

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC., AMAZON.COM SERVICES LLC,

Petitioner,

v.

NOKIA TECHNOLOGIES OY,

Patent Owner.

Case No. IPR2024-00799

U.S. Patent 9,473,602

Declaration of Steven Visser

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I, Steven Visser, declare as follows:

1. My name is Steven Visser. I am a Professor of Industrial Design at Purdue University and is the founder of Steve Visser Design, a design consultancy. I have prepared this report as an expert witness retained by Amazon.com, Inc. and Amazon.com Services LLC. In this report I give my opinions as to whether certain claims of U.S. Patent No. 9,473,602 (“the ’602 patent”) are invalid. I provide technical bases for these opinions as appropriate.

2. This report contains statements of my opinions formed to date and the bases and reasons for those opinions. I may offer additional opinions based on further review of materials in this case, including opinions and/or testimony of other expert witnesses. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

I. OVERVIEW OF THE TECHNOLOGY

3. In the 1990s, electronic devices became smaller and more portable. By the mid-2000s, portable electronic devices were widespread. This included personal digital assistants (“PDAs”) such as the popular Palm Pilot devices, which had, e.g., a single body, a touchscreen on the front, and a battery and printed circuit

board (“PCB”) inside the body. An exemplary Palm Pilot is shown below resting in its docking cradle:¹



By 2006, there were several variations of the Palm Pilot. Indeed, prior art shows that Palm was contemplating features that were popular at the time, including, e.g., a backwards-facing camera (Ex-1004, ¶19) and cellphone service (Ex-1008, Abstract).

4. Several techniques were known for manufacturing housings for portable electronic devices. Palm prior art taught the use of a unitarily-formed housing (*see* Ex-1004, ¶24, ¶26), which was a widely-known design. A popular way to produce unitarily-formed housings was through an extrusion process, where metal was extruded through a die to form a housing with a hollow tubular shape.

¹ Image downloaded from <https://www.computinghistory.org.uk/det/16738/Palm-V/>. This image is consistent with my personal memory of the Palm V.

Subsequently, machining or punching was used to form openings and holes into the housing. Extruding a hollow tubular metal shape was known for reducing manufacturing costs and making devices lighter and more aesthetically pleasing. Extrusion housing was used in numerous devices including Apple iPods of the mid-2000s. *See* Ex-1009 (Apple’s Claim Construction Response Brief), 000069.



5. In 1991, I designed a radio frequency meter that has a hollow tubular extruded aluminum one-piece housing with plastic end caps. It also had a hole cut into the housing for a speaker on the top of the product. One-piece housings manufactured in such manner were featured in various products including Apple’s iPod mini’s released in 2004.

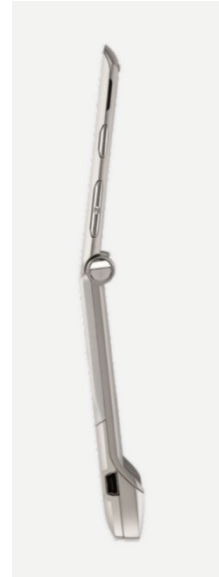
II. THE ’602 PATENT

A. Overview

6. The ’602 patent relates to the form factor of portable electronic devices (Ex-1001, 1:19-21) and describes Nokia’s attempt, in 2006, to purportedly improve on the RAZR form factor, which it admits was prior art. Ex-1001, 1:23-35. According to the ’602 patent, there was a “desire” for “ultrathin” flip-phones,

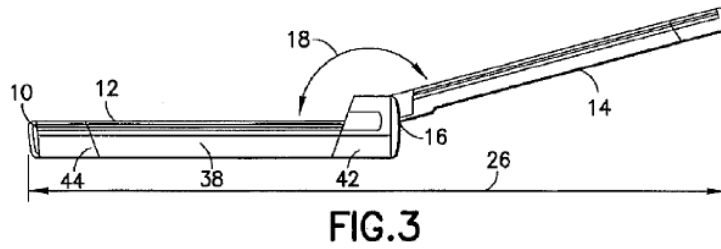
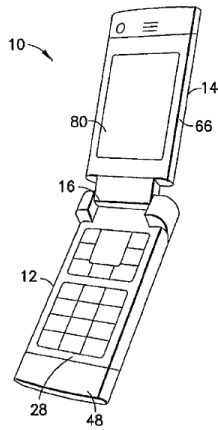
which it sought to improve with balanced proportions between the two halves of the flip phone that avoided the “squeezed” appearance of the RAZR. Ex-1001, 1:35-39.

Motorola RAZR:



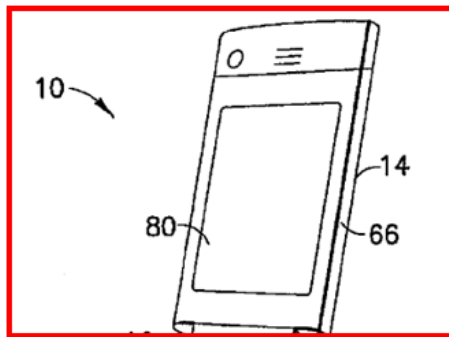
7. To achieve balanced proportions, the embodiments feature “a substantially uniform thickness lower section 12 and a substantially uniform thickness upper section 14 along their entire lengths except for at the hinge 16.” Ex-1001, 3:4-20.

'602 Patent:



8. The '602 patent describes a flip phone with two sections connected by a hinge, as shown below. *Id.*, 1:43-50; Fig. 1 (annotations added).

Second Section



First Section

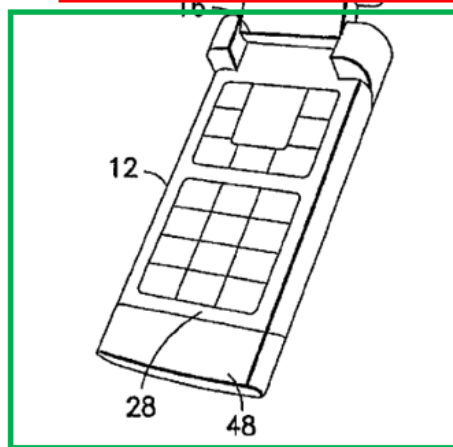


FIG. 1

9. The first section comprises a first housing member (such as a one-piece tubular member), an engine, a battery, a user input section, and an antenna module. *Id.*, 3:24-44. As a typical arrangement, the battery is located adjacent to the engine and directly opposite to the user input section. *Id.*, 3:64-4:10. The second section comprises a second housing member (such as another one-piece tubular member) and a display module. *Id.*, 4:52-5:6. The specification of the '602 patent also states that a camera is located at a cutout portion of the second housing member in the second section. *Id.*, 5:15-25.

10. The '602 patent, however, does not claim two sections of a device. The claims of the '602 patent only recite a one-piece housing, in which common components such as cameras, a battery, and a PCB are housed. *See id.*, 6:21-8:46. The claims also recite other commonplace features including a user input section, as well as certain features such as a continuous surface that the '602 specification does not explain.

11. However, this form factor was already known, including for Palm Pilots. As explained below, Palm prior art, alone and in combination with other common features, invalidates the Challenged Claims.

B. Prosecution History

12. I understand the '602 patent is one of a chain of continuation patents beginning with U.S. Patent No. 7,787,618 and including U.S. Patent No.

8,363,824, U.S. Patent No. 8,615,077, and U.S. Patent No. 8,953,780. Ex-1001, (63).

13. During prosecution of the '077 patent, the examiner issued a non-final rejection of the claims based on U.S. Patent No. 7,515,431 to Zadesky. Ex-1014, 000098, 000077-78. Among the rejections, the examiner found that Zadesky anticipated the following claim 41:

41. (Previously presented) A housing for a portable electronic device comprising:

a one piece housing forming enclosed exterior lateral sides and a rear side;

said one piece housing has a front side extending from the lateral sides along at least two edges of the housing,

the front side extending between the lateral edges, said lateral sides and front side forming a aperture configured to receive a user input wherein the user input and the front side of the housing form a continuous front surface of the portable electronic device.

14. The applicant did not dispute that Zadesky teaches a “one piece housing.” Ex-1014, 000114-119. Instead, the applicant amended claim 41, adding “a door in the one piece housing configured to receive and support an electronic module; and an engine section located in the housing comprising electrical connectors to couple the electronic module to the engine section.” Ex-1014, 000114. The applicant contended that “there is no teaching, disclosure, or

suggestion, in Zadesky that the end caps, in any way, *support* any of the subassemblies or components.” Ex-1014, 000119-000120 (emphasis in original).

15. Subsequently, the examiner allowed the ’077 patent. Ex-1014, 000135.

C. Priority Date

16. The earliest parent of the ’602 patent was filed in 2006. However, as I explained in IPR2024-00798, the ’602 patent is not entitled to a 2006 priority date. In this declaration, I will show that prior art before March 29, 2006 teaches the challenged claims of the ’602 patent, without regard to whether the ’602 patent is entitled to that priority date.

D. Challenged Claims

17. I understand that Petitioner is challenging the validity of claims 1-36 of the ’602 patent in the Petition for Inter Partes Review to which this declaration will be attached. Those claims are reproduced in Appendix 3.

E. Related Prior Litigations

18. I understand that the ’602 patent was previously asserted against Apple Inc. concurrently in the Eastern District of Texas and the International Trade Commission. I understand that both cases were settled before any substantive decision or determination was made. *Nokia Technologies Oy et al v. Apple Inc.*, No. 2:16-cv-1441, Dkt. 34 (E.D. Tex. Jun. 6, 2017); *Electronic Devices, Including*

Mobile Phones, Tablet Computers, and Components Thereof, Inv. No. 337-TA-1038, Order No. 26 (August 8, 2017).

19. I understand that a parent patent, U.S. Patent No. 8,363,824, to which the '602 patent claims continuation, was asserted against Google LLC, HTC America, Inc., and HTC Corporation in another case before the ITC. I understand that this case is also settled before any substantive determination was made.

Portable Electronic Communications Devices, Including Mobile Phones and Components Thereof, Inv. No. 337-TA-885, Order No. 23 (February 25, 2014).

III. LEVEL OF ORDINARY SKILL IN THE ART

20. I have analyzed the '602 and determined that the field of the patent is the form factor design of portable electronic devices. For example, the '602 patent characterizes its alleged invention as being related to “a portable electronic device and, more particularly, to form factor configuration of a portable electronic device.” Ex-1001, 1:19-21. This is consistent with the specification, which describes a form factor for portable electronic devices, and the claims, which recite form factor limitations.

21. In determining the characteristics of a hypothetical person of ordinary skill in the art (“POSITA”) of the '602 patent at the time of the claimed invention, I considered several things, including various prior art techniques relating to the field of form factor design of portable electronic devices, the type of problems that

such techniques gave rise to, and the rapidity with which innovations were made. I also considered the sophistication of the technologies involved, and the educational background and experience of those actively working in the field at the time. I also considered the level of education that would be necessary to understand the '602 patent. Finally, I placed myself back in the relevant period of time and considered the designers and engineers that I have worked with and managed in the field of form factor design of portable electronic devices.

22. I came to the conclusion that a person of ordinary skill in the field of art of the '602 patent would have been a person with a bachelor's degree in industrial design, fine arts, or a similar field with at least two years of experience in industrial design. A person with less education but more relevant practical experience may also meet this standard.

23. I would have satisfied the criteria for POSITA because I received a Bachelor of Art with a major in Fine Art, received an MFA in Industrial Design and also have 38 years of experience in both the practical and academic areas of the industrial design, as explained in more detail below (in Section VI) and my attached CV. I have designed mobile phones, and other housings for electronics. For example, in 2006 I designed mobile phones for Samsung. In 1989, I assisted in the designed a camera for Ansco called the Vision AL, as well as the Whistler 750 radar detector. In 1991, I designed the Tricorder R.F. meter for Trilithic. In

1996, I received a utility and a design patent for the design of a video game controller for use with exercise equipment. In 2005, I helped create the concept design for Filadex USB drive. In 2005-2006, I co-designed a portable electronic device for Klipsch for use with an iPod device.

24. In the 2006 timeframe, a POSITA would have known and had the skills necessary to:

- Apply conventional arrangements of various internal components of a portable electronic device;
- Apply conventional methods for manufacturing portable electronic devices including, for example, extrusion, injection molding, casting, and stamping;
- Apply conventional ergonomics of various configurations of portable electronic devices.

IV. CLAIM CONSTRUCTION

25. For purposes of this inter partes review, I have considered the claim language, specification, portions of the prosecution history, and publicly available claim construction briefs filed by parties in the related litigations, to determine the meaning of the claim language as it would have been understood by a person of ordinary skill in the art at the time of the invention. The “plain and ordinary meaning” or *Phillips* standard has traditionally been applied in district court

litigation, where a claim term is given its plain and ordinary meaning in view of the specification from the view point of a person of ordinary skill in the art.

26. I have applied the *Phillips* standard in my analysis. Unless otherwise stated, I have applied the plain and ordinary meaning to claim terms.

**A. “housing forming enclosed exterior lateral sides and a rear side”;
“housing . . . forming enclosed exterior lateral sides and a rear
side” (claims 1, 15, 22)**

27. The phrase “housing forming enclosed exterior lateral sides and a rear side” or “housing...forming enclosed exterior lateral sides and a rear side” is recited in claims 1, 15, and 22 of the '602 patent.

28. In the prior ITC investigation (*Electronic Devices, Including Mobile Phones, Tablet Computers, and Components Thereof*, Inv. No. 337-TA-1038), the Patent Owner briefed the terms “housing forming enclosed exterior lateral sides and a rear side” (claims 1 and 15) and “housing...forming enclosed exterior lateral sides and a rear side” (claim 22). *See* Ex-1014, 000080; Ex-1016, 000064-70. The Patent Owner argued that the terms should be afforded their plain and ordinary meaning, or in the alternative, be construed as a “member that houses forming enclosed exterior lateral sides and a rear side.” Ex-1016, 000064-70.

29. The Patent Owner rejected Apple’s proposed construction of “tubular housing,” as being “much too narrow, particularly if it requires that the housing have a ‘front side.’” Ex-1016, 000064. The Patent Owner further argued that the

term “housing” does not require an enclosed front side. Ex-1016, 000065-68. The Patent Owner also argued that the “housing” does not need to have open top and bottom ends. *Id.*

30. I explain below how the Patent Owner’s proposed construction is satisfied by prior art listed below, which invalidates the Challenged Claims regardless of whether the Patent Owner’s proposed construction is adopted.

