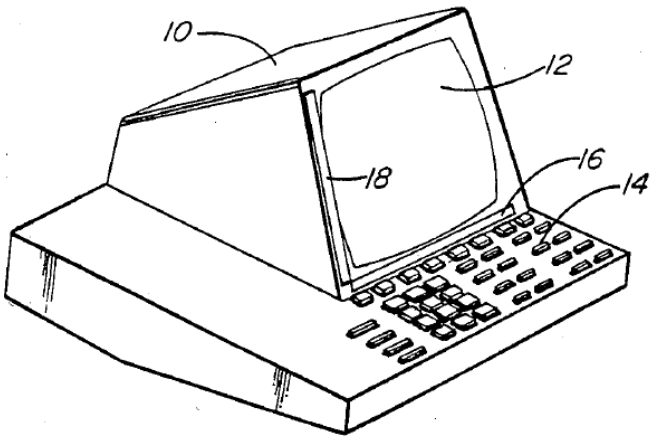



FIG. 1

57. The vertical and horizontal touch strips are described as having identical construction and in use each has a voltage output which is representative of the distance along its length at which it is touched. *Id*. at 2:22-25. Fig. 2 of Moore shown below illustrates that each of the touch strips has a flexible conductive strip 20 overlaying a resistive substrate 22. *Id.* at 2:26-29. The conductive strip and the substrate are normally separated from one another by an insulating frame 24 but can be locally brought together by pressing the strip downwardly at a desired location along the strip. *Id.* at 2:29-33. A voltage gradient is established along the resistive substrate by applying voltages V+, and V- through resistors R to electrodes contacting the substrate ends. *Id*. at 2:33-36.

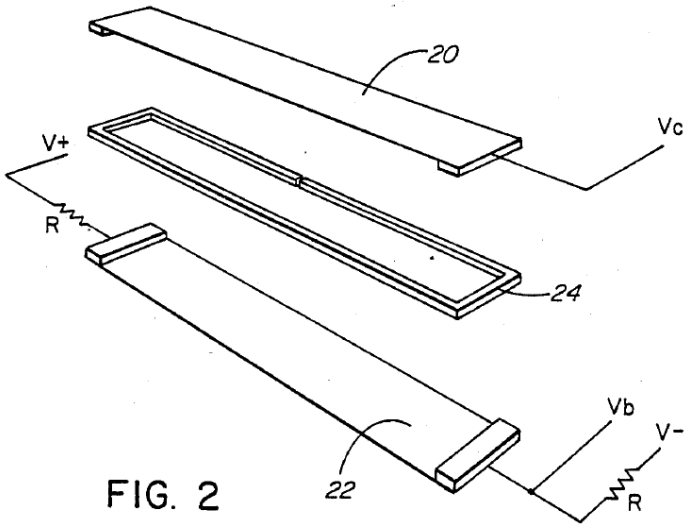



FIG. 2

58. Fig. 3 of Moore shown below shows a block diagram of the hardware used in the terminal:

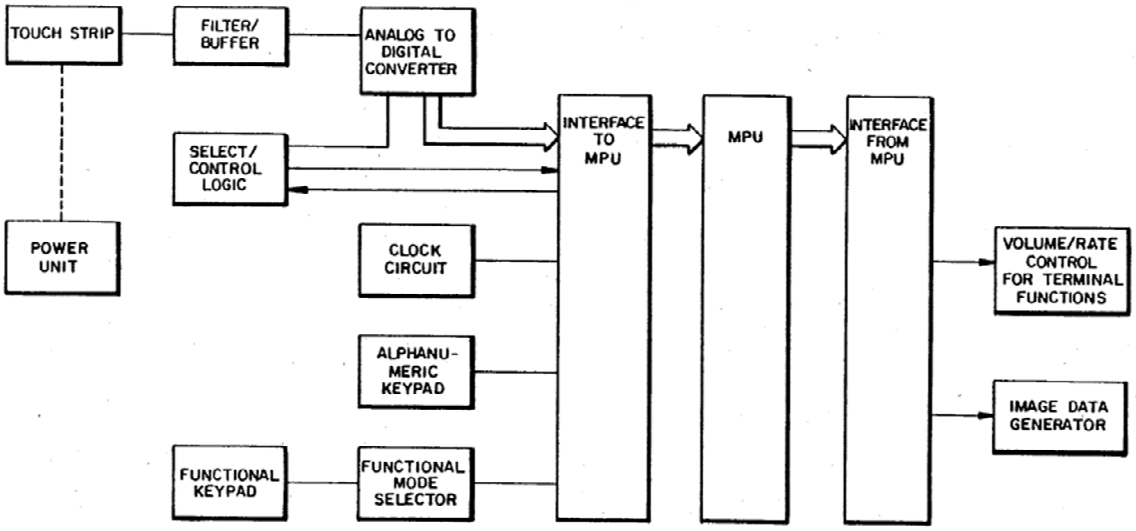



FIG. 3

59. The touch strip has a power supply to establish the voltage gradient along the resistive substrate. *Id.* at 2:37-39. The output of the touch strip is provided to

the input of a filter/buffer unit and the output of the filter/buffer unit is provided to one input of an analog-to-digital converter. *Id.* at 2:39-42. The analog-to-digital converter operation is controlled by a select/control logic circuit driven by timing impulses from a clock circuit. *Id.* at 2:42-44. Operation of the clock circuit is determined by an interface circuit which also loads data from the analog-to-digital converter into a microprocessor unit. *Id*. at 2:45-47. Outputs from the microprocessor unit control operation of the touch strip input circuit and also alter terminal functions in response to the strip being touched. *Id*. at 2:49-51.

60. The touch strips can be used in a variety of ways depending on the manner in which the microprocessor is programmed. *Id*. at 3:18-20. In order to select the desired program, one of the functional-designation keys in the primary keyboard is pressed. *Id*. at 3:20-22. Typical functional keys associated with the touch strips are soft-key designation, menu selection, cursor generation, graded control and scrolling. *Id*. at 3:22-25.

61. I note that in the menu selection mode, a user presses the menu selection function key on the keyboard, enabling a user to select one title from a list of displayed titles by pressing the touch strip at a location adjacent to the particular displayed title. *Id*. at 3:45-53. By pressing the scrolling functional key on the keyboard, the terminal is programmed to permit the displayed text or graphics to

be moved vertically or laterally to display adjacent parts of the displayed matter of which the currently displayed field is just a part stored in memory. *Id*. at 4:20-27.

62. Moore also briefly describes an alternative embodiment in which a bank of such touch strips can be mounted along each edge. *Id*. at 4:32-33. In this latter case keys associated with the functional keyboard must permit switching between different ones of the banks of strips. *Id*. at 4:33-35.

**C. Summary of Tiilikainen**

63. Tiilikainen discloses a portable telephone as show in Fig. 1. Tiilikainen describes a telephone 15 including a scrolling key which is not described as receiving a moving contact to effectuate scrolling. Ex. 1088 at 1:21-22 and 3:17. Fig. 2 of Tiilikainen (below) shows that different phone numbers are stored on the phone and can be displayed in columns 25, 26, and 27 having corresponding headers 21, 22, and 23. *Id.* at 3:8-10.

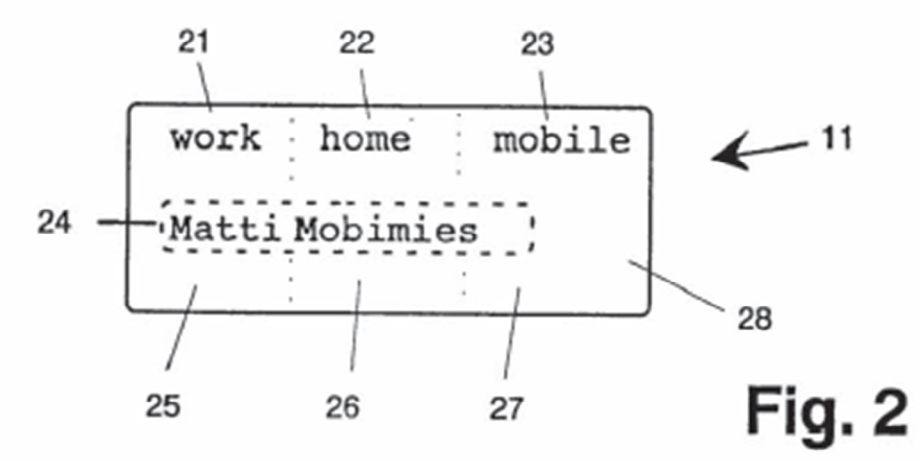


Fig. 2

64. When the required number has been displayed in the field using a

scrolling key, the user can select the required number by pressing the corresponding column 25, 26, or 27. *Id*. at 3:16-19. Selection can be made by pressing with a finger or, *e.g.*, with a pen, whereby the phone immediately makes a call to the chosen number. *Id*. at 3:19-22.

## IX. CLAIMS 1-12, 15-26, 29-31, 33-41, AND 45-69 ARE NOT OBVIOUS OVER PALATSI IN VIEW OF MOORE

65. It is my opinion that a POSITA would not have been motivated to modify Palatsi based on the teachings of Moore to achieve the results of Claims 1-12, 15-26, 29-31, 33-41, and 45-69 of the '931 patent.

**Neither Palatsi nor Moore Discloses the "Second Mode"**

66. Contrary to TCL's characterization of the references, neither Palatsi nor Moore discloses a controller operable in a "second mode wherein the controller is unresponsive to contact with the contact-sensitive transducer, the second mode being entered in response to an input from a user." In particular, TCL attempts to apply the touch sensitive strips of Moore to the portable telephone in Palatsi, asserting that:

> Moore discloses 'switching between ones of the banks of touch strips' **to disable one bank of touch strips, such that the controller is unresponsive to contact with the one bank of touch strips, while enabling another bank of touch strips, such that the controller is responsive to contact with the other bank of touch strips. (*Id.*, ¶ 185; Ex. 1012, 4:33-36.)** Accordingly, Palatsi in combination with

> Moore teaches a second, unresponsive mode where the controller is unresponsive to contact with the contact-sensitive transducer. *Petition at 39* (emphasis added).

67. After a detailed and thorough review of the Moore reference, I have been unable to find any disclosure in Moore which recites or even suggests TCL's words which are bolded and emphasized above. The bolded text does not appear in Moore. Instead, the cited section in Moore uses the phrase "functional keyboard," which is a clear reference to the "function keys" described at column 3, lines 22-25 used to "select the desired program" for the touch strips, e.g., "soft-key designation, menu selection, cursor generation, graded control and scrolling."

68. As I discussed above, Moore is directed to a display terminal which has touch strips extending along the adjacent and horizontal edges of the screen. Ex. 1012 at Abstract. Fig. 1 of Moore shows a terminal that has a cathode ray tube unit 10 with a rectangular screen 12, a keyboard 14, and touch sensitive strips 16 and 18 extending horizontally and vertically along two edges of a bezel surrounding the rectangular screen. *Id*. at 2:15-22.

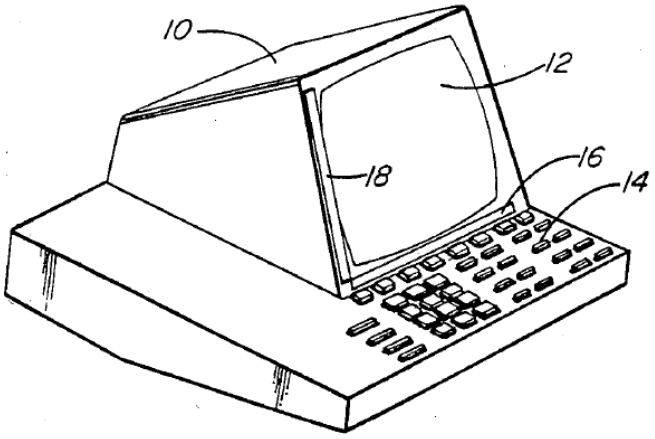



FIG. 1

69. The touch strips can be used in a variety of ways depending on the manner in which the microprocessor is programmed. *Id*. at 3:18-20. In order to select the desired program, determining the manner in which the touch strips can be used, one of the functional-designation keys in the primary keyboard is pressed. *Id*. at 3:20-22. Typical functional keys associated with the touch strips are soft-key designation, menu selection, cursor generation, graded control and scrolling. *Id*. at 3:22-25.

70. Moore also describes an alternative embodiment in which a bank of such touch strips can be mounted along each edge. *Id*. at 4:32-33. In this latter case keys associated with the functional keyboard permit switching between different banks of strips. *Id*. at 4:33-35. Specifically, Moore recites:

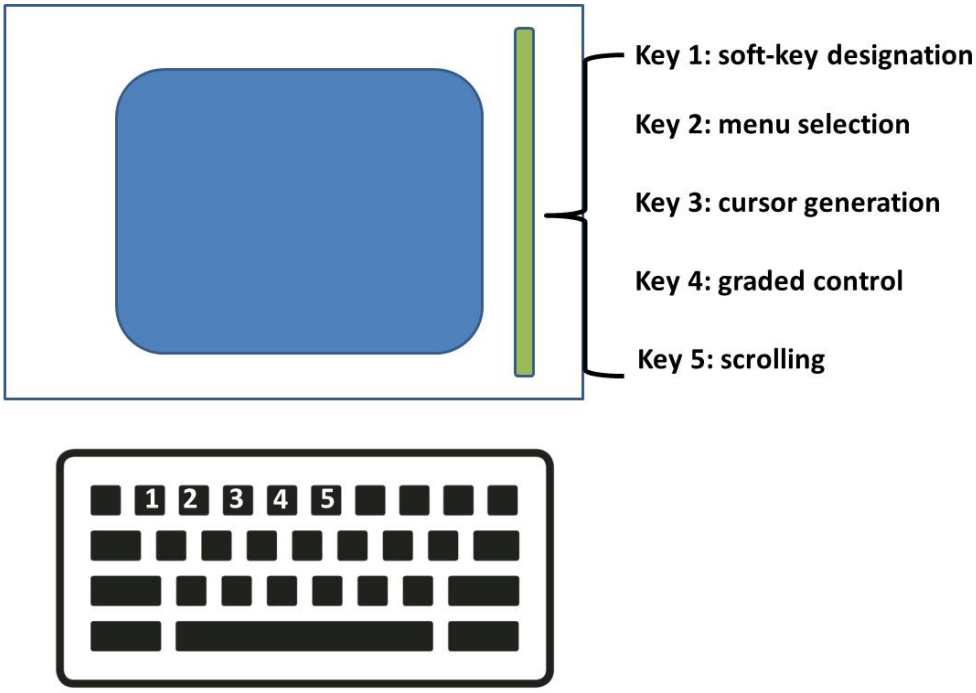
> Moreover, if desired, a bank of such touch strips can be mounted along each edge. In this latter case keys associated with the functional

keyboard must permit switching between different ones of the banks of strips. Ex. 1012 at 4:33-36.

71. Accordingly, Moore explicitly discloses "switching" between different banks of strips but never "enabling/disabling" or "activating/deactivating" or rendering "unresponsive" the banks of strips. To suggest otherwise is plainly unreasonable and a fabrication of the actual teachings of Moore. I note that TCL's own expert, Dr. Wolfe, acknowledged in his deposition that the term "switching" as used in Moore does not say, and does not necessarily mean, selecting two touch strips to be operable while another two touch strips are inoperable. Ex. 2002 at 99:15 to 100:5.