V. INVALIDITY GROUNDS

31. Based on my review and analysis of the materials cited herein, my opinions regarding the understanding of a POSITA in the 2006 timeframe, and my training and experience, it is my opinion that the challenged claims of the ’602 patent are invalid based on the following grounds:

Grounds	Claims	Statutory Basis	Prior Art
1	1, 11, 12, 15	§ 103	Nguyen
2	1-7, 9-13, 15-28, 30-34, 36	§ 103	Nguyen, Zadesky, Oda
3	1-36	§ 103	Nguyen, Zadesky, Oda, Gettemy

A. Ground 1: Nguyen

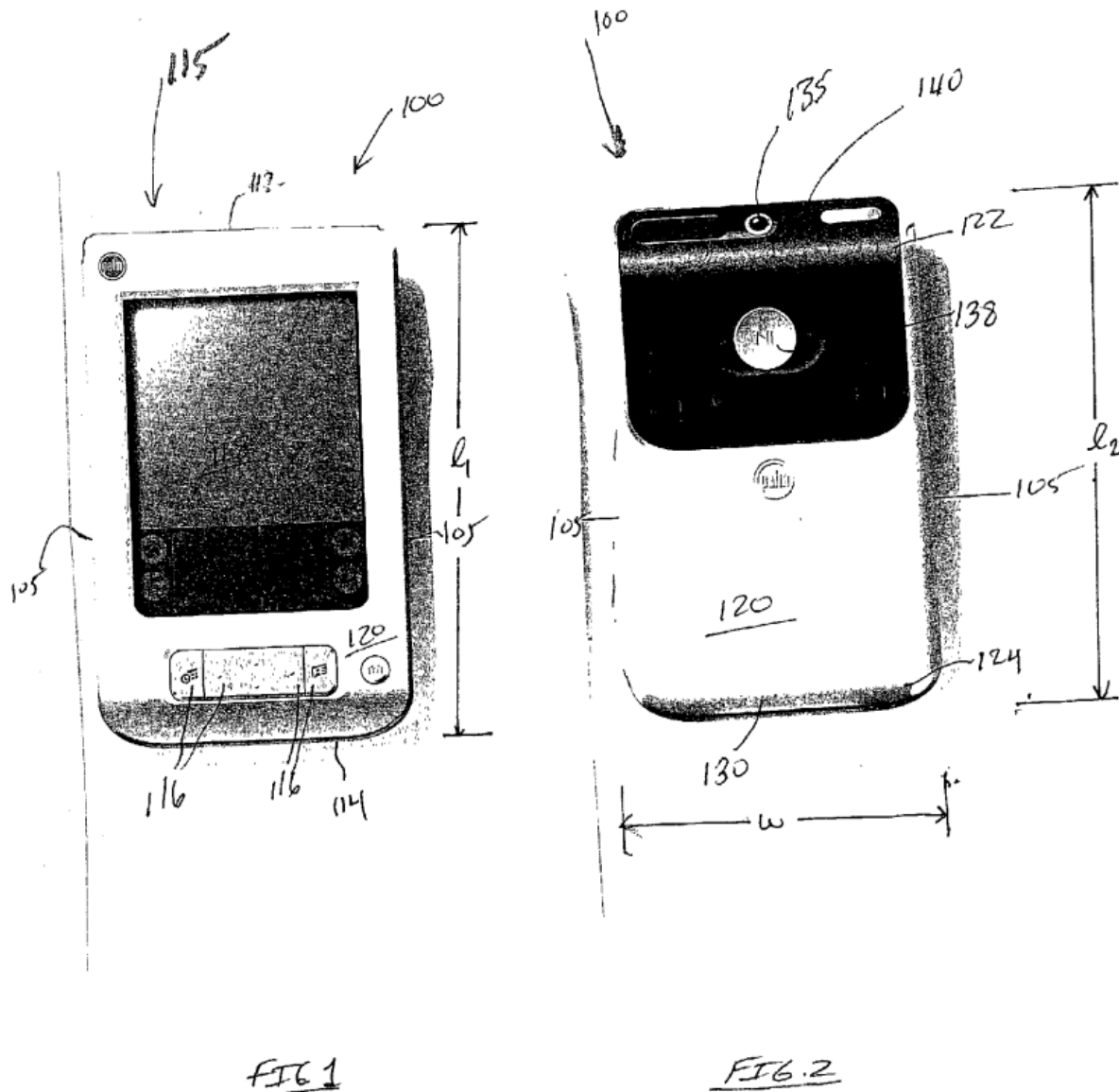
32. It is my opinion that a POSITA would have found claims 1, 11, 12, and 15 obvious based on the teachings of Nguyen.

**1. U.S. Patent Application Publication No. 2003/0222845
("Nguyen") (Ex-1004)**

33. I have reviewed the Nguyen reference. I understand that Nguyen was not cited or considered during prosecution of the '602 Patent, based primarily on the fact that Nguyen is not cited on the face of the patent, nor have I seen the reference discussed in the prosecution history.

34. Nguyen is entitled "Housing Configuration for Orientating a Surface Feature on a Handheld Computer." Nguyen was filed on May 31, 2002 and was published on December 4, 2003. Based on the adopted priority date of March 29, 2006 of the '602 patent, I understand Nguyen is prior art to the '602 patent under at least pre-AIA §§102(a).

35. Nguyen is directed to a Palm Pilot handheld computer, e.g., a personal digital assistant (PDA). *See* Ex-1004, Abstract, ¶¶1-2. Nguyen teaches that the handheld computer device has a "unitarily formed" housing with a touchscreen display in the front and a rear-facing camera. Ex-1004, ¶¶24-26, ¶¶21-22, Figs. 1-2.



36. Within the unitarily-formed housing, Nguyen's device includes internal components such as a processor, memory, and a battery, as shown in the hardware diagram of Fig. 4 below. Ex-1004, ¶34. In addition, Nguyen teaches that the handheld computer includes a wireless communication transmitter and a wireless communication receiver. Ex-1004, ¶39.

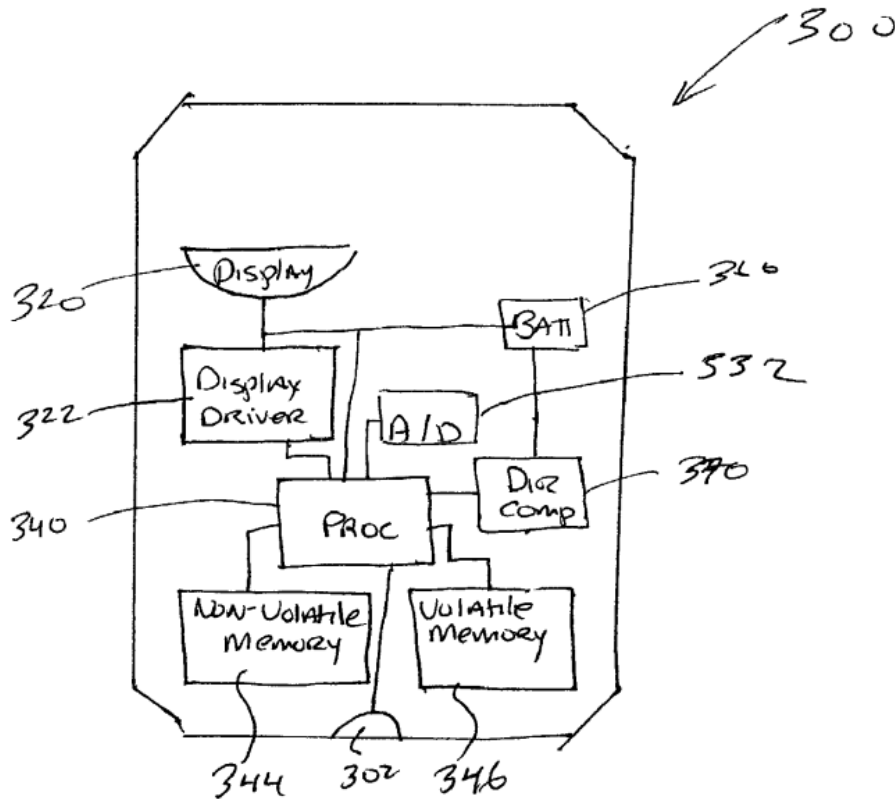


FIG. 4

37. Nguyen is analogous art to the '602 patent because it is directed to a portable electronic device. Ex-1004, Abstract. For example, Nguyen's teachings concern the design and components of a portable electronic device, e.g., a handheld computer such as a Palm Pilot PDA. Ex-1004, ¶7.

2. Independent Claim 1

38. It is my opinion that Nguyen teaches claim 1.

[1pre] A portable electronic device comprising:

39. I understand that a preamble generally does not state a claim limitation. However, to the extent that Patent Owner argues that the preamble

states a limitation, it is my opinion that Nguyen teaches the preamble, as explained below.

40. Nguyen teaches **a portable electronic device**. For example, Nguyen teaches a “handheld computer.” *See* Ex-1004, Abstract, ¶¶1-2, 7, 13, 15, Figs. 1-4. A handheld computer is an electronic device because computers run on electricity and processes information, and therefore are electronic devices. In addition, a handheld computer, e.g., in a Palm Pilot form factor, is held in the hand and therefore portable.

41. Therefore, Nguyen teaches the preamble of claim 1.

[1a] a one piece housing forming enclosed exterior lateral sides and a rear side;

42. Nguyen teaches **a one piece housing forming enclosed exterior lateral sides and a rear side**. For example, Nguyen teaches a housing with “a front face and a *back face*.” Ex-1004, ¶15. The housing includes “lateral sides 105” (Ex-1004, ¶21) and “[t]he width of *back face* 120 may extend between lateral sides 105, so as to be the same as front face 110.” Ex-1004, ¶25; *see also* Ex-1004, ¶21.

43. As also seen in Fig. 2 below, Nguyen teaches that the housing forms a rear side (labeled as 120) and enclosed exterior lateral sides around the rear side. Ex-1004, ¶¶10, 21, 25. Fig. 3 is a side view of the device showing one of the

exterior lateral sides. Ex-1004, ¶11. This housing forms a tray-like shape, with raised edges, that houses the components of the handheld computer, as further explained for subsequent limitations.

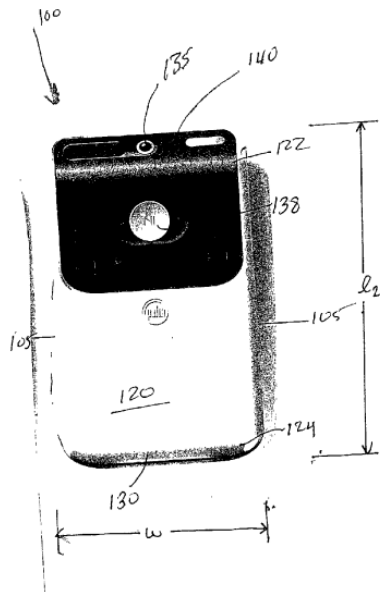


FIG. 2

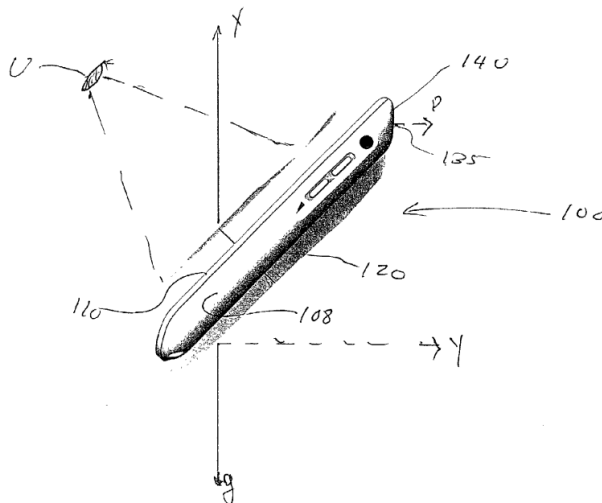


FIG. 3

44. Nguyen teaches that the housing is a one-piece housing. For example, Nguyen teaches a mobile device “having a housing that is shaped to orient a surface component on the handheld computer.” Ex-1004, ¶7. In its textual description, Nguyen teaches that, “[a]s with the bottom slanted surface 130, the top slanted surface 140 may be *unitarily formed* as part of the housing that includes back face 120.” Ex-1004, ¶¶26-27. In addition, the lateral sides are also unitarily formed as a one piece housing together with the top slanted surface and the back face, as shown in Nguyen’s figures. Ex-1004, Figs. 2-3. A POSITA would have

understood this or at least found it obvious because Nguyen teaches that the above-described housing, i.e., the entire tray-shaped housing with a back face surrounded by enclosed exterior lateral sides, is formed as a unitary (one-piece) housing. *Id.*, ¶¶26-27, Figs. 2-3.

45. Nguyen also teaches this limitation under Nokia's construction: a member that houses forming enclosed exterior lateral sides and a rear side. Nguyen's one-piece housing is a member that houses internal components, such as the engine section and battery. *See* Sections V.A.2[1d], [1e]. Nguyen's one-piece housing also forms enclosed exterior lateral sides and a rear side. Based on the foregoing explanations, Nguyen teaches limitation [1a].

[1b] a cut out in the rear side of said housing;

46. Nguyen teaches **a cut out in the rear side of said housing**. For example, Nguyen teaches a backwards-facing camera that extends from the back face. Ex-1004, ¶¶19, 27. Nguyen teaches that the camera optics are provided through an opening in the housing. Ex-1004, ¶27 ("The lens may be formed by a transmissive layer provided on the top slanted surface 140 surface. A light-detecting material may be provided under the transmissive material of the lens 135."). Therefore, Nguyen teaches a cut out in the rear side of the housing to allow for the rear-facing camera's optics.