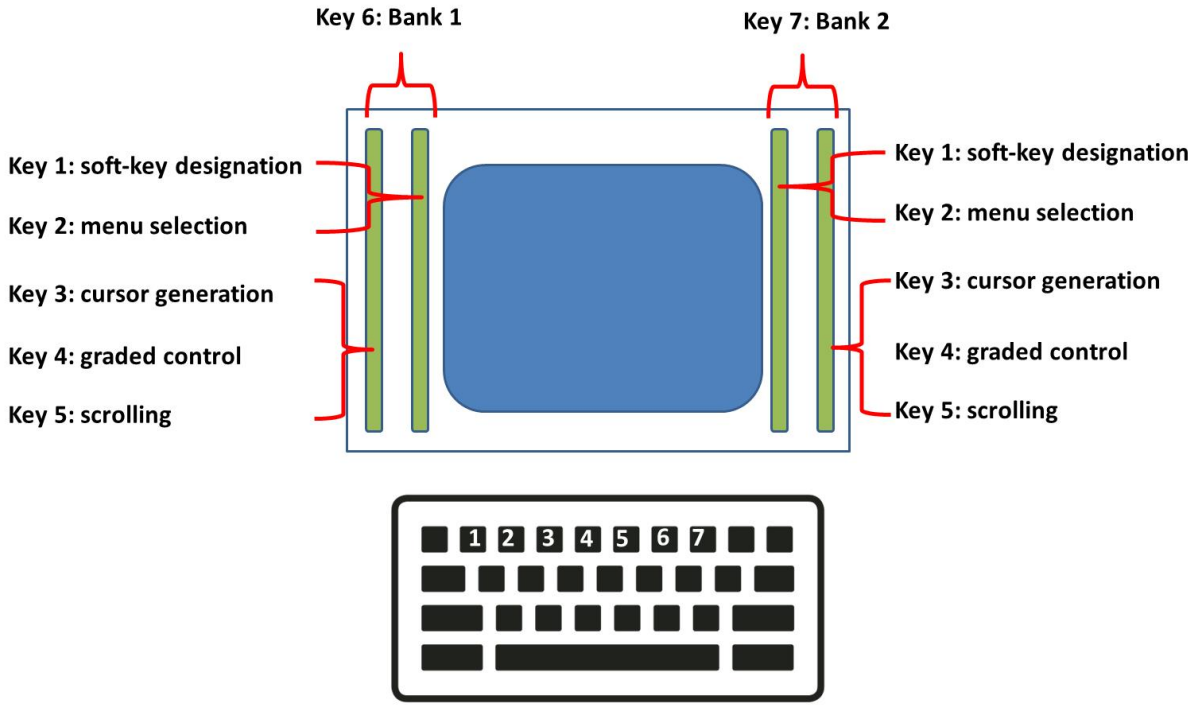
72. Based upon my experience and expertise, and from the point of view of a person of ordinary skill in the art, it is my opinion that when Moore states that "keys associated with the functional keyboard must permit switching between different ones of the banks of strips," Moore is simply referencing the ability to select one of the banks of touch strips and then to select a desired program that corresponds to a different mode of the touch strips, **not** that any of the banks of strips are made unresponsive to contact or that using a functional key in the primary keyboard disables a touch strip. As discussed in Moore, some examples of different modes are soft-key designation, menu selection, cursor generation, graded control and scrolling. Ex. 1012 at 3:18-24.

73. Therefore, based on the primary embodiment discussed in Moore, a key on the keyboard is used to assign a function to a touch strip and can be embodied as illustrated below.




74. In the alternative embodiment which briefly describes the use of banks of touch strips, it is my opinion that Moore recognizes that assigning functions to each of the touch strips in each bank would take too many keys assigned for each separate function of each separate touch strip. For example, for two banks of touch strips, each bank having two touch strips, creating a total of four touch strips, this would entail having 20 (4 x 5) separate functional keys to assign any of the above-noted five functions to any of the four touch strips. Therefore, Moore allows for switching which bank of touch strips is the object of the user's intention when

switching functionality of a bank of touch strips. For example, if the user wanted to change the functionality of a touch strip within a bank, the functional keys described on column 3, lines 18-24 of Moore could be used for the function designations on any of the banks of touch strips while a different set of keys is used to designate which bank of touch strips the user is interested in changing the functionality for. An example of this situation is shown below.




75. Therefore, functional keys 1-5 could still be used to select a functionality of a touch strip with five keys on the keyboard while keys 6 and7 can select which one of the banks of touch strips is having its functionality changed.

76. Thus, since Moore only describes using additional functional keys of a keyboard to switch the functionality of a given touch strip at a given time in the

primary embodiment, it logically follows that "switching" referred to in Moore's brief description of "keys associated with the functional keyboard must permit switching between different ones of the banks of strips," with respect to the embodiment in which banks of touch strips are used, merely means selecting one of the banks of touch strips and then to assign or switch a desired program or function to one or more of the touch strips within one of the banks as depicted above. The "keys associated with the functional keyboard" described on column 4, lines 34-35 of Moore relate to the "functional keys associated with the touch strips" described on column 3, lines 22-23 of Moore. There simply is not any reason to disable or render unresponsive any one of the touch strips described in Moore. Moore does not describe any functional key with this function.

77. Additionally, Moore teaches different functions, such as cursor manipulation and grade control, where multiple touch strips can be used simultaneously in order to execute a selected function. Moore teaches instances where multiple touch strips need to be used at the same time in order to perform the function. *See* Ex. 1012 at 3:60-62, 3:66 – 4:1, 4:10-12. Accordingly, such disclosure in Moore, in combination with that which is discussed above, establishes that if a "bank of strips" is mounted along each edge of the rectangular screen 12 of the cathode ray tube unit 10, then there is a designation provided on the functional keyboard which

allows the user to switch to or select a particular strip among the group of strips if a mode on the touch strip needs to be changed.

78. Again, I simply cannot find any disclosure in Moore of the controller ever being rendered unresponsive or the touch strips being rendered disabled or deactivated upon "switching between different ones of the banks of strips." Ex. 1012 at 4:33-36.

**A POSITA Would Not Be Motivated to Incorporate Moore's Touchstrips into Palatsi's Handheld Device**

79. TCL creates a hypothetical scenario which supposes that "the ability to hold the portable telephone in a user's hand with a thumb extending around one side and the thumb extending around the other . . . would create a risk of the user accidentally activating an unintended touch strip on the opposite side of the display . . . A POSITA would have appreciated that switching a non-used bank of touch strips off . . . would intuitively solve this problem." *See* Petition at 38-39. Even assuming a POSITA incorporated one or more of the touch strips from Moore into the mobile phone of Palatsi, there would have been absolutely no teaching or reason for the POSITA to know to include a "second mode" in which a touch strip is made unresponsive to contact because the POSITA would have been simply unaware of the risk of the user accidentally activating an unintended touch strip as described in the Petition.

80. For one consideration, Moore has no such problem. Moore's touch strips are located on the front face of a desktop terminal. There is no teaching that even suggests that the terminal would be held in a hand, or that the touch strips are subject to accidental touches. Furthermore, Moore has no teaching of an unresponsive mode of a touch strip as already pointed out above.

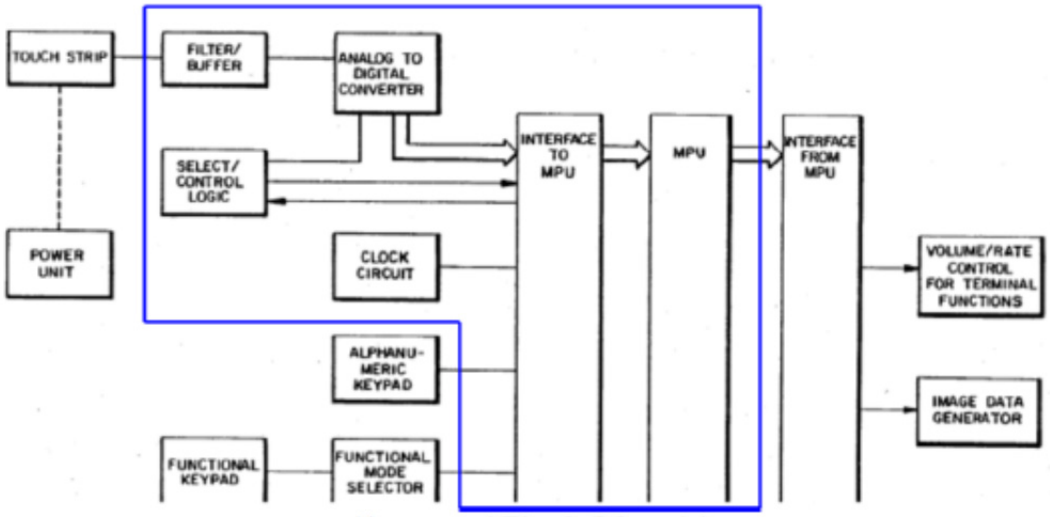
81. TCL's attempted combination introduces the problem by placing touch strips on the sides of the device, where TCL states they are subject to being activated accidentally. Touch strips placed on the front face (the only location taught or implied in Moore) would not be subject to inadvertent activation in general use: in addition to not being located in where a user would be likely to touch them while holding the device in the palm of the hand, a user would -- without thinking -- avoid holding the device in a way that blocked the view of the small display.

82. The only disclosure of the "risk" and the teaching of the solution achieved from a "second mode" in the Petition comes from the Petition itself and not from anything taught in the prior art. Therefore, it is my opinion that TCL and Dr. Wolfe achieved this analysis based on employing hindsight after viewing the '931 patent itself.

**No Reasonable Expectation of Success to Incorporate Four Touch Strips of Moore into Palatsi**

83. It is also my opinion that a POSITA would not attempt to combine the dedicated hardware and software, that Moore states is required for its touch strips, with Palatsi's handheld device. Neither TCL nor Dr. Wolfe have provided any explanation as to why a POSITA would be motivated to incorporate Moore's "dedicated hardware" required to implement the "banks of strips" into Palatsi's handheld device, without a clear understanding of the hardware requirements of the specific Moore solution.

84. First, TCL fails to address, much less show or explain, how the hardware used to support and operate the **four touch-sensitive strips** in Moore could have been implemented in the portable telephone of Palatsi while maintaining the size requirement of claim 1. TCL discusses the hardware requirements of Moore by annotating Fig. 3 and highlighting certain elements:



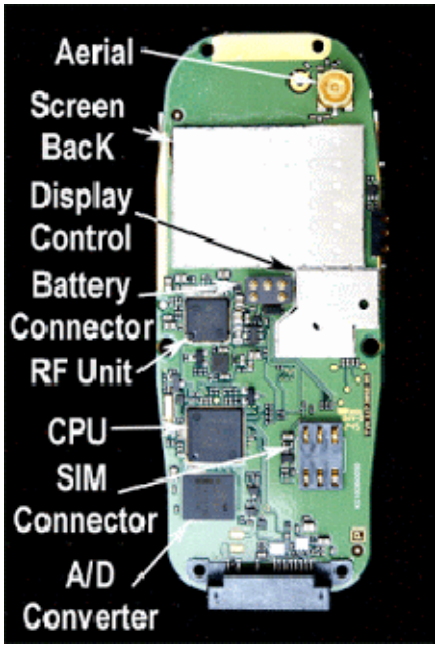
(Annotated Fig. 3 (Moore).)

85. TCL suggests that it would have been obvious to modify the existing processor in Palatsi to have all the elements show in the blue box above and to be connected to the touch strip. However, what TCL completely omits is that the above-noted elements need to be incorporated **four times** because the embodiment from Moore the Petitioner relies upon requires four touch strips.

86. Thus, even if the clock circuit and power unit could be made common to all four of the touch strips, there are still clear hardware elements from Moore that are dedicated for each touch strip separately, such as the filter buffer circuit, the analog digital converter, and the select/control logic. Thus, based on Moore's most basic teaching, the Petitioner's modification requires at least four filter buffer circuits, four analog to digital converters, and four select control logic chips in addition to the four touch strips.

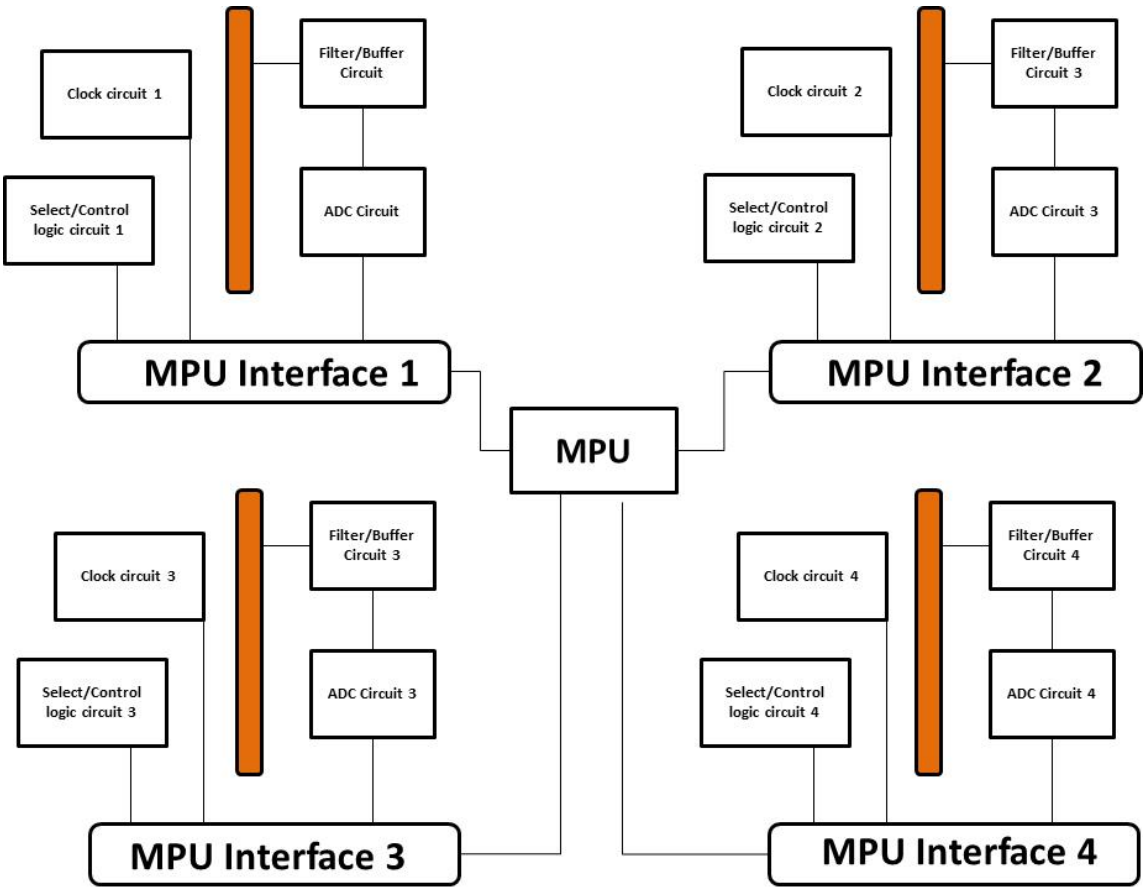
87. I emphasize that these elements shown in Fig. 3 of Moore are not mere functional elements that can be readily programmed into the existing hardware of Palatsi. These are discrete integrated circuits which will take up already limited real estate on the existing printed circuit board of Palatsi's phone. For instance, in a mobile phone there is already one analog to digital converter chip that is already used for converting the voice signal through the microphone to digital data, which is shown below as the "AD Converter." The analog to digital converter is a separate component from the microprocessor, and not included in the

microprocessor as Dr. Wolf tried to assert in his deposition. Ex. 2003 at 93:14-19. The below figure shows a "teardown" photograph of a representative handheld mobile radiotelephone designed to be held in the palm of a user's hand. The specific model shown in the photograph is a Sony Ericsson T200 released in 2002, but representative of typical components found in mobile phones in 1997.