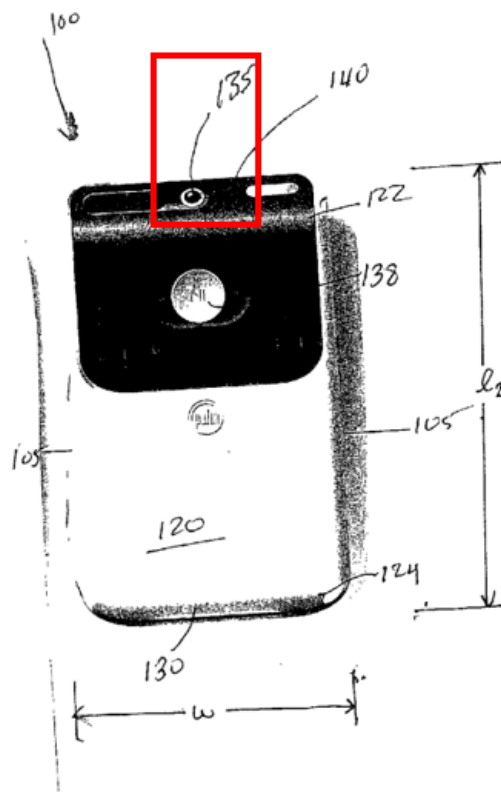


FIG. 2

47. Thus, Nguyen teaches limitation [1b].

[1c] a camera located in said housing and extending to said cut out at said rear side;

48. Nguyen teaches **a camera located in said housing and extending to said cut out at said rear side**. For example, as I explained above for limitation [1b], Nguyen teaches a backwards-facing camera and a cut out at the rear side for the camera. Nguyen further teaches that that the camera is located in the housing and extends to the cut out, with the optics of the camera (including its lens)

extending to and through the cut out. Ex-1004, ¶27. The camera includes a lens and other internal components that are inside the handheld computer, which means that they are located inside the one-piece housing. Ex-1004, ¶27 (“The lens 135 may be used in conjunction with a processor or other internal components of handheld computer 100 in order to capture images.”), ¶28 (“The back face 120 may have other features as well. For example, an actuation mechanism 138 may be provided for causing the handheld computer 100 to capture an image using lens 135.”), ¶30. Nguyen teaches that a sensor, e.g., light-detecting material, is located under the lens. Ex-1004, ¶27 (“The lens may be formed by a transmissive layer provided on the top slanted surface 140 surface. A light-detecting material may be provided under the transmissive material of the lens 135.”). Thus, Nguyen teaches a camera located in the one piece housing extending to the cut out.

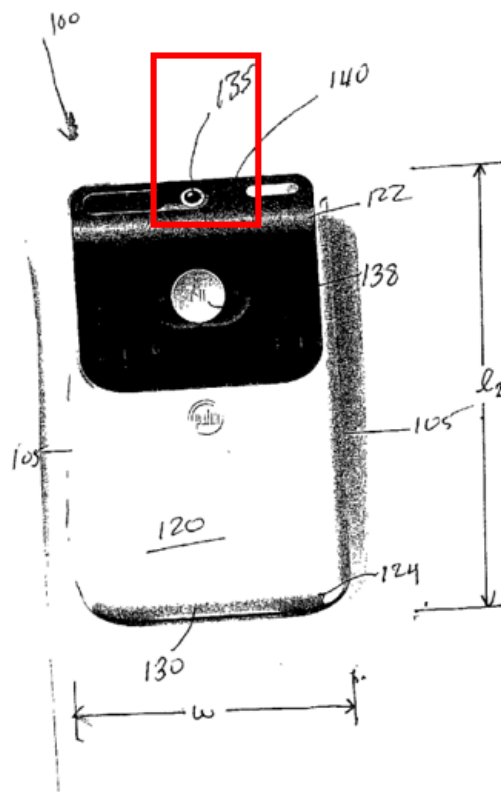


FIG. 2

49. Therefore, Nguyen teaches limitation [1c].

[1d] an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

50. Nguyen teaches **an engine section comprising a printed circuit board, a transceiver, a processor and a memory.** For example, Nguyen teaches that an engine section comprises a printed circuit board in its teaching that the handheld computer uses printed circuit board technology. Ex-1004, ¶5. Nguyen further teaches that an engine section comprises a transceiver, for example, through

its teaching that the handheld computer includes “a wireless communication transmitter” and “a wireless communication receiver.” Ex-1004, ¶39. Since the device in Nguyen can both transmit and receive wireless communication, the device includes a transceiver, which is part of the engine section. In addition, Nguyen teaches a processor and a memory. Ex-1004, ¶34 (“a handheld computer 300 includes a processor 340 coupled to a first memory 344 (non-volatile) and a second memory 346 (volatile).”).

51. As also shown in the hardware diagram illustrated in Fig. 4, Nguyen teaches that the processor 340 is coupled with a non-volatile memory 346 and a volatile memory 344. The printed circuit board, the transceiver, the processor, and the memory modules are all included in the engine section.

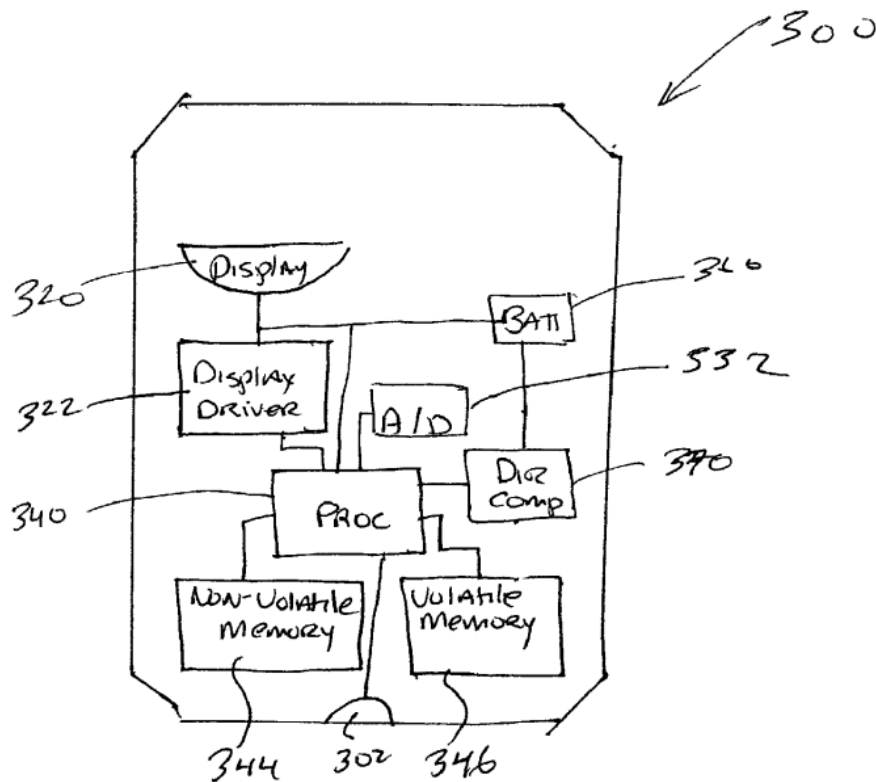


FIG. 4

52. Therefore, Nguyen teaches limitation [1d].

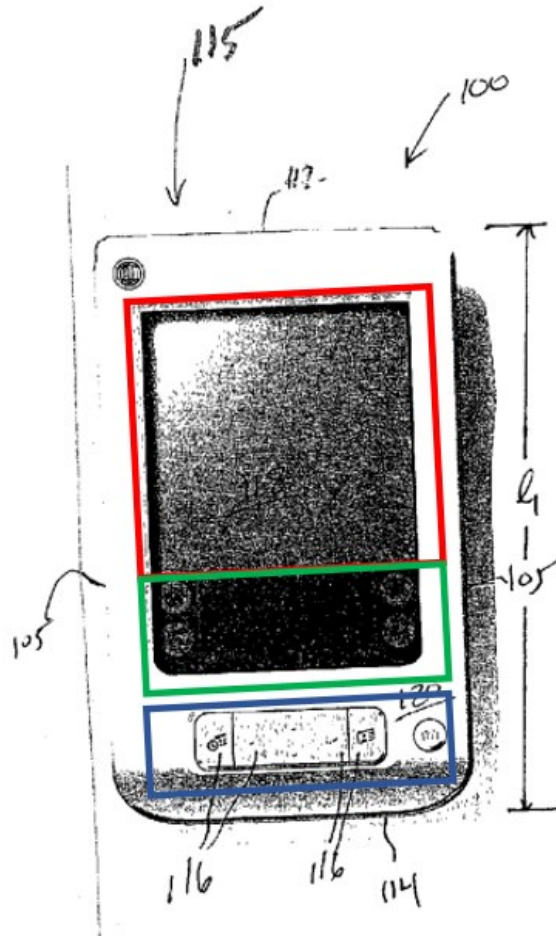
[1e] a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section;

53. Nguyen teaches that the device comprises **a user input section** (e.g., a touchscreen display). For example, Nguyen teaches that “[t]he display 118 may be contact sensitive.” Ex-1004, ¶22. Indeed, a touchscreen display had been a standard feature for Palm Pilots and other PDAs since the 1990s. Therefore, it is no surprise Nguyen teaches one for its handheld computer. Nguyen’s “contact sensitive” touch screen was used for providing user input to the device. *See id.*

54. In addition, Nguyen teaches an alphanumeric input area and application buttons, which are also part of the user input section. Nguyen teaches that “[a]n alphanumeric input area 119 may form as or adjacent to a portion of display 118.” Ex-1004, ¶22. Nguyen teaches that the alphanumeric input area is “a handwriting recognition area,” such as provided by GRAFFITI in the PALM OS (manufactured by PALM INC.) or POCKET PC (manufactured by MICROSOFT CORP.). *Id.* Nguyen further teaches that the alphanumeric input area can be a keyboard. In addition, Nguyen teaches that the input section includes application buttons that receive input from the user to perform a variety of operations. *Id.* (“The application buttons 116 may be actuated to launch applications, to select input or content appearing on display 118, and to actuate other functions and operations that can be performed by the handheld computer.”).

55. I have highlighted the user input section in Fig. 1 below, which includes a touch screen (highlighted in red), an alphanumeric input area (highlighted in green), and application buttons (highlighted in blue)²:

² The display 118 is labeled in the middle of the display (with a black background) and difficult to see. The alphanumeric input area 119 is not clearly labeled on this figure.



56. Nguyen teaches that the user input section is **located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section**. As I explained above, Nguyen teaches that the device comprises an engine section. *See* Section V.A.2[1d]. Nguyen also teaches that the device comprises a battery. Ex-1005, ¶35 (“A battery 360 may power multiple components with handheld computer 300.”), Fig. 4.

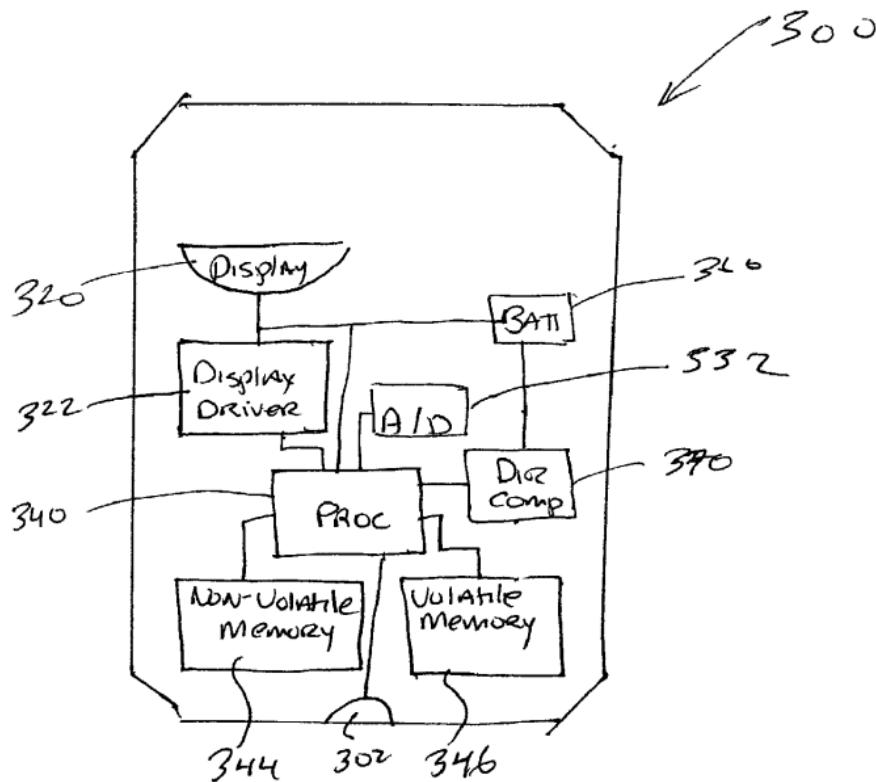


FIG. 4

57. Nguyen teaches that the user input section is located above and adjacent to the engine section and a battery. Nguyen teaches that the user input section, including the touch screen, alphanumeric input area, and buttons, are located on the front face (Ex-1004, ¶¶21-22, Fig. 1) above and adjacent to the internal components of the device, which include the engine section and battery (Ex-1004, ¶¶34-35, Fig. 4).

58. Additionally, it would have been obvious for the input section to be located above and adjacent to the engine section and battery because Nguyen teaches a compact form factor for its handheld device, where the internal

components such as the engine and battery would have been in close proximity to the user input section on the front face. *See* Ex-1004, ¶6. Given the tight space constraints of a handheld device and the fact that Nguyen shows and describes a device with an input section covering nearly all of the front surface, it is obvious that the user input section is located above and adjacent to engine section and battery.

59. Therefore, Nguyen teaches limitation [1e].

[1f] wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.

60. Nguyen teaches that **the battery and engine section are housed in the housing**. As I explained above, Nguyen teaches that the handheld computer includes an engine section and a battery. *See* Sections V.A.2[1d], [1e]. Nguyen teaches that these are internal components of the handheld computing device, which means they are housed in the housing. Ex-1004, ¶27, ¶¶34-35, Fig. 4. Moreover, it would have been obvious that Nguyen's battery and engine section—which includes the PCB, processor, transceiver, and memory—were housed in the housing. These components require the protection of the housing. It would be an absurd design to place them outside the housing (and therefore outside of the device).