Ex. 2060.

88. Therefore, in the Petitioner's alleged combination, the phone would have at least four more A/D converters chips, four filter/buffer circuits, and at least the equivalent of four clock circuits, four select/control logic units, and four MPU Interface units as depicted below.




89. This diagram is based entirely on the description of the necessary components to incorporate into Palatsi from the "blue box" shown in the Petition and the Petition's strict reliance on using four touch strips. Therefore, the actual hardware modifications to Palatsi's native hardware environment would have required significantly more modification than either TCL or Dr. Wolfe assume based on what is literally conveyed in the Petition.

90. Furthermore, Moore ***only*** discloses touch-sensitive strips integrated into a computer terminal device large enough to support a cathode ray tube display. As such, nothing in Moore teaches a POSITA how to apply this hardware on a smaller

scale in a hand-held radiotelephone device. A POSITA would not have had a reasonable expectation of success to accomplish such a modification to Palatsi without substantially undue effort and experimentation.

91. In particular, it is my opinion that given the size and power constraints of mobile phone technology compared to display terminal technology during the 1997 timeframe, ***there would have been no reasonable expectation*** that four new hardware elements (which each require four sets of dedicated hardware circuitry) could be successfully implemented in Palatsi without considerable undue experimentation and trade-offs that would be clearly undesirable to the POSITA.

92. First, a POSITA would just take a common sense approach to addressing the scale of the device in Moore compared with that of Palatsi. As an illustration for at least some of the differences between desktop devices and mobile phone device, as noted above, the ATX motherboard size released by Intel in 1995 was 12 × 9.6 inches (305 × 244 mm) (Ex. 2070), while the Nokia 1610 mobile phone released in 1996 was 168 x 58 mm (Ex. 2005). Thus, even if we generously assume that the PCB of the Nokia 1610 were the same size as the phone itself, then the total area of the desktop motherboard (74,420 $mm^2$) is **over seven times the size of the mobile phone PCB** (9,744 $mm^2$).

93. Therefore, the POSITA would have been aware of this difference in the structure of Moore compared to the structure of Palatsi, and would have been

immediately skeptical about transferring four touch strips, and their accompanying circuitry, to the size-constrained housing and PCB of Palatsi. TCL and Dr. Wolfe ignore this very apparent challenge which the proper POSITA would have known had to be addressed.

94. Both TCL and Dr. Wolfe further ignore what the proper POSITA would be aware of: that additional components require additional processing capabilities (Ex. 2071 at 99), and the particular need to minimize the power budget of a portable hand-held device or radiotelephone. *Id*. They also ignore the need to minimize any increase in size in any portable device (*Id*. at 155), which would also be well known by the proper POSITA. They further ignore that mobile phones in the 1997 time period were very constrained in terms of processing power. *Id*. at 33.

95. For instance, it is my opinion that the four touch strips added to Palatsi, along with their required hardware would be problematic in a portable radiotelephone fitting in the palm of a user's hand. They add to the bulk, and cellphone size and weight desirable to be minimized, as specifically taught in Palatsi (Ex. 1087 at 1:21-23), as well as in other references (Ex. 2071 at 155).

96. Under deposition, Dr.Wolfe makes several unsubstantiated claims about how a "microprocessor, whether we're talking about in Moore or in Palatsi, it would ordinarily include additional circuitry. And in this particular case, it would

ordinarily include analog-to-digital converter circuitry capable of connecting to the touch strips of Moore." Ex. 2003 at 93:14-19.

97. In Dr. Wolfe's deposition, he simply assumes that in 1997, all the additional circuitry and processing capability for a number of additional touch strips would simply be available in a microprocessor used in in a hand-held radiotelephone. Ex. 2003 at 94:15-19. In my opinion, given the state of the art at the time, no such hardware would have existed in any device such as the representative radiotelephones cited above in the background section. To achieve the necessary small size, it is necessary to perform a high degree of integration of only the functionality needed for the overall design -- as a proper POSITA, as well as Dr. Wolfe, would readily appreciate. Ex. 2071 at 155. The portable radiotelephone of Palatsi does not include touch strips and neither do any of the mobile phones available in 1997 that I am aware of. Further, my consideration of the "teardown" of a representative device above shows that the analog to digital converter circuitry that already is included in the device is a separate component, and not integrated with the microprocessor - as Dr. Wolfe assumes and relies upon in his deposition testimony. A proper POSITA would have an expectation that a microprocessor in 1997 - even one designed specifically for radiotelephones held in the palm of the hand - would not have the necessary support circuitry for the touch strips.

98. Given Dr. Wolfe's experience and background as shown in his CV, I am puzzled as to why he would make such an assertion. I can only hypothesize that he is conflating the technology and functionality available in later times, such as the mid 2000's with that of 1997. Ex. 2072 at 11. Dr. Wolfe also ignores the magnitude of the integration effort for maintaining a small handset size while incorporating additional functionality. Ex. 2071 at 155.

99. Also, mobile phones, such as the representative "tear-down" device shown above, kept the existing analog-to-converter used for the microphone external to the microprocessor as shown above. As described above, the type of processor used in mobile phones in 1997 was a constrained processor compared to those of a desktop computer. There is simply no precedent in 1997 that I am aware of for a microprocessor used in a handheld device which incorporated four analog-to-digital converters, four filter/buffer circuits, four clock circuits, while also being able to handle the additional processes already required for a mobile phone. To design such a microprocessor in 1997 would have been well beyond the knowledge of a proper POSITA, much less the less experienced POSITA put forward by TCL, and thus required undue development and experimentation.

100. Accordingly, given TCL has provided no explanation as to how a POSITA would implement Moore's dedicated hardware and software into Palatsi's handheld telephone, while maintaining the handheld device, and without this

teaching being clear from Moore, it is my opinion that only an individual with substantially greater expertise than a proper POSITA would attempt the combination.

**Claims of the '931 Patent Provide Unexpected Results Over the Combination of Palatsi and Moore**

101. I note that the '931 specification describes that a user can swipe a contact-sensitive transducer to achieve scrolling while the radiotelephone is held in a one-handed fashion. Ex. 1001 at 5:44-48. It is my opinion the one-handed swipe-to-scroll ability provided by the '931 patent was a significant breakthrough for its time since I am not aware of any commercially available handheld device that achieved a similar result by December 1997. Particularly, I note that TCL could not even find any such handheld device as a secondary reference since Moore is clearly not a handheld device.

102. It is also my opinion that this unexpected result, the ability to do one-handed swipe scrolling on a handheld device, would not have been apparent to a proper POSITA from either Palatsi or Moore teachings, much less TCL's and Dr. Wolfe's less knowledgeable POSITA.

103. Palatsi uses single touch inputs to effectuate scrolling and thus does not envision the swipe gesture at all. Further, as noted above, Moore provides touch strips on a large desktop device. The unique benefit of performing a scrolling

operation with a swipe gesture using a single hand that is also used to grip the entire device would not have been apparent at all in Moore.

104. The breakthrough result provided by the '931 patent is evidenced from later touted commercial products. For instance, the ability to easily scroll through lists on a hand-held device with a one-handed operation was a heavily-touted feature of the Apple iPod's scroll wheel, described by Apple as "the easiest to use digital device ever." Ex. 2068. Another user of the iPod described the device as follows:

> The face of the iPod is touch-sensitive, so it has no moving parts and no buttons to break. It is designed to be used by only one hand, so if you're walking, jogging, driving, or doing anything else, you can use your iPod without interrupting whatever else you're doing. The iPod's scroll wheel is a true breakthrough . . . Just imagine clicking a button 5,000 times, or rolling a scroll barrel over and over. Does your finger hurt yet? The iPod's software engineers did a great job implementing smart acceleration into the scroll wheel so depending on how quickly you spin your thumb on the scroll wheel, the active selection scrolls through a higher number of songs, but remains easy to control.

Ex. 2069.

105. I also note that in the first generation iPod, introduced into the market in 2001, well after the priority date of the '931 patent, "the scroll wheel was a mechanical wheel which spins around on the face of the player. By the second

generation it had become a touch sensitive surface, and by the fourth generation the buttons around the edges were built into the wheel itself." Ex. 2065. According to Steve Jobs, Apple's CEO, regarding the release of its third generation iPod, "[t]he competition hasn't even caught up with our first generation iPod, and we're introducing our third generation." Ex. 2067.

106. As of the priority date of the '931 patent, desktop computers were used for most processing and computing needs as software and processors on mobile phones were not powerful or robust enough to support multiple functions and applications to be performed by the device. On desktop computers, a pointing device, such as a scroll wheel mouse or trackball, was used for sending directional or scrolling instructions. On the mobile handset front, directional arrows and buttons were routinely used for sending scrolling instructions to the processor, as screen space was very limited on which to display information, let alone implement a dedicated scrolling region. Further, there was no radiotelephone device that existed prior to the '931 patent that received a moving contact to scroll through displayed rows of graphical objects.

107. Regarding the "moving contact" feature recited in the claims of the '931 patent, in particular, "a contact-sensitive transducer . . . which produces an output signal in response to moving contact of an object along the contact-sensitive surface of the contact-sensitive transducer," I am not surprised that TCL could not

find any secondary reference with such feature embodied in a handheld device, as of the priority date of the '931 patent. It would have been known to a POSITA that the solution offered by Moore would encounter the numerous problems discussed above. In fact, many solutions to the problems with developing a scrolling technique for portable devices were only developed after 1997, and in particular, after the release of Apple's iPod and modern-day smartphones, such as the iPhone. Ex. 2034 and 2039. I note that the ability to use a flicking gesture to scroll on the iPhone has been described as a game-changing feature. Ex. 2039 at 3. Therefore, it is my opinion that the '931 patent provides an *unexpected result* that rebuts the obviousness of combining Palatsi and Moore, since it is the first reduction to practice that I am aware of that disclosed a one-handed swipe-to-scroll capability on a handheld device without using moving parts, and thus breaking an entrenched paradigm on mobile phones of using single-touch buttons to perform scrolling.

## X. CLAIM 11 IS NOT OBVIOUS OVER PALATSI IN VIEW OF MOORE

108. I note that claim 11 of the '931 patent states the following:

> The radiotelephone according to claim 10, wherein the controller is operative, responsive to the contact-sensitive transducer to detect a momentary contact with the contact-sensitive transducer and to initiate the action associated with the identified graphical object responsive to detection of the momentary contact

109. I note that "the identified graphical object" is introduced in claim 7, which recites "wherein the controller is operative **to determine a position of contact of an object along an axis of the contact-sensitive transducer responsive to the output signal of the contact-sensitive transducer**, and to selectively display a graphical object based on the determined position of contact to thereby **identify the graphical object**." (Emphasis added). I further note that "the output signal" which leads to identification of "graphical object" is produced in response to the "moving contact" of claim 1.

110. Therefore, claim 11 in combination with base claims 1, 4, 7, and 10 requires that a ***graphical object be identified in response to moving contact*** at a contact-sensitive transducer, and an action be taken related to the identified graphical object the contact-sensitive transducer ***in response to a momentary contact at the same contact-sensitive transducer***.

111. It is my opinion that the combination of Palatsi and Moore does not disclose or suggest the features of claim 11.

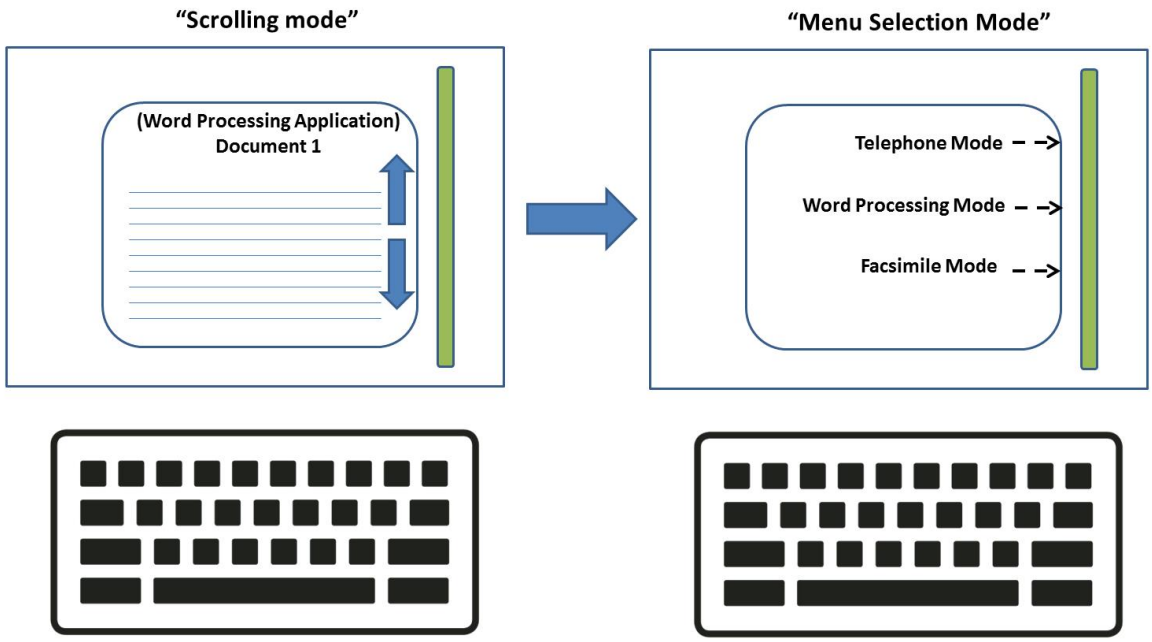
112. First, the manner in which Palatsi allows a user to select a currently displayed menu item is very specific. As described above, one of the objectives of Palatsi is to avoid using dedicated arrow keys and a separate "select" key. Ex. 1087 at 2:43-46. Thus, as illustrated in Fig. 3, Palatsi describes that the processor of the telephone monitors the time period since either of the soft keys was last

pressed. *Id.* at 3:2-4. When a certain set time has elapsed, the soft key zone 13 corresponding to key 11 changes to display "OK." *Id.* at 3:4-6. Pressing key 11 will then select the currently-displayed menu item and cause the processor to take the appropriate action corresponding to that item. *Id.* at 3:7-9. In other words, **Palatsi is only responsive to momentary contacts** and does not allow for determining an identified graphical object based on a *moving* contact, and then subsequently using a momentary contact to initiate an action with respect to the identified graphical object.

113. The touch strips in Moore maintain a certain mode (such as a scrolling mode) unless deliberately switched to another mode by pressing a function key on the keyboard. Ex. 1012 at 3:17-24. Therefore, in Moore, if a user makes a "moving contact" on one of the touch strips to perform a scrolling function, then the user would still only be able to provide a scrolling input even if a subsequent momentary contact is made to the touch strip because the touch strip would still be in the scrolling mode: in Moore, such a momentary contact would be merely a small scrolling input. Moore discloses a simple scrolling functionality and does not allow for determining an identified graphical object based on a moving contact, and then using a momentary contact to initiate an action with respect to the identified graphical object.

114. TCL and Dr. Wolfe completely mischaracterize Moore's description of the menu selection function key. Petition at 52. As pointed out above, there are different modes for using the touch strip in Moore, and pressing a function on the keyboard changes a mode of the touch strip, such as soft-key designation, menu selection, cursor generation, graded control and scrolling. Ex. 1012 at 3:17-24. The menu selection mode is distinct from the scrolling mode, and it causes a list of displayed titles to be displayed adjacent to a portion of touch strip. Thus, when the user presses (which is a separate type of contact from the *moving* contact) a portion of the touch strip adjacent to the desired menu title, it causes selection of this title. *Id.* at 3:45-53.