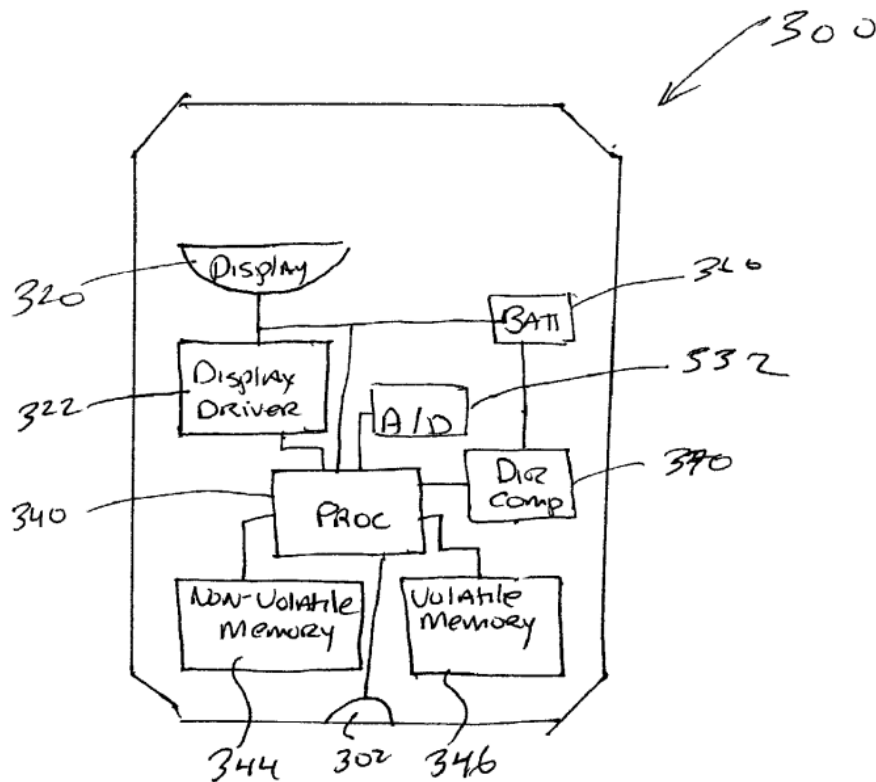
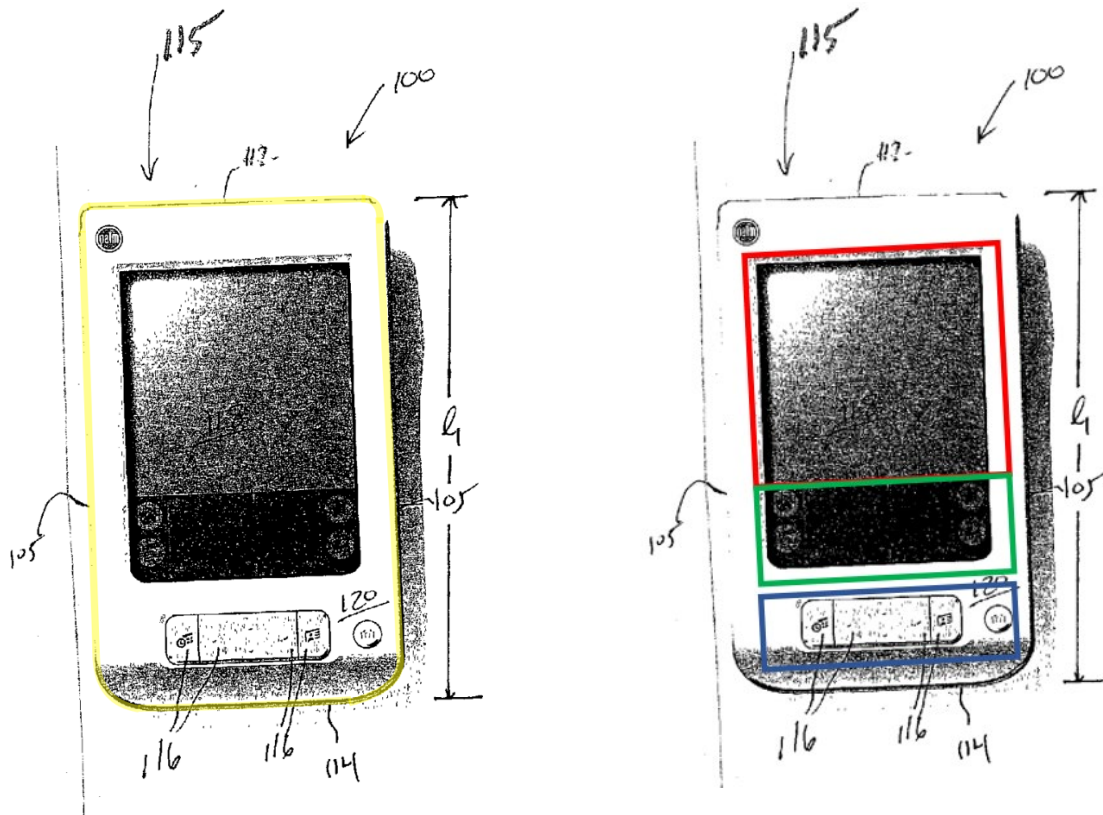
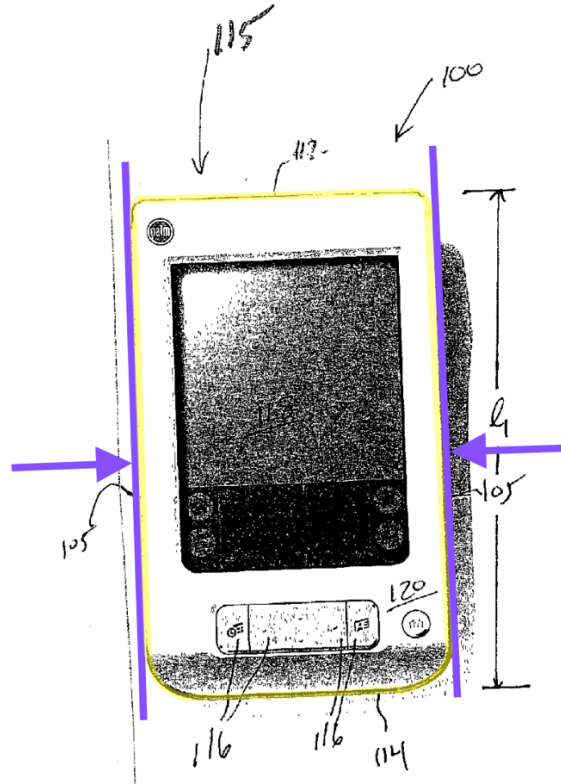


FIG. 4

61. Nguyen teaches that **the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.** Nguyen teaches an opening between the exterior lateral sides of the housing, which forms a tray-like shape with the rear and lateral sides. Ex-1004, ¶21, Figs. 1, 4. The user input (including the touch screen, alphanumeric input area, and buttons) is located in this opening, as I have highlighted in yellow below. I have also highlighted the touch screen in red, the alphanumeric input area in green, and the buttons in blue.



62. I further note that even if the lateral sides, highlighted in purple, were considered to be only the left and right sides of the device, Nguyen's user input would be located in an opening between the left and right lateral sides of the housing, as illustrated below, and therefore would still satisfy the claims.



63. I further note that Nguyen's touch screen and alphanumeric input area are recessed relative to the front face of the device, and the touch screen and alphanumeric input also have their own depth dimensions (thickness). Ex-1004, Fig. 4. Therefore, when viewed from the side, at least a portion of the thickness of Nguyen's user input is located in the opening between the lateral sides.

64. Therefore, Nguyen teaches limitation [1f].

3. Dependent Claim 11

[11] A portable electronic device according to claim 1 further comprising a door configured to support an electronic module.

65. Nguyen teaches claim 11, as explained below.

66. As I have explained above, Nguyen teaches a portable electronic device according to claim 1. *See* Section V.A.2.

67. Nguyen further teaches **a door configured to support an electronic module**. For example, Nguyen teaches that the handheld computer 300 includes “one or more expansion ports for coupling to accessory devices,” such as “CompactFlash slots.” Ex-1004, ¶37, Fig. 4. I have highlighted an expansion port 302, which “enables one or more types of expansion modules to be connected to processor 340,” in Fig. 4 below. Ex-1004, ¶37, Fig. 4. Nguyen further teaches that the expansion port 302 “may physically be positioned on top slanted surface 140.” Ex-1004, ¶41, Fig. 2.

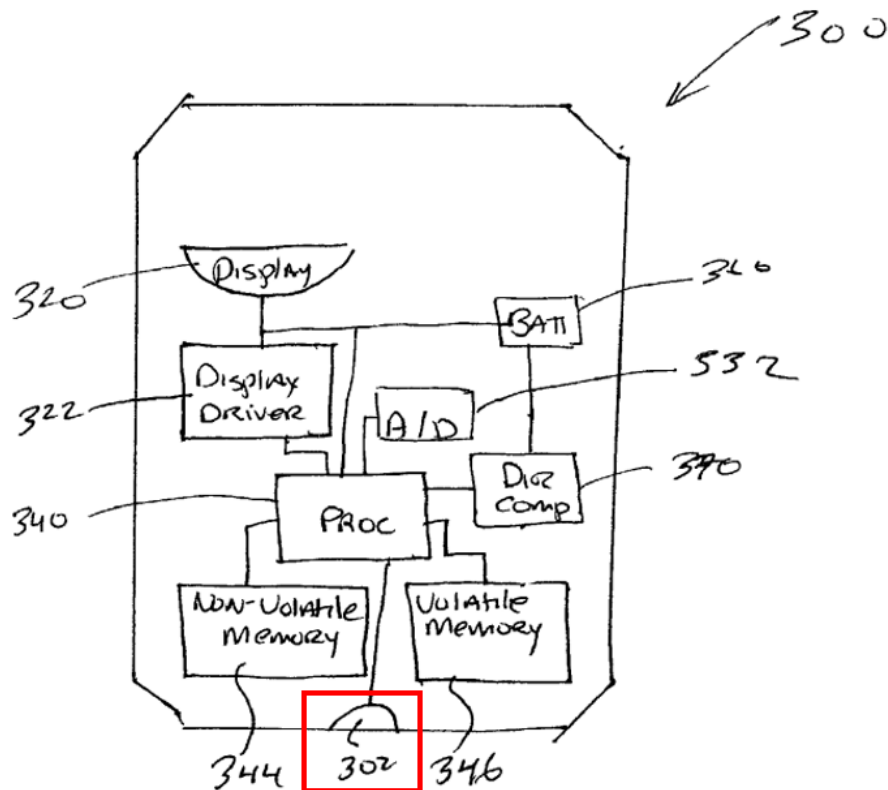


FIG. 4

68. Nguyen teaches that the expansion port 302 encompasses a CompactFlash slot. Therefore, Nguyen teaches a door of the portable device, because, consistent with CompactFlash slots, the expansion port includes an opening that allows contact with the inside of the portable device and, at the same time, protects the internal electronic components from outside dust and contamination. Ex-1004, ¶37, Fig. 4. Accordingly, Nguyen teaches or suggests that, as part of the exterior of the device, the expansion port comprises a door that separates internal components from unwanted objects outside the device. Accordingly, a door would have been obvious in view of Nguyen's teachings.

69. Further, Nguyen teaches that the expansion port 302 supports an electronic module, such as a CompactFlash card. The CompactFlash card is an electronic module because it provides data storage for the device by allowing the device to read and write data and requires electricity to function. In addition, as I explained, Nguyen teaches that the door (expansion port) can be placed on the rear surface to provide access for the CompactFlash card from the rear side of the device. The port further keeps the CompactFlash card steady to prevent it from moving or falling out. Thus, the expansion port comprises a door that supports the CompactFlash card. It would further have been obvious to include a swinging cover for the port because Nguyen states that the port can be used for a wide variety of interfaces, and it was common in 2006 for expansion ports to include covers that kept out dust and other particles. Ex-1004, ¶37. This was a simple mechanism that a POSITA would have found basic and obvious. Therefore, a POSITA would have understood Nguyen's expansion port teachings to encompass a door with a cover.

70. Therefore, Nguyen teaches claim 11.

4. Dependent Claim 12

[12] A portable electronic device according to claim 11 wherein the electronic module is configured to interface to the engine section.
--

71. Nguyen teaches claim 12, as explained below.

72. As I have explained above, Nguyen teaches a portable electronic device according to claim 11. See Section V.A.3.

73. Nguyen further teaches **the electronic module is configured to interface to the engine section**. For example, Nguyen teaches that the expansion slot 302 “enables one or more types of expansion modules to be connected to processor 340,” as shown in Fig. 4 below. Ex-1004, ¶37. As is also shown below, the processor is part of an engine section as it is connected with other parts of the engine section such as memory.

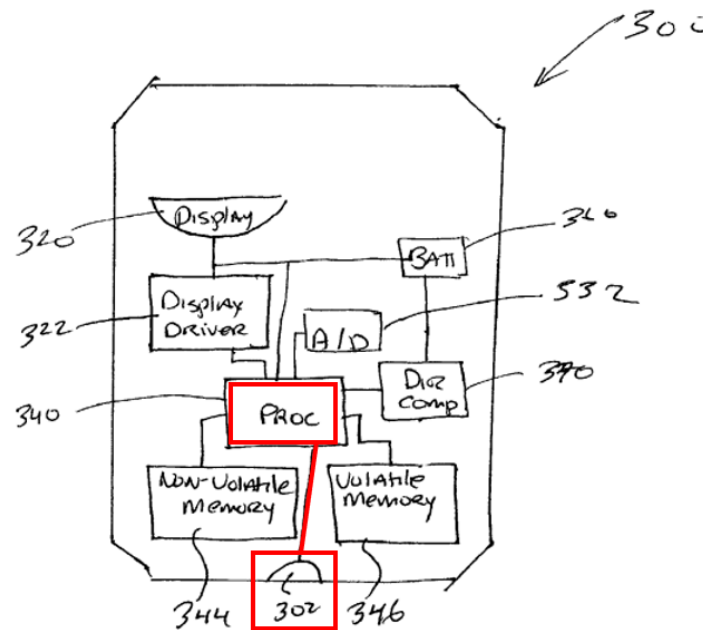


FIG. 4

74. Indeed, a POSITA would have understood, and it would have been obvious, that a CompactFlash card is a storage card that interfaces to the engine

section, for example a processor, because it allows the device to read and write data with the CompactFlash card.

75. Therefore, Nguyen teaches claim 12.

5. Independent Claim 15

76. It is my opinion that Nguyen teaches claim 15.

[15pre] A housing for a portable electronic device comprising:

77. I understand that a preamble generally does not state a claim limitation. However, to the extent that Patent Owner argues that the preamble states a limitation, it is my opinion that it is taught by Ground 1.

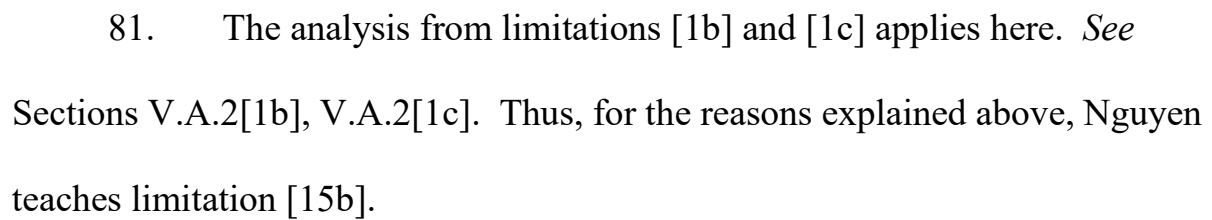
78. Limitation [15pre] is analogous to limitation [1pre] except that [15pre] recites, “[a] housing for a portable electronic device,” rather than “[a] portable electronic device.” This addition does not materially alter my analysis because while [15pre] might be narrower than [1pre], it is satisfied by the teachings of Ground 1. *See* Sections V.A.2[1pre], V.A.2[1a]. The analysis from limitations [1pre] and [1a] applies here. *See* Sections V.A.2[1pre], V.A.2[1a]. Thus, for the reasons explained above, Nguyen teaches the preamble of claim 15.

[15a] a one piece housing forming enclosed exterior lateral sides and a rear side;

79. Limitation [15a] is analogous to limitations [1a]. The analysis from limitations [1a] applies here. *See* Section V.A.2[1a]. Thus, for the reasons explained above, Nguyen teaches limitation [15a]. *See* Section V.A.2[1a].

[15b] a cut out in the rear side of said housing, said cut out configured to receive at least part of a camera;

80. Limitation [15b] is analogous to limitations [1b] and [1c]. Although limitation [15b] also recites “said cut out configured to receive at least part of a camera,” a POSITA would understand that, in Nguyen, the lens 135 which is visible on the exterior the device as seen in Fig. 2, would need to be located in a cut out to allow the light to pass through the housing for an image to be captured. This cut out in the rear side of the housing receives at least the lens portion of the camera. Nguyen states “[t]he lens 135 may be used in conjunction with a processor or other internal components of handheld computer 100 in order to capture images.” Ex-1004, ¶27. Nguyen also clarifies “The back face 120 may have other features as well. For example, an actuation mechanism 138 may be provided for causing the handheld computer 100 to capture an image using lens 135.” Ex-1004, ¶28.



[15c] wherein the housing is configured to receive a battery and an engine section, wherein a user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device, wherein the battery and engine section are configured to be housed in the housing such that the user input section is located above the engine section and the battery, and wherein the user input section is located adjacent the battery and the engine section.

82. Limitation [15c] is analogous to limitations [1e] and [1f]. The analysis from limitation [1e] and [1f] applies. *See* Sections V.A.2[1e] and V.A.2[1f].

83. Although limitation [15c] recites “housing is configured to receive a battery and engine section” instead of “the battery and engine section are housed in the housing,” since Nguyen teaches that the battery and engine section are housed in the housing, Nguyen teaches that the housing fits the battery and the engine section. Thus, Nguyen teaches that the housing is configured to receive the battery and the engine section. Moreover, for the reasons I explained above, Nguyen teaches that a user input is located in an opening between the exterior lateral sides of the one piece housing of the portable electronic device.³ For the above-explained reasons, Nguyen further teaches that the battery and engine section are configured to be housed in the housing such that the user input section is located

³ Claim 15 recites “the user input section,” which finds no antecedent basis in this claim. I understand that the “user input section” is equivalent to “user input” in claim 15.

above the engine section and the battery, and wherein the user input section is located adjacent the battery and the engine section. *See* Sections V.B.3[1e] and V.B.3[1f]

84. Therefore, Nguyen teaches limitation [15c].

B. Ground 2: Nguyen in View of Zadesky and Oda

85. It is my opinion that a POSITA would have found the challenged claims discussed for Ground 1 obvious based on Nguyen. Zadesky provides additional teachings regarding the one-piece, unitarily-formed housing, which reinforces Nguyen’s teachings and provides further details of the design and form factor that are recited by several dependent claims (for example, claims 2-7 and 16-17). For example, Zadesky teaches a hollow tubular extruded metal housing with a flat front and rear surface. *See* Section V.B.3[1a/22a]. Additionally, Oda teaches a “cellular phone” with two cameras (including details of the camera orientation), which is relevant to independent claim 22 and several dependent claims (for example, claims 9, 10, 13, and 20-36). A POSITA would have been motivated to combine these known elements of handheld devices because it would have been a combination of prior art elements according to known methods to yield predictable results, as explained below.

86. Indeed, the references teach common features of handheld devices. Nguyen teaches a “handheld computer” with a “unitarily formed” housing, as I

explained for Ground 1. *See* Section V.A.2[1pre]. Similarly, Zadesky is directed to the design of a “handheld computing device.” Ex-1005, Abstract. The portable electronic devices in Nguyen and Zadesky serve similar functionalities and include similar components. For example, as I will explain, Nguyen and Zadesky teach similar user input components. *See* Section V.B.3[1e/22e]. Additionally, Zadesky teaches similar internal hardware components to Nguyen, including “a printed circuit board,” as well as “a microprocessor, memory, hard drive, battery, I/O connectors, switches, power connectors, and/or the like.” Ex-1005, 6:4-26. These similar components inside the housing would provide further motivation to apply Zadesky’s housing teachings to the device taught in Nguyen. A POSITA would have been motivated to combine Nguyen with Zadesky’s teachings for manufacturing a unitary housing, which provides and houses similar components, through an extrusion process, as explained below in Section V.B.3[1a].

87. A POSITA would also have been motivated to apply these teachings in a mobile phone form factor because mobile phones had been one of the most popular types of portable electronic devices for many years. Therefore a POSITA would have been motivated to further apply Oda’s teachings of a “cellular phone,” along with Oda’s details regarding a camera in the mobile phone, which had been a common mobile phone feature for years. *See* Sections V.B.3[1a] below. Oda also provides express motivation to apply its teachings to PDAs, explaining that its

teachings were “described in connection with the camera-equipped cellular phone” but “may be widely applied to camera-equipped portable devices such as a PDS (Personal Digital Assistant)[.]” Ex-1006, ¶117. Combining the teachings of Nguyen, Zadesky, and Oda would have been a combination of known prior art elements according to known methods to yield predictable results. It is my understanding that this is an indicator of obviousness, as stated in my Understanding of the Law in Appendix 4.

88. In addition, Oda also teaches that the camera orients at an angle with the direction perpendicular to the display surface while located in a cut out. Ex-1006, ¶¶9-11. Oda teaches that this design would allow the operator to take a natural posture when taking pictures. *See* Ex-1006, ¶¶7-8; *see also* Section V.B.2. Similarly, Nguyen includes teachings where the camera has a slight angle because a different orientation of lens enables the lens to capture different images and allows the user to “operate handheld computer ... in a normal manner” and “without altering the position of the handheld computer in his or her hand.” Ex-1004, ¶¶19, 30, 32. The combination furthers the goals of the references because Oda’s teachings achieve the goal of an angled camera on an essentially flat rear surface as taught in Zadesky. Ex-1006, ¶¶9-11, Fig. 14.

89. Further, as I previously noted, in the 2006 timeframe, there was a desire for a compact design of portable electronic devices and for reducing the

costs of design and manufacturing. *See* Section V.B.3[1a]. This goal would further motivate a POSITA to combine Oda, Nguyen, and Zadesky.

90. A POSITA would have had a reasonable expectation of success when combining the complementary teachings of Oda, Nguyen, and Zadesky. The combination would not have changed the principles of operation. For example, Nguyen's teachings on a cut out and camera lens would still be used for capturing images on the rear surface. Zadesky's teachings on the one-piece extruded housing would still be used for the housing. The combination with Oda's front and back cameras and cellular capabilities would not require the change of the principles of operation of the overall form factor, exterior housing, and interior components. The operation of internal electronic components in the combination would perform in the same way as they do in Nguyen, Zadesky, and Oda.

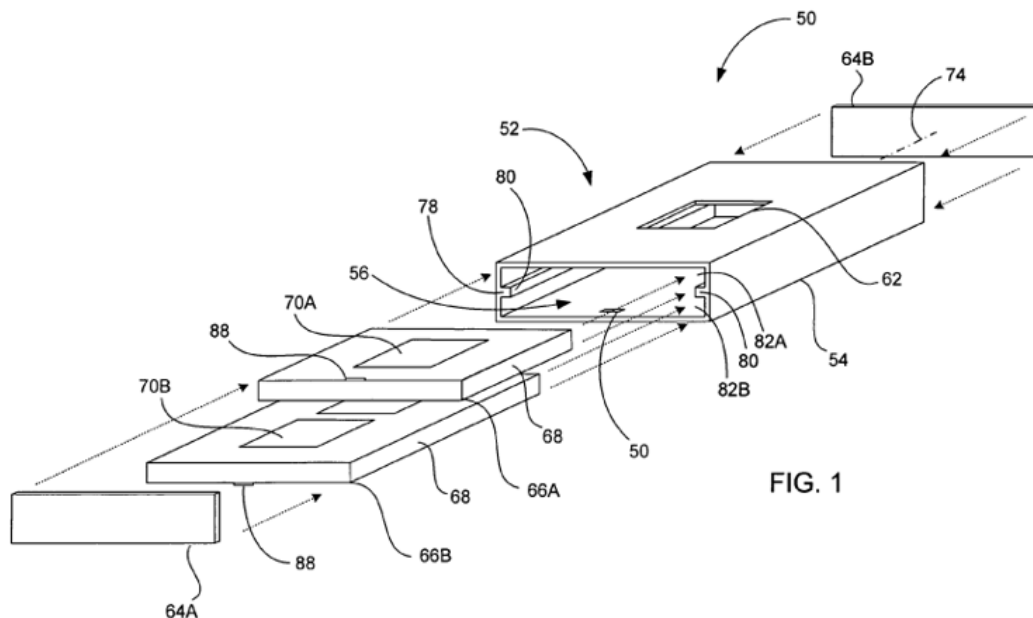
91. The motivation and reasonable expectation of success in combining these prior art elements is explained in more detail below. *See* Section V.B.

1. U.S. Patent No. 7,515,431 ("Zadesky") (Ex-1005)

92. I have reviewed the Zadesky reference. I understand that Zadesky is cited on the face on the '602 patent and in the prosecution history of the '602, '824, '077, and '780 patents. In addition, Zadesky was used for rejection in the prosecution of the '077 patent. *See* Section II.B.

93. Zadesky is entitled “Handheld Computing Device.” Zadesky was filed on July 2, 2004 and issued in 2009. Based on the priority date of March 29, 2006 of the ’602 patent, I understand Zadesky is prior art to the ’602 patents under at least pre-AIA §102(e).

94. Zadesky is directed to a portable computing device. Ex-1005, Abstract, 1:23-27. Zadesky proposes multiple embodiments for its design. An exemplary device of a first embodiment, labeled 50, has sharp edges between the sidewalls and front and back surfaces, whereas an exemplary device of the second embodiment, labeled 100, has round or curved edges. In both embodiments, Zadesky teaches that the housing of the device includes a planar front surface, as shown below.



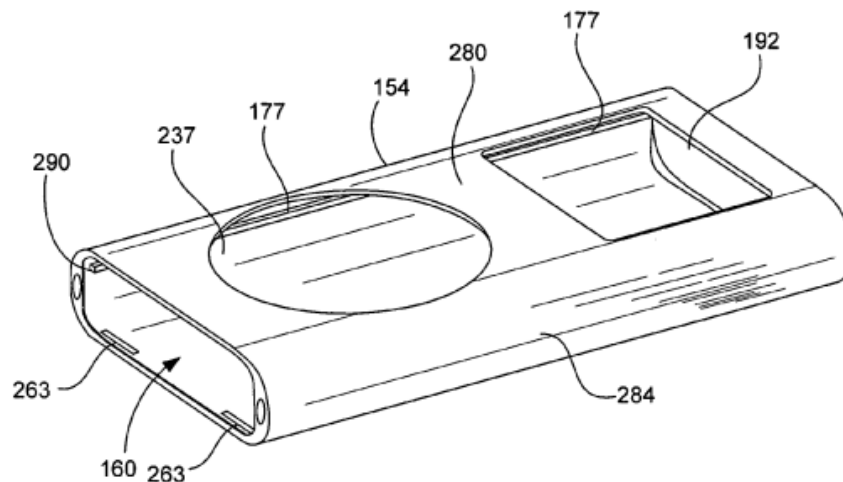


FIG. 9A

Ex-1005, Figs. 1 and 2, 5:8-15, 9:13-35.

95. Zadesky teaches that the housing is a seamless enclosure formed by a hollow extruded tube, e.g., a single piece of metal. Ex-1005, 2:26-35, 11:66-12:13. Zadesky teaches the extruded one piece housing includes a front surface, a rear surface, and lateral sides, which are all formed by the single piece of metal and part of the same housing. Ex-1005, 2:56-3:2, 5:37-55, 10:27-39, 17:15-32, 19:3-23. Zadesky teaches that the main body can advantageously be formed from an aluminum tube. Ex-1005, 8:64-9:12.

96. Zadesky is in the same field as the '602 patent (form factor of a portable electronic device, *see* Section III). For example, Zadesky's teachings concern the shape, structure, and components of an electronic device. Ex-1005, 1:23-27.

**2. European Patent Application Publication No. 1,482,733
("Oda") (Ex-1006)**

97. I have reviewed the Oda reference. I understand that Oda was not cited or considered during prosecution of the '602 Patent, based primarily on the fact that Oda is not cited on the face of the patent, nor have I seen the reference discussed in the prosecution history.

98. Oda was filed on March 2, 2004 and was published on December 1, 2004. Based on the adopted priority date of March 29, 2006 of the '602 patent, I understand Oda is prior art to the '602 patents under at least pre-AIA §§102(a) and (e).

99. Oda is directed to a mobile phone. *See* Ex-1006, Abstract. In particular, Oda teaches a cellular phone, for example as shown in Figs. 17A and 17B, below. Ex-1006, Figs 17A and 17B, ¶117. In addition to the phone's communication capabilities, Oda teaches form-factor details for orienting a camera at an angle. Ex-1006, ¶7, Fig. 7B.

FIG.17A

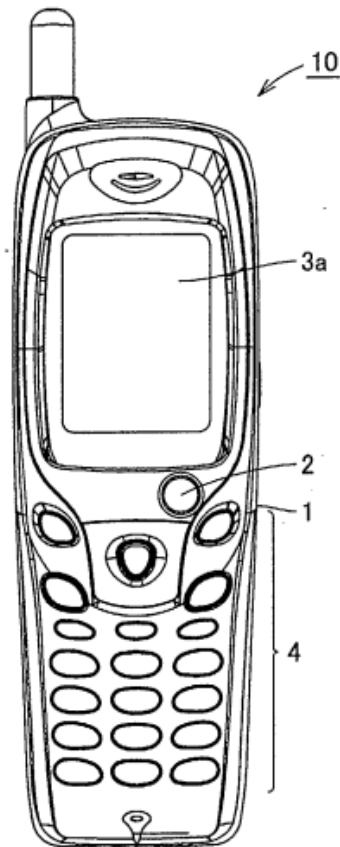
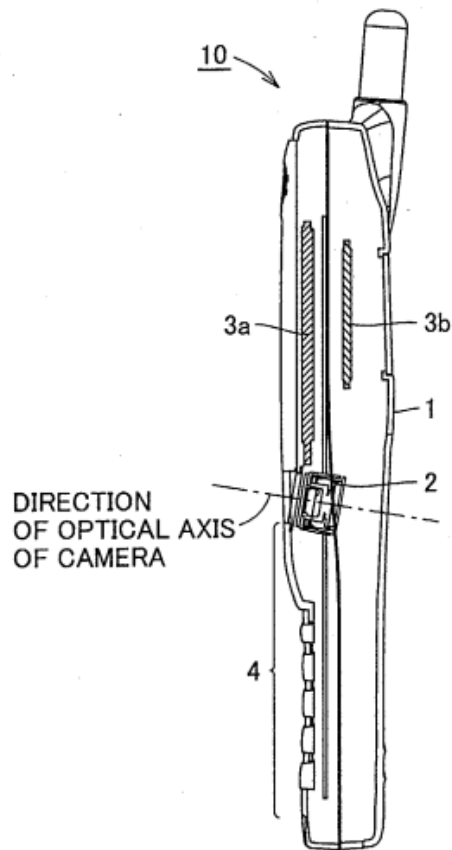


FIG.17B

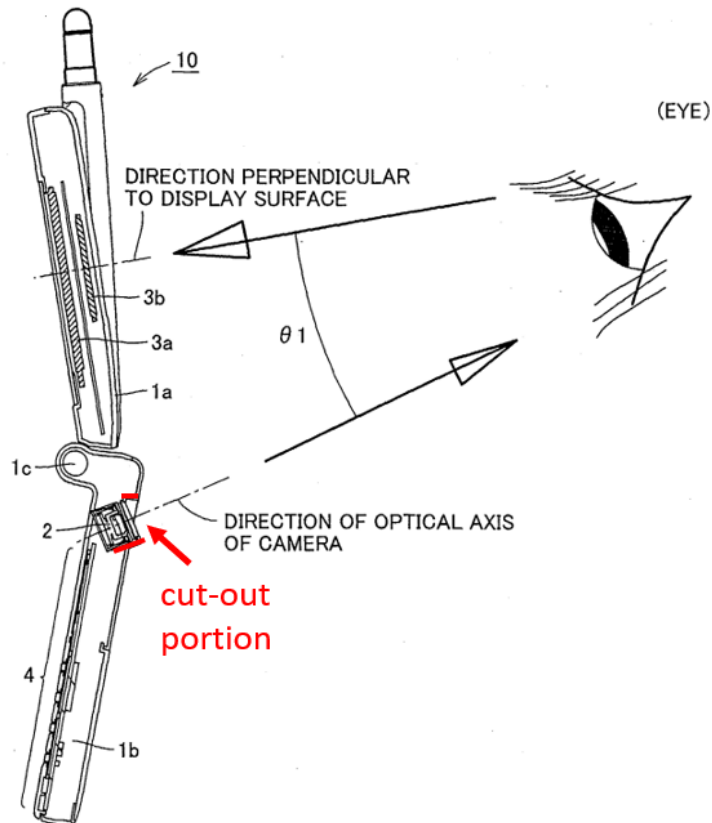


100. Oda teaches that the cellphone comprises two cameras. For example, Oda teaches that “one of the two cameras may be arranged on the one surface (front surface) of one of the first and second bodies 1a and 1b, and the other of the two cameras may be arranged on the other surface (rear surface) of the same body (i.e., the above one of the first and second bodies 1a and 1b).” Ex-1006, ¶115.

101. In addition, Oda teaches that a camera is located in a cut out that projects from the surface, so that the camera forms an angle with respect to the normal to the display surface, as shown in Fig. 14, below. Ex-1006, ¶¶77-79. Oda

teaches that this allows the user to take a more natural posture while taking pictures. See Ex-1006, ¶¶7-8.

FIG.14



102. Oda is analogous art to the '602 patent because it is directed to a portable electronic device, such as a mobile phone. Ex-1006, Abstract, ¶37, ¶117. For example, Oda's teachings concern the design, structure, and components of a portable electronic device. Ex-1006, ¶9, ¶37.

3. Independent Claims 1, 22

[1pre] A portable electronic device comprising:
--

103. I understand that a preamble generally does not state a claim limitation. However, to the extent that Patent Owner argues that the preamble states a limitation, Nguyen teaches **a portable electronic device**, as I explained above. *See* Section V.A.2[1pre]. Therefore, Ground 2 teaches the preamble of claim 1.

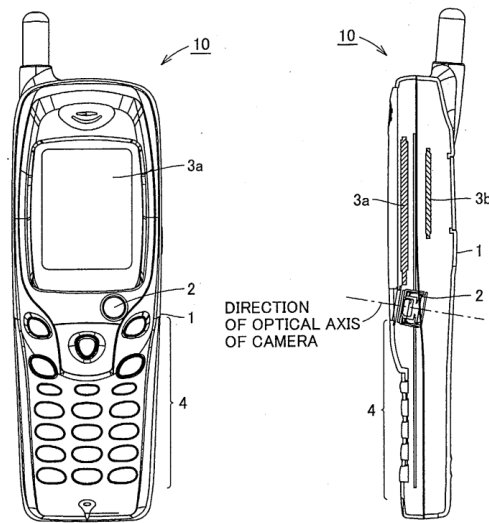
[22pre] A mobile phone comprising:

104. I understand that a preamble generally does not state a claim limitation. However, to the extent that Patent Owner argues that the preamble states a limitation, Oda teaches the preamble, as explained below.

105. Oda teaches **a mobile phone**. For example, Oda teaches that its embodiments are “described in connection with the cellular phones of the foldable type and the straight type,” specifically “in connection with the camera-equipped cellular phone.” *Id.*, ¶117. A cellular phone is a mobile phone because a cellular phone is a portable telephone that can make and receive calls over a cellular network. An exemplary embodiment of a cellular phone taught in Oda is shown in Figs. 17A and 17B, reproduced below.

FIG.17A

FIG.17B



106. A POSITA would have been motivated to apply Oda’s mobile phone teachings with Nguyen and Zadesky. *See* Section V.B. Since mobile phones were commonplace handheld devices, Ground 2 combines prior art elements according to known methods to yield predictable results (e.g., a handheld computing device with mobile phone functionality).

107. Indeed, by the 2006 timeframe, mobile phones were widespread. It was well-known for portable electronic devices to include mobile phone capabilities. Therefore, the prior art provides express teaching, suggestion, and motivation to combine a handheld computing device with mobile phone capabilities. For example, Hawkins teaches that an “organizer,” in particular “electronic handheld computers, such as the PalmPilot,” may include a cellular component to act as a cellular phone. Ex-1008, Abstract, ¶5, ¶9. By 2004, this

concept was implemented in the Treo 270 smartphone developed by Handspring, of which Hawkins himself was the chief product officer and chairman. Treo 270 was an exemplary mobile phone that “seamlessly integrates a mobile phone, a Palm OS organizer, and wireless applications[.]” Ex-1010, 000003.

The Treo 270 Smart Phone is, indeed, smart. It is a **mobile communicator** that includes a **cellular phone**, wireless access to **email and Web browsing**, and a Palm OS personal **organizer**, all in one small **hand-held** device.



Jeff Hawkins, chief product officer and chairman of Handspring as well as founder of palmOne, met a financial analyst at a road show who dumped a phone, Palm Organizer, and Blackberry email device out of her purse and asked Hawkins, “Please fix this! I need one device that allows me to manage my life on the road!”

That incident propelled the project. The Handspring team focused on the user interface and the integration of phone and organizer, while the IDEO product design team focused on the product architecture, hardware, and industrial design.

“The market need was the clear driver in this case, but the product timing was facilitated both by evolving small form factor telecommunications technology (especially digital cellular networks) and The new demographics of an increasingly mobile workforce,” says Peter Skillman, director of product design at Handspring.

108. Therefore, Ground 2 teaches the preamble of claim 22.

- [1a] **a one piece housing forming enclosed exterior lateral sides and a rear side;**
- [22a] **a one piece housing of the mobile phone forming enclosed exterior lateral sides and a rear side of the mobile phone;**

109. Ground 2 teaches limitation [1a], as explained below.

110. As I discussed previously, Nguyen teaches **a one piece housing forming enclosed exterior lateral sides and a rear side**. *See* Section V.A.2[1a].

111. Zadesky provides additional teachings for **a one piece housing forming enclosed exterior lateral sides and a rear side**, which complement and

elaborate on Nguyen's teachings. As I explained above, Nguyen teaches that the housing is "unitarily formed." See Section V.A.2[1a]; Ex-1004, ¶¶26-27.

Therefore, Nguyen provides express motivation to use a one-piece housing for its handheld computing device. A POSITA would have understood that Zadesky's teachings explain a preferable method of how the "unitarily formed," one piece housing is achieved.

112. For example, Zadesky teaches that the housing is a seamless enclosure formed by a single piece of material. Ex-1005, 11:66-12:13 ("the *seamless* enclosure 154 and the rail system 176 are formed from *a single piece of material*."); see also Ex-1005, 4:39-67 (describing a seamless enclosure). Zadesky teaches that the main body is "a single complete unit" in the form of "an integral tube." Ex-1005, 5:16-35 ("By integral, it is meant that the main body is a single complete unit. By being integrally formed, the main body has a substantially seamless appearance, which is unlike conventional housings, which include two parts that are fastened together thereby forming a seam therebetween."). Zadesky further teaches that the housing is formed from an extruded hollow tube, which is formed as a single piece material. Ex-1005, 2:27-35, 8:34-51 ("[E]xtrusion is a shaping process where *a continuous work piece* is produced by forcing molten or hot material through a shaped orifice.").

115. For rounded sides, Zadesky teaches that “the computing device 100 includes a housing 102 that encloses and supports internally various electrical components,” as shown in Fig. 9A below. Ex-1005, 9:36-54; *see also* Fig. 2. The housing in this embodiment also forms enclosed exterior lateral sides and a rear side. I have highlighted the lateral sides in yellow. The rear side is the bottom side.

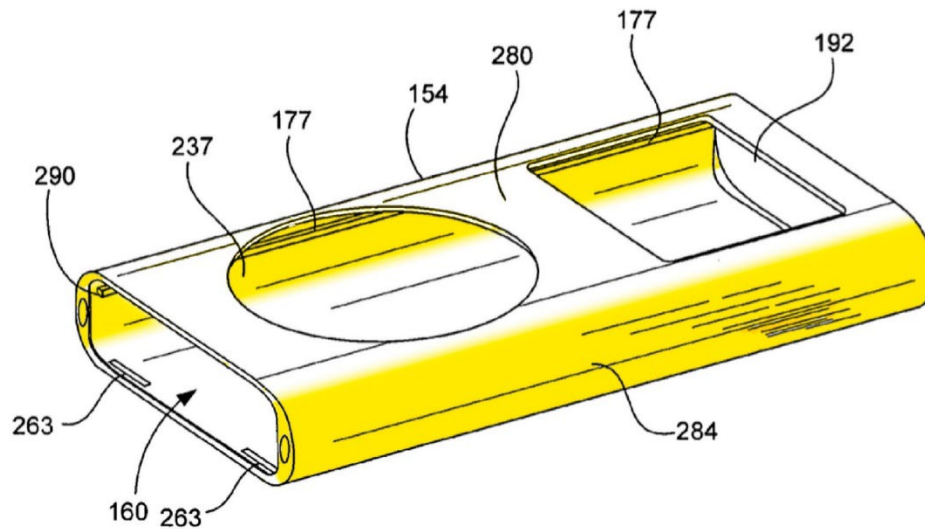


FIG. 9A

116. **Motivation to Combine.** A seamless one-piece housing was one of the common, well-known housing types for handheld computing devices. It is well-documented, widely followed, and is adopted in many products by the 2006 timeframe. For example, in the 1990’s, I designed a electronic device called the tricorder II for Trilithic. It included a one-piece tubular housing that was extruded,

along with injection molded front and back caps.



117. This type of hollow extrusion was taught in textbooks and design courses, for example in *Chris Lefteri's textbook Metals: Materials for Inspirational Design* (Ex-1017). Extrusion is described as a common process for manufacturing materials including Aluminum. One of the typical application listed is components for consumer electronics.

Profile designs

Extrusion is another common process applied to a range of metallic and non-metallic materials. The key aspect of this manufacturing process is that it allows you to produce a long strip of a profile, which can then be sliced into the desired lengths. Aluminum is a popular material for extrusions, as it has a low melting point. This is an essential characteristic of all extrusion materials, which include copper, stainless steels, medium and low carbon steels, and magnesium.

Extrusion is often combined with other methods, for example, extrusion blow-molding for plastics, or impact extrusion for metals. For standard metal extrusion however, there are two main forms: direct extrusion, where the metal is forced through a stationary die, allowing for longer lengths to be produced; and indirect extrusion, where the die compresses the metal producing less friction but shorter lengths.

Dimensions	2250mm wide overall
Key Features	Allows for production of long, continuous lengths of the same shape
	Allows for both solid and hollow shapes
	Low cost
More	Can be applied to a range of materials
	www.aluminium-extrusion.hydro.com
	www.omkdesign.co.uk
Typical Applications	www.aec.org
	The process is universal and can be applied to most areas of design and engineering, including tubing, sheet materials, structures and body frames for motor vehicles, furniture, and components for consumer electronics

Saville Bench
Designer: Rodney Kinsman
Manufacturer: OMK Design
Date: 1992

Lefteri's book also teaches that both solid and hollow shapes can be formed with extrusion. Ex-1017, 000005. In my design class AD 25600 *Presentation Techniques*, I introduce students to aluminum extrusion as a manufacturing technique. My students frequently enter the ET foundation's student design competition. In 2005, a winning students created a design was for an extruded aluminum computer mouse with a one-piece tubular housing and colorful endcaps. The judges stated that "[w]ith the trend in the computer industry towards

aluminum products, this extruded mouse would fit right in.” The website showing this design is still active and a portion is shown below.⁴

members.aec.org/page/iaedc_2005_stu

YouTube Wikipedia News Popular Imported From Sa... ★ Bookmarks Antique Boat Amer...

Second Place: Extruded Computer Mouse, Submitted by John Paul Gucciardo



Second Place in the Student Class, with a \$2,000 cash prize, was awarded to John Paul Gucciardo, a junior studying industrial design at Dawson College in Montréal, Quebec. His design of an extruded aluminum computer mouse in an array of anodized colors intrigued the judges. "It integrates design and new technology," explained the designer. "It allows for a unique styling and may last longer than plastic." "With the trend in the computer industry towards aluminum products, this extruded mouse would fit right in," noted Design Competition judge Angel Rosario, Applications Engineer for Alcoa Engineered Products in Chicago. "Wow! What a great idea," commented Kasten. "While the idea of a computer mouse is not revolutionary, the application for aluminum extrusion is a concept the technology world should incorporate. The pizzazz this product offers combining extrusions and bright colors is consistent with marketability concepts currently employed by the computer industry."

118. The one-piece housing design was frequently adopted in consumer electronics. For example, in 2002, the I.D. Magazine published the Samsung personal MP3 player, which featured an “aluminum-extrusion body”. It had both a display and input on the front of the one-piece body. Ex-1018, 000004.

⁴ Screenshot taken from https://members.aec.org/page/iaedc_2005_stu



PERSONAL MP3 PLAYER

London-based Samsung Design Europe's Personal MP3 Player has an aluminum-extrusion body with rubberized plastic molding. The player's function keys are split into two categories and located in two different places. Primary functions, such as play, pause and stop, are located on the outside of the case around the LCD. Lesser-used secondary functions, such as the equalizer, are located on a slide-out section. Samsung says the benefit of such key placement is twofold: It makes the player easier to operate and provides a protected space for the USB connector and SmartCard memory slot.

INTEL PERSONAL AUDIO PLAYER 3000

Although Hillsboro, Ore.-based Intel Corp. designed its compact MP3 player with a customizable faceplate and expandable memory to attract the Generation Y market, Lovelady was

119. In 2004, Innovation Journal of Industrial Designers Society of America (IDSA) highlighted the Apple iPod Mini, which featured an extruded tube with endcaps at the top and bottom. The extruded aluminum tube is strong yet lightweight. Ex-1019.





plastic. An extruded tube allowed a similar level of simplicity with the iPod mini, showing only one material break at a time where the tube meets either the top or the bottom cap. Aluminum provides the best properties for extruding a seamless tube of material that would be strong yet lightweight.

The mini's electronics are contained within the mini tube by twin-shot plastic end caps, the Click Wheel and a hard-coated acrylic window. And the product comes in five colors (silver, gold, green, pink and blue),

enabling consumers to pick the iPod that suits them best or to coordinate it with their wardrobe.

The shape, small size and light weight of iPod mini allow it to work with some new accessories. The mini snaps in and is cradled by a belt clip and armband clip, enabling the user to exercise without even noticing that it's there. Like other iPods, users can also use the mini with an iPod dock connected directly to a Mac or PC.

Like the iPods before it, the mini is making music lovers tap their feet. ■

120. Another example of a tubular one-piece housing around this timeframe is the design by Scott Shim for the Apollo Gobo Rotator is shown below. This image was dated January 23, 2006.



121. Therefore, a POSITA would have been fully aware and knowledgeable of this common type of housing, including, for example, the common approach of manufacturing a seamless, one-piece housing via an extruded tube of metal from a single-piece of metal. *See* Ex-1005, 2:26-34, 8:52-63, 12:27-33.

122. In addition, in the combination of Nguyen, Zadesky, and Oda, a POSITA would have been motivated to adopt an essentially straight (flat) rear side for the extruded housing. In other words, a POSITA would have been motivated to design the rear surface so that the rear side is essentially flat throughout the entirety of the rear side, as taught in Zadesky and Oda.

123. An essentially flat rear side, which is part of a basically rectangular, consistent profile (a rectilinear form factor) of an electronics housing, was common and widely adopted in the 2006 time frame. Since the 2000s, this design

has been typical for portable electronic devices on the market, used in popular devices such as Palm Pilots and other PDAs. Accordingly, a rectilinear form factor with an essentially straight rear side (as taught in Zadesky) is expected and accustomed to by many users. Moreover, Nguyen provides motivation for an essentially flat rear side, for example by teaching that the housing is “unitarily formed,” which motivates the use of a rectilinear form factor with an essentially flat rear side as taught in Zadesky. *See* Section V.A.2. Zadesky teaches a preferable method of how a unitarily formed housing is accomplished, for example, through a one piece extruded housing with an essentially flat rear side. Therefore, a POSITA would have understood that that the combination of Nguyen and Zadesky teaches a unitarily formed housing in a rectilinear form factor with an essentially flat rear side.

124. A POSITA would have been motivated to apply Zadesky’s teachings of a one piece housing to Nguyen. For example, Zadesky describes that one of its goals is to make the enclosure of the portable electronic device lighter, thinner, stronger, and more rigid. *See* Ex-1005, 1:39-53, 2:14-22. A lighter and thinner enclosure contemplated in Zadesky would further a major goal of Nguyen: increasing the mobility of portable devices. *See* Ex-1004, ¶2 (“[S]mall sizes are desired for handheld computers to enhance mobility.”). A POSITA would also have understood, and it would have been obvious, that a stronger and a more rigid

housing is also more desirable in Nguyen, as it reduces the impact of collision or deformation in the daily use of the handheld computer.

125. In view of the similar and/or complementary design goals, Zadesky teaches a seamless enclosure formed from an extruded tube. *See* Ex-1005, 2:26-34. As explained by Zadesky, “[m]ost portable computing devices, the enclosures are mechanical assemblies having multiple parts that are screwed, bolted, riveted, or otherwise fastened together at discrete points. For example, the enclosures typically have included an upper casing and a lower casing that are placed on top of one another and fastened together using screws.” *Id.*, 2:54-60. Zadesky accordingly teaches that, “[b]y being integrally formed, the main body has a substantially seamless appearance, which is unlike conventional housings, which include two parts that are fastened together thereby forming a seam therebetween.” *Id.*, 5:26-29. Zadesky teaches that this design is “stronger and more aesthetically pleasing.” *Id.*, 9:37-54. Zadesky further teaches that the material of the one-piece housing is selected based on strength (tensile), density (lightweight), strength to weight ratio, etc. *Id.*, 8:52-63. Applying Zadesky’s teachings of the enclosure to Nguyen thus improves the mobility, strength, and desirability for the device, for reasons explained above.

126. **Reasonable Expectation of Success.** The combination of Nguyen, Zadesky, and Oda teaches an extruded one piece housing that has a primarily

rectangular profile with essentially flat rear side and integral edges. A POSITA would have found this design to be obvious and have a reasonable expectation of success in doing so. Indeed, a POSITA would have understood that the one-piece housing with a consistent profile and an essentially flat rear side is easy to achieve, as it is the typical outcome of the extrusion process.

127. The combination also teaches this limitation under Nokia's construction: a member that houses forming enclosed exterior lateral sides and a rear side. Zadesky's one-piece housing is a member that houses internal components, such as the engine section and battery. *See* Section §§V.B.3[1d], [1f]. Zadesky's one-piece housing also forms enclosed exterior lateral sides and a rear side. Based on the foregoing reasons, a POSITA would have combined Zadesky with Nguyen. Ground 2 accordingly teaches limitation [1a].

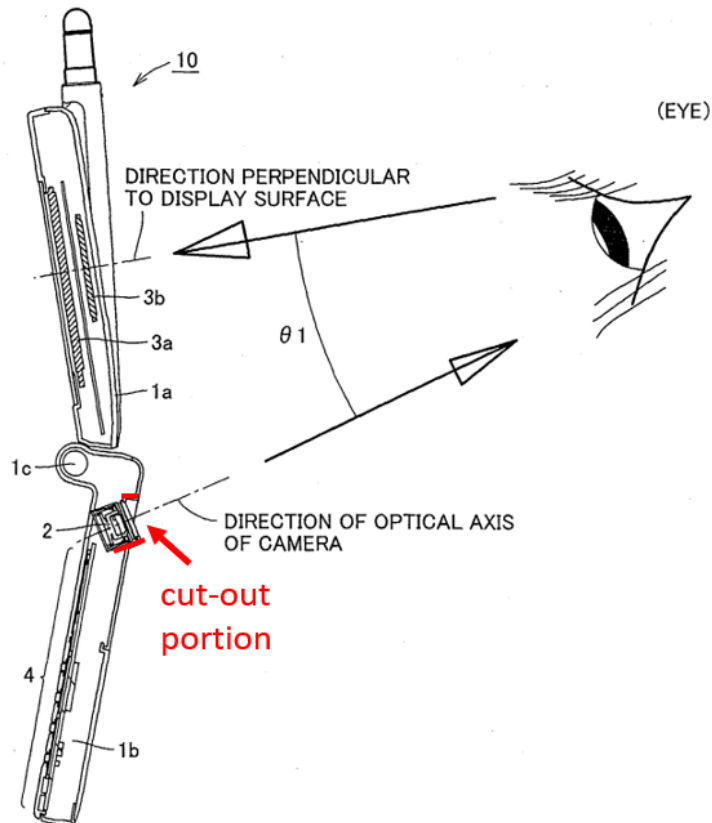
[1b/22b] a cut out in the rear side of said housing;

128. Ground 2 teaches limitations [1b] and [22b], as explained below.

129. As I explained above, a POSITA would have been motivated to combine Nguyen, Zadesky, and Oda, which teaches a one piece housing with a flat rear side. *See* Section V.B.3[1a]. As I also explained above, Nguyen teaches a cut out in the rear side of the housing, which is the hole that accommodates the camera lens. Accordingly, in the combination of Nguyen, Zadesky, and Oda, the cut out is placed on the rear surface taught in Zadesky.

130. Oda reinforces this teaching. For example, as shown in Fig. 14 below, Oda teaches a cut out on the (flat) rear side of a housing:

FIG.14



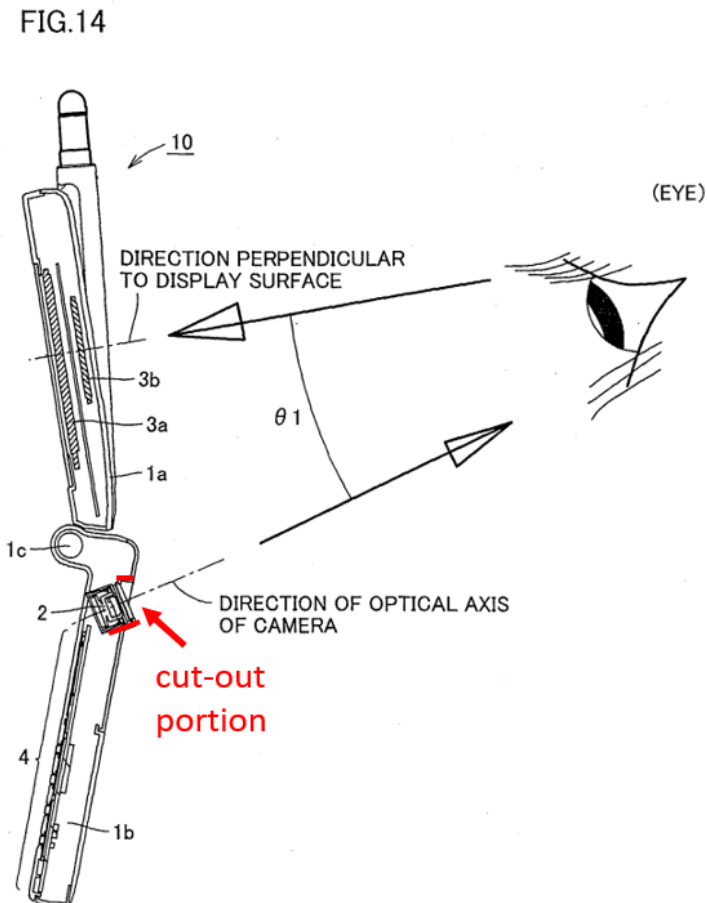
131. Based on the foregoing explanations, Ground 2 teaches limitations [1b] and [22b].

[1c/22c]	a camera located in said housing and extending to said cut out at said rear side;
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132. Ground 2 teaches limitations [1c] and [22c], as explained below.

133. As I explained above, Nguyen teaches limitation [1c]. *See* Section V.A.2[1c]. Further, the combination of Nguyen, Oda, and Zadesky teaches a cut out on the rear surface of the one piece housing. *See* Section V.B.3[1b/22b].

134. Oda further teaches **a camera located in said housing and extending to said cut out at said rear side**. For example, as shown in Fig. 14 below, Oda teaches a camera located in said housing and extending to said cut out at said rear side:

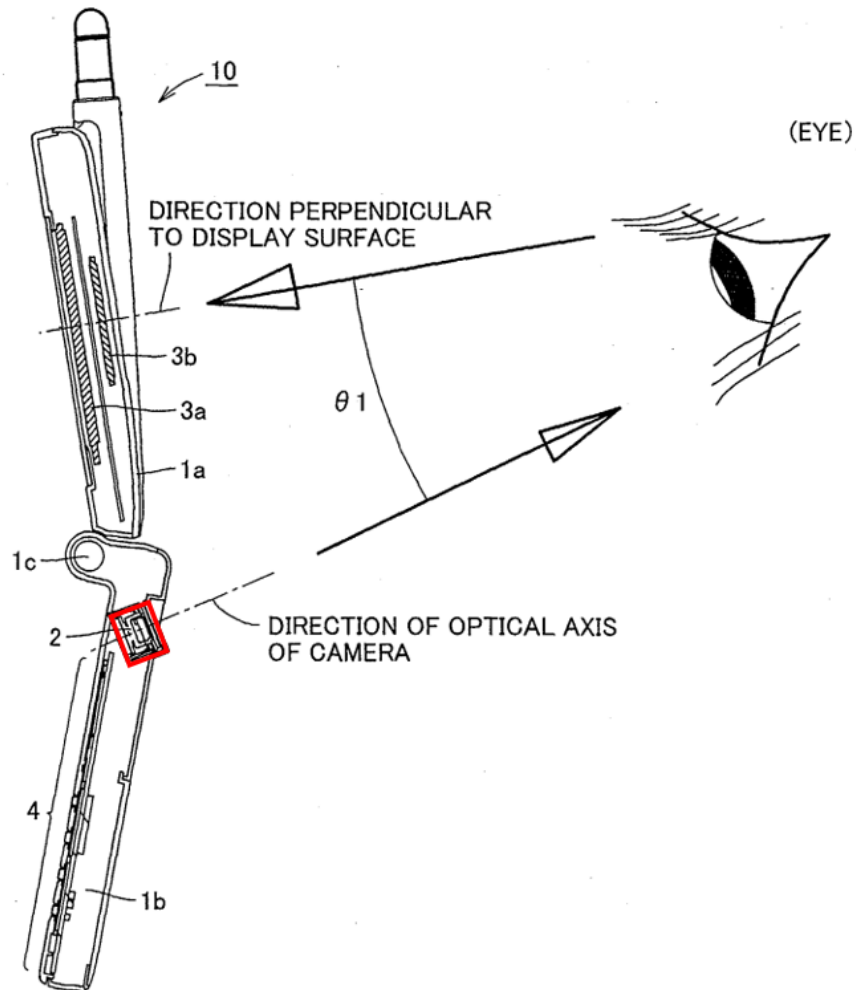


135. Motivation to Combine and Expectation of Success. A POSITA would have been motivated to combine Oda's teaching of a camera with the device taught by the combination of Nguyen and Zadesky. Oda teaches that the optical axis of the camera form an angle, from 10 to 30 degrees, with respect to the normal to the display surface. Ex-1006, ¶¶78-79. Nguyen also teaches that the lens is directed at a certain angle instead of pointing straight backwards because "[t]he orientation of the lens affects a selection of images that can be captured with the lens." Ex-1004, ¶19; *see also* Ex-1004, ¶27 ("The direction in which lens 135 is directed determines the images that the lens can capture."), ¶30, ¶31 ("lens 135 may be angled acutely away from the tangential planes to either of the front or back face."). In addition, Nguyen teaches that with the lens oriented at a direction, "the display 118 (FIG. 1) can be maintained in an optimal viewing position for the user." Ex-1004, ¶32. Thus, a POSITA would have understood that such an angle allows the camera to capture images from more advantageous positions or in a more advantageous manner. A POSITA would have been motivated to combine these teachings from Oda with the device taught by the combination of Nguyen and Zadesky to facilitate Nguyen's camera orientation, which provides express motivation to do so. *See* Ex-1006, ¶¶11, 14.

136. Oda and Nguyen share a common goal of pointing the camera lens at an angle, which allows the user to operate the device more naturally. As I

explained above, while Nguyen attains the angle through placing the lens on a partially-slanted rear surface (*see* Sections V.A.2[1b], [1c]), Oda provides a simple mechanism for accomplishing this goal when the lens is placed in a cut out located on an essentially flat rear surface—which is precisely the scenario presented by the extruded one-piece housings taught in Zadesky. Therefore, Oda’s teachings maintain the advantages of both Nguyen and Zadesky; a POSITA would have found such a design highly desirable and have been motivated to implement this teaching in the combination of Nguyen, Zadesky, and Oda. A POSITA would also have had reasonable expectation of success because Oda teaches this design on a flat rear surface, just like the rear flat surface in Zadesky. Ex-1006, Fig. 14, ¶¶37, 42-45, 79.

FIG.14



137. In addition, the camera design taught in Oda to make the device compact and to keep the manufacturing costs low. *See* Sections V.B.3[1a], V.B.3[1c/22c]. For example, Oda teaches that its camera-equipped electronic device “can suppress a product cost, and can easily achieve a compact structure.” Ex-1006, ¶9. Oda teaches fixing a camera to the main body of the product at a certain angle, eliminating the need of a rotary structure typically required for an

angled lens. *See id.*, ¶12. Therefore, Oda’s teachings advance the shared goal of Nguyen and Zadesky.

138. Indeed, Oda expressly teaches that the arrangement of cameras is applicable to portable electronic devices that are not limited to mobile phones, such as the devices taught by the combination of Nguyen and Zadesky. Oda explains that “the invention is not restricted to the cellular phones, and may be widely applied to camera-equipped portable devices such as a PDS Personal Digital Assistant) or a notebook personal computer.” Ex-1006, ¶117. Therefore, a POSITA would have applied Oda’s teachings related to the cut out and the camera to not only cell phones, but also other types of portable electronic devices.

139. Based on the foregoing explanations, Ground 2 teaches limitations [1c] and [22c].

[1d/22d] an engine section comprising a printed circuit board, a transceiver, a processor and a memory;
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140. Ground 2 teaches limitations [1d] and [22d], as explained below.

141. As I explained above, Nguyen teaches **an engine section comprising a printed circuit board, a transceiver, a processor and a memory**. *See* Section V.A.2[1d].

142. Oda reinforces the teaching of a transceiver. For example, Oda teaches that its embodiments are “described in connection with the cellular phones

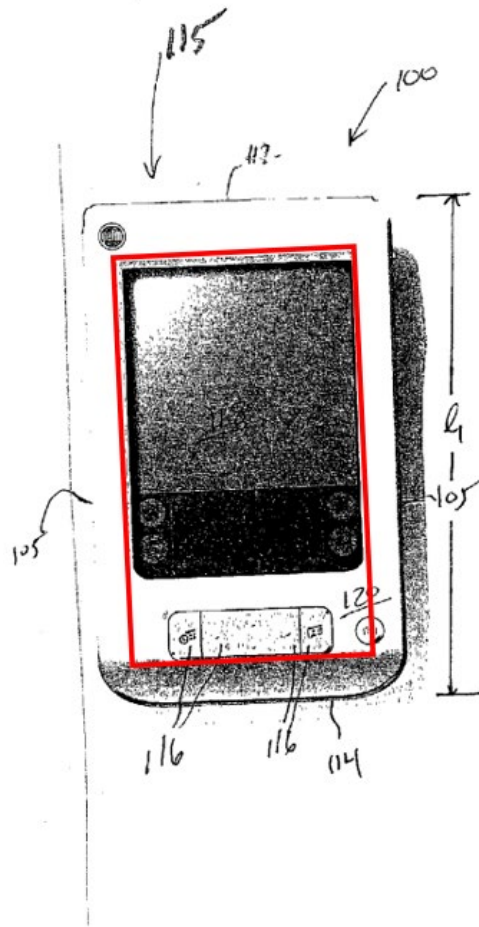
of the foldable type and the straight type.” Ex-1006, ¶117. A POSITA would have understood, and it would have been obvious, that a cellular phone includes a cellular phone transceiver to allow the device to wirelessly transmit and receive data. *See* Ex-1006, ¶117 (“the embodiments have been described in connection with the cellular phones”), ¶2 (describing “portable communication devices” that “transmit pictures taken by the cameras”).

143. Based on the foregoing explanations, Ground 2 teaches limitations [1d] and [22d].

[1e/22e]a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section;

144. As I will explain below, Ground 2 teaches limitations [1e] and [22e].

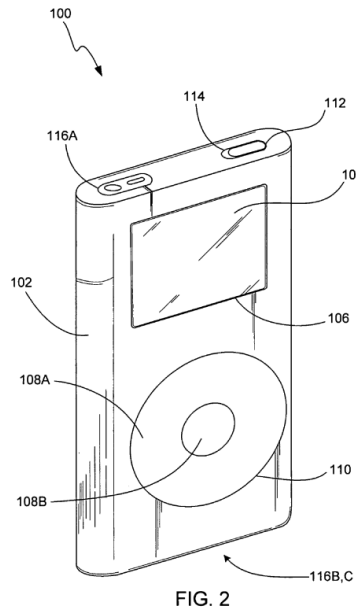
145. As I explained above, Nguyen teaches **a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section.** *See* Section V.A.2[1e]. Nguyen’s user input section is shown below.



146. Zadesky reinforces Nguyen’s teaching regarding this limitation. Like Nguyen, Zadesky also teaches user input devices that include “touch screens” and buttons. Ex-1005 (Zadesky), 6:4-27 (explaining that, in a device with square sides, “the user interface elements 70A may correspond to a display and/or an input device such as a keypad, touch pad, touch screen, joystick, trackball, buttons, switches and/or the like.”), 9:66-10:10 (explaining that, in a device with rounded sides, “the input devices 108 may correspond to keypads, joysticks, touch screens, touch pads, track balls, wheels, buttons, switches, and/or the like.”). In addition,

like Nguyen, Zadesky teaches that the user input section is located on the front surface of the portable electronic device. *See* Ex-1005 (Zadesky), Figs. 1, 9A.

Zadesky's exemplary user input sections are shown below, which include a touch pad 108A and buttons 108B. Ex-1005, 9:66-10:10.



147. A POSITA would also have been motivated to combine the teachings related to user input sections taught in Nguyen and Zadesky based on their similar components and locations. The combination of Nguyen and Zadesky would result in a user input section located on the front surface of the extruded one piece housing. In the combination, the user input section is located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section. Because Nguyen and Zadesky teach similar user input elements located on the front face of the device, combining Nguyen and Zadesky

regarding the user input elements amounts to the use of known technique to improve a familiar system in the same way. A POSITA would have had a reasonable expectation of success for this combination.

148. Therefore, Ground 2 teaches the limitation [1e] and [22e]. *See* Section V.B (explaining other motivation to combine Oda and Zadesky with Nguyen).

[1f]	wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.
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[22f]	wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the mobile phone.
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149. As I will explain below, Ground 2 teaches limitations [1f] and [22f].

150. As I explained above, Nguyen alone teaches limitation [1f]. *See* Section V.A.2[1f].

151. The device in view of the combination of Nguyen and Zadesky also teaches this limitation. As I have explained, the combination of Nguyen and Zadesky teaches that the battery and the engine section are housed in the housing. *See* Sections V.B.3[1c]-[1e].

152. The combination of Nguyen and Zadesky further teaches an extruded one piece housing, in which the user input is located in an opening between the lateral side walls of the one piece housing. As I explained above, Zadesky and

Nguyen teach similar user input elements, for example a touch screen and buttons, which are located on the front side of the portable electronic device. *See* Section V.B. Therefore, a POSITA would have been motivated to place any user input elements taught in Nguyen and/or Zadesky on the front side of the device.

153. Zadesky provides further teachings of **an opening between said exterior lateral sides of said one piece housing of the portable electronic device**. For a device with square sides, Zadesky teaches that “[t]he main body 54 also includes one or more windows 62, which provide access to the electrical components, particularly the user interface elements.” Ex-1005, 5:16-36. I have colored the lateral sides in yellow, the user input in red, and the opening in pink in Fig. 1, below. As seen in Fig. 1, the user input is located in an opening between the lateral sides.

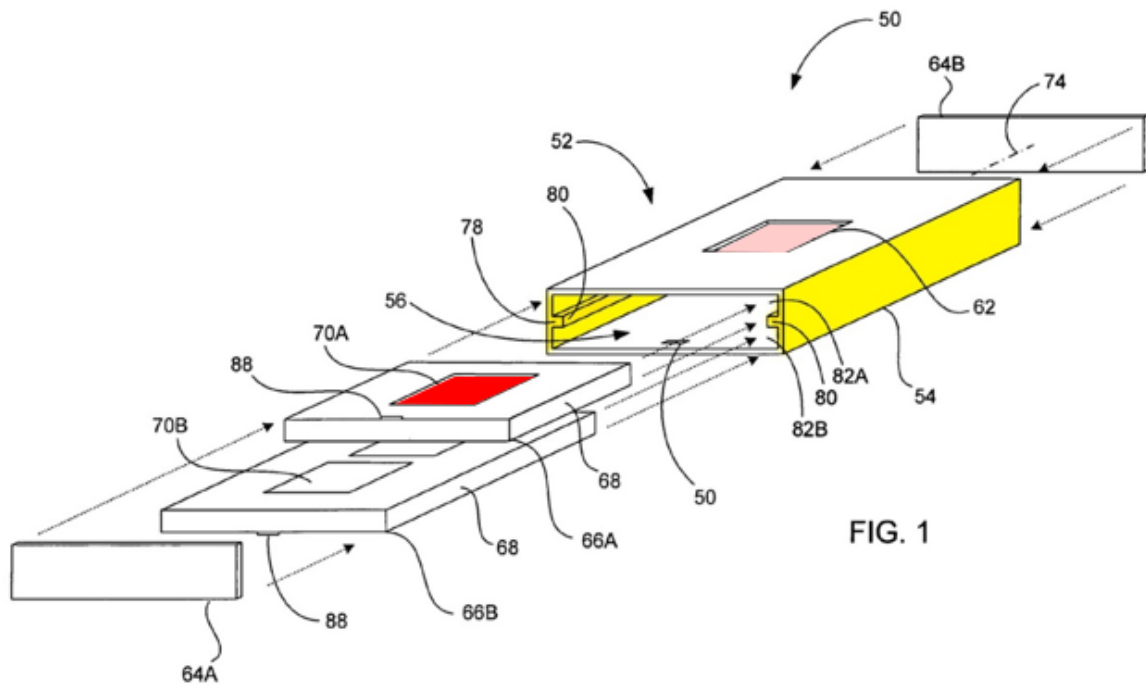