115. However, in the scrolling mode, text or graphics that are already displayed can be moved vertically or laterally to view other portions of the displayed matter. *Id.* at 4:20-27. Moore simply does not provide for the scrolling mode to determine an identification. As illustrated below, if displayed text or graphics are being scrolled vertically or laterally while in the scrolling mode of Moore (such as in a word processing application) and a user switches to the menu mode by pressing the menu selection function key on the keyboard, then a new list of titles will be displayed adjacent to respective portions of the touch strip (such as for higher level program or application selection).




116. Moore's scrolling mode does not identify an object: objects are selected separately and independently in the menu selection mode. Moore does not describe that an item which was displayed while in the scrolling mode can itself become a selectable item when the user exits the scrolling mode.

117. Thus, Palatsi and Moore fail to disclose determining an identified graphical object based on "moving contact," received at a contact-sensitive transducer and then initiating an action associated with the identified graphical object responsive to detection of a momentary contact at the same contact-sensitive transducer.

118. That is, Moore does not teach a contact-sensitive transducer that is sophisticated enough such that a graphical object that is displayed while in the scrolling mode for the touch strip, can then become a selectable menu item using "momentary contact" at the same touch strip while in the menu selection mode.

119. Therefore, it is my opinion that the combination of Palatsi and Moore fails to teach or suggest the features of claim 11. As such, Palatsi and Moore fail to render obvious claim 11 of the '931 patent.

## XI. CLAIMS 12 AND 49 ARE NOT OBVIOUS OVER PALATSI IN VIEW OF MOORE AND TIILIKAINEN

120. As I discussed above, Tiilikainen is directed a portable telephone with a touch-sensitive display and a scrolling key as shown in Fig. 1 below.

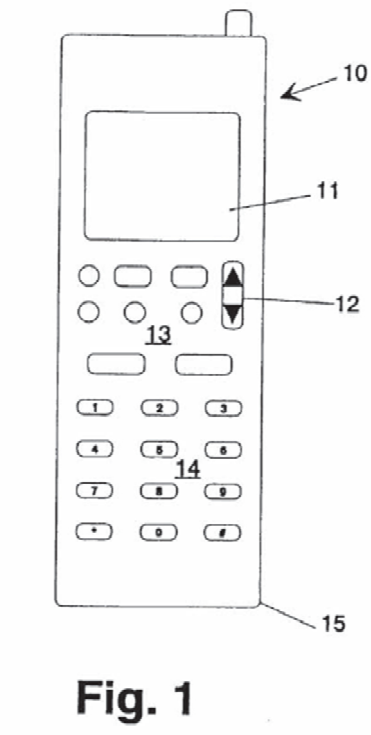



Fig. 1

121. Tiilikainen describes using the scrolling key 12 to scroll through stored telephone numbers. Then, when the required number has been brought to the field 24 (Ex. 1088 *at* Fig. 2), the user can select the required number by pressing the

display (with a finger or a pen) at the corresponding column 25, 26, or 27, whereby the phone immediately makes a call to the chosen number. *Id*. at 3:19-22.

122. However, I note that the scrolling key of Tiilikainen is similar to the "soft" keys of Palatsi, in which a single touch operation on the scroll buttons causes the scrolling operation. Accordingly, similar to the deficiencies of Palatsi that I discussed above, Tiilikainen does not describe performing the scrolling by way of a ***moving contact*** of an object along the surface of the touch screen.

123. Therefore, it is my opinion that Tiilikainen does not disclose or suggest anything to remedy the deficiencies of combining Palatsi and Moore discussed above for claims 1 and 11. As such, Palatsi, Moore, and Tiilikainen fail to render obvious claims 12 and 49 of the '931 patent.

## XII. AVAILABILITY FOR CROSS-EXAMINATION

124. In signing this declaration, I recognize 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 also recognize that I may be subject to cross examination in the 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.

## XIII. RIGHT TO SUPPLEMENT

125. I reserve the right to supplement my observations in the future to respond to any arguments that the Petitioner raises and to take into account new information as it becomes available to me.

## XIV. JURAT

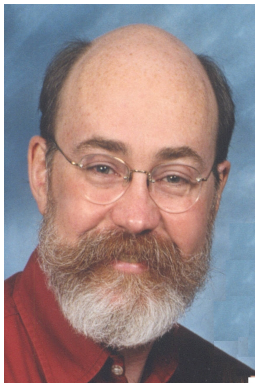
126. I, Jean Renard Ward, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable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

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 20 June 2016

Jean Renard Ward

# APPENDIX A



Jean Renard Ward
Rueters-Ward Services
350 Massachusetts Avenue PMB 210
Arlington, MA 02476-7737
Voice: 781-267-0156
jrward@alum.mit.edu
jrward@ruetersward.com

Technical and software development consultant, February 1993 to present.
Currently doing business as Rueters-Ward Services.
Prior to 1993, positions as noted.

2008-present
Consulting/development for multiple clients:

- Laboratory information processing for biomedical drug-discovery company
- Digital audio HW/SW Agile verification automation for massive VOIP technology.
- Consulting/development for TV-band datacasting architecture.
- Technical consulting, review, development for web-based collaborative work systems.
- Prior-art research and source-code analysis in patent litigations (confidential).
- Technical assistance to Boston-area attorney in solo practice (patent prosecution only).

2012-2015

Declarations in support of petitioner Samsung for *Inter Partes* Review of U.S. Patent 6,610,917 and related patents, concerning touchscreen hardware (February 2016).

Expert witness for plaintiff GO Computer in *GO Computer Inc. v. Microsoft,* CGC-05-442684 in Superior Court, State of California/San Francisco. Report and Deposition August 2015. Settled September 2015.

Expert witness for defendant Google in *ContentGuard Holdings, Inc. v. Google Inc*., Case No 2:14CV0061, (Eastern District of Texas, Marshall Division), concerning Digital Rights Management and Secure Systems. Deposition June 2015, trial September 2015.

Expert witness for defendant Lenovo in *MAZ Encryption Technologies LLC v Lenovo Inc.*, Case No 13-303-LPS (District of Delaware), concerning encryption/decryption in conjunction with smartcards. Deposition April, 2015.

(Non-expert deposition as subpoenaed fact witness in *Flatworld v. Samsung Electronics Co. LTD. et al,* Case No 12-804-LPS, District of Delaware, April 2015.)

Declaration/report in support of petitioner Google Inc. for *Inter Partes* Review of U.S. Patent 6,121,960, concerning rendering of transparency in graphics images and touch screen user-interface methods (May 2014), Depositions February and May, 2015.

Consulting expert for two patents concerning touchscreen gestures on a virtual keyboard, and layered display of information.

Expert witness for defendant Samsung in *Apple Inc. v Samsung Electronics Co. Limited, Proceeding No. NSD 1243 of 2011, Federal Court of Australia*, concerning multi-touch hardware. Two reports, testimony at trial (June 2013).

Consulting expert for patent concerning transparent graphical displays.

Consulting expert for patent concerning rotation of window views in touchscreen devices.

2012
Expert witness for defendant Motorola in *Certain Mobile Devices Incorporating Haptics*, case number 337-2875, in the U.S. International Trade Commission, concerning touch haptics (settled).

2011-2012
Expert witness for defendant Motorola Corporation in *Motorola Mobility, Inc. v. Microsoft Corporation,* Case No. 10-24063-CIV-MORENO (Southern District of Florida) concerning touchscreen gestures in smartphones. Two reports, testimony at deposition, one affidavit in re-exam.

2010-2011
Expert witness for defendant Nokia in *Nokia Corporation v. Apple, Inc*., Case No. C.A. 09-791-GMS, (District of Delaware). Prior art and other research on multiple patents regarding touch user-interfaces, color rendering, touchscreen integration, and development tools for hand-held devices. Settled shortly before reports due.

2006-2008
Expert witness for plaintiff Lucent Technologies in *Lucent Technologies, Inc., v. Gateway, Inc. et al.*, Case No. 02-CV-2060-B (WMC), consolidated with Case No. 03-CV-0699-B (WMC) and Case No. 03-CV-1108-B (WMC) (S.D. Cal.), concerning gesture user interfaces and hardware integration in tablet-type computers. Three expert reports, testimony in three depositions and at trial.

2007 Bluesocket Inc., Burlington Massachusetts
Software development and engineering process (with QA Director and VP Eng.) for a distributed wireless network controller product with integrated security, verification of SSL/TLS and VPN features in multiple hardware devices. Agile/Jira.

2005/2006: (Staff: Principal Engineer) Cylant Security, Burlington Massachusetts
Computer security technology: Multi-platform product for malware/virus detection, including techniques of behavioral analysis. Two patent filings on novel techniques (violation of invariant conditions) for detection of rootkits and malware

2004:
Expert witness for defendant in patent case *Anoto AB v. Sekendur*, Case 03-C-4723, Northern District of Illinois, optical (video) stylus digitizer hardware and firmware. Expert report and deposition .

2003/2004: Digimarc, Burlington Massachusetts
Consultant: Application of PKI technology in fabrication and production of secure identity documents and manufactured items. One patent filing regarding PKI signatures to ensure authenticity and track unauthorized issuance of security documents such as passports.

2002/2003:
Three projects involving secure Web development in high-availability, high-performance applications, and international certification of a life-critical annunciation system.
Prior-art research for two clients: pen-computing hardware and handwriting recognition.

2001:
Expert witness for defendant in *Shumer v. LCS* involving hardware controllers and virtual devices for digitizing tablets (WINTAB).

1999/2002: (Staff: PKI Systems Architect) CertCo Incorporated, Cambridge Massachusetts
Development of distributed web applications involving proprietary PKI in e-commerce.
Three patent filings regarding PK infrastructure for distributed electronic signing.

1998 to 1999: Siemens-Nixdorf USA, LCP Business Unit, Burlington Massachusetts
Design and development of cryptographic PKI/security technology for electronic DRM licensing of documents and materials distributed without restriction over the public Internet.

1996 to 1998: (Staff: Dev. Group Leader) e-parcel.com, Newton Massachusetts
Division of Mitsubishi Electronics America,
Secure, encrypted document and software delivery systems for automatic dissemination and delivery over the public Internet. Instituted engineering tracking and QA process.

1995/1996: FAX International, Burlington MA
Automated Email-to-FAX gateway, routing of fax traffic over private TCP/IP network.

1994/1995: DEC/Digital VXT Division, Marlboro, MA
WindowsNT-based graphics/applications terminal product using ALPHA technology.

1994: DMR Group, Waltham, MA
Proprietary application scripting language, associated compilers, debuggers, and tools.

1993/1994: Phoenix Technologies Ltd., PAGE Division Cambridge, MA
Firmware for a multiple-language, multiple-resolution network printer (PostScript/PCL).

1993: Termiflex Corporation, Merrimac, NH
Compiler, linker, interpreter, and related tools for an object-based programming language for applications in a hand-held touchpad industrial controller terminals.

**Prior to 1993**

1992, 1993:
Session chair and instructor for tutorial seminars on touchscreen/pen interfaces and digitizer technology at the 1992 and 1993 annual conferences for the Society for Information Display.
Consultant to various clients on digitizer technology and pen computing interfaces

1991 to 1993: Developer, Slate Corporation, Newton MA
Development of tablet and pen computing applications products for the Microsoft PenWindows and GO/PenPoint pen-computing operating systems.
Company representative and technical co-chair of an industry standardization effort ("JOT") for electronic ink data format and compression applications.

1989 to 1991: Senior Software Architect Wang Laboratories, Lowell MA
Lead developer for digitizer and controller/driver software to provide enhanced functionality to a portable computer as part of the "Freestyle" digitizer-based computer applications family.
Company technical representative to early Pen Windows discussions with Microsoft. Hardware design of an electrostatic tablet digitizer. Patents on novel pen-based UI involving virtual devices.

1987 to 1989: Dir. of Software Eng., Teledyne/TAC, Woburn MA
Software group leader for computer-controlled industrial automation for IC wafer testing.

1979 to 1987, Lead Engineer, Pencept Inc., Waltham MA
Group leader for Pencept's handwriting recognition, and pen-computing digitizers and hardware controllers through three generations of products.
Patents related to pen-computing UI and pen-computing digitizers.

1977 to 1979, Senior Engineer/Analyst, Dynatron Corporation, Waltham, Massachusetts
Early work as consultant for Penverter Partners (predecessor to Pencept).
Specialized implementation tools for real-time digital audio signal processing and testing.

1974 to 1977, Senior Systems Programmer, Data General Corp., Westboro Massachusetts
Compiler development.

**Partial list of published patent applications**

US Published Patent Application 20070169192, June 19, 2007
“Detection of system compromise by per-process network modeling”

US Published Patent Application 20070067623, March 22, 2007
“Detection of system compromise by correlation of information objects”

US Published Patent Application 20050132194, June 16, 2005
“Protection of identification documents using open cryptography”

US Published Patent Application 20030163686, August 28, 2003
“System and method for ad hoc management of credentials, trust relationships and trust history in computing environments”

European Patent Application Publication EP1421464 A1, May 26, 2004
“System and method for trust in computer environments”

**Partial list of granted patents**

US 5,491,495
"User interface having simulated devices"

European Patent Application EP693724A1
"A method of reconfiguration of a simulated keyboard device in a computer system"

US 5,148,155
"Computer with tablet input to standard programs"

US 4,608,658
"Method and apparatus for removing noise at the ends of a stroke caused by retracing"

US 4,562,304
"Apparatus and method for emulating computer keyboard input with a handprint terminal"

US 4,534,060
"Method and apparatus for removing noise at the ends of a stroke"

**Partial list of On-line publications**

“Annotated Bibliography in On-line Character Recognition, Pen Computing, Gesture User Interfaces and Tablet and Touch Computers “, available at http://www.ruetersward.com/biblio.html

“History of Pen-Based Computing - March 1992, Jean Renard Ward”,
available at http://www.youtube.com/watch?v=4xnqKdWMa_8
(Posted 2013 by Dan Bricklin, http://bricklin.com)

**Partial list of presentations and publications as author or co-author**

"Under the Hood: Digitizer Technology and Pen Computing", BYTE Magazine, January, 1993.

"UNIX as a development tool for a non-UNIX microprocessor", CommUNIXations, Vol. V No. 5, August/September 1985.

"Interactive Recognition of Handprinted Characters for Computer Input", IEEE Computer Graphics and Applications, Vol. 5 No. 9, September 1985.

"Digitizer technology: Performance characteristics and the effects on the user interface", IEEE Computer Graphics and Applications, April 1987.

Panel organizer: "Issues in the validity of testing protocols and criteria for on-line recognition of handwritten text", presented at the 3rd International Conference on Handwriting and Applications, July 1987.

Organizer for multi-company presentation to PHIGS standardization committee on pen computing and gesture-recognition input devices, 1986.

"A model for variability effects in hand-printing, with implications on the design of on-line character recognition systems", IEEE Trans. on Systems, Man, and Cybernetics, May 1988.

"One view of outstanding problems in handwriting recognition systems", 3rd International Conference on Handwriting Recognition and Applications, Montreal, Quebec, April 1990.

"Pen computing -- fad or revolution?," Information Display, pp. 14-19, March 1992.

**Education**

S.B. in Computer Science and Electrical Engineering
M.I.T., Cambridge, Massachusetts 1974

Independent Study, Philipps-Universität
Marburg, Germany 1972

**Other Skills**

Fluent in German.

10/05/15 09:49:54 PM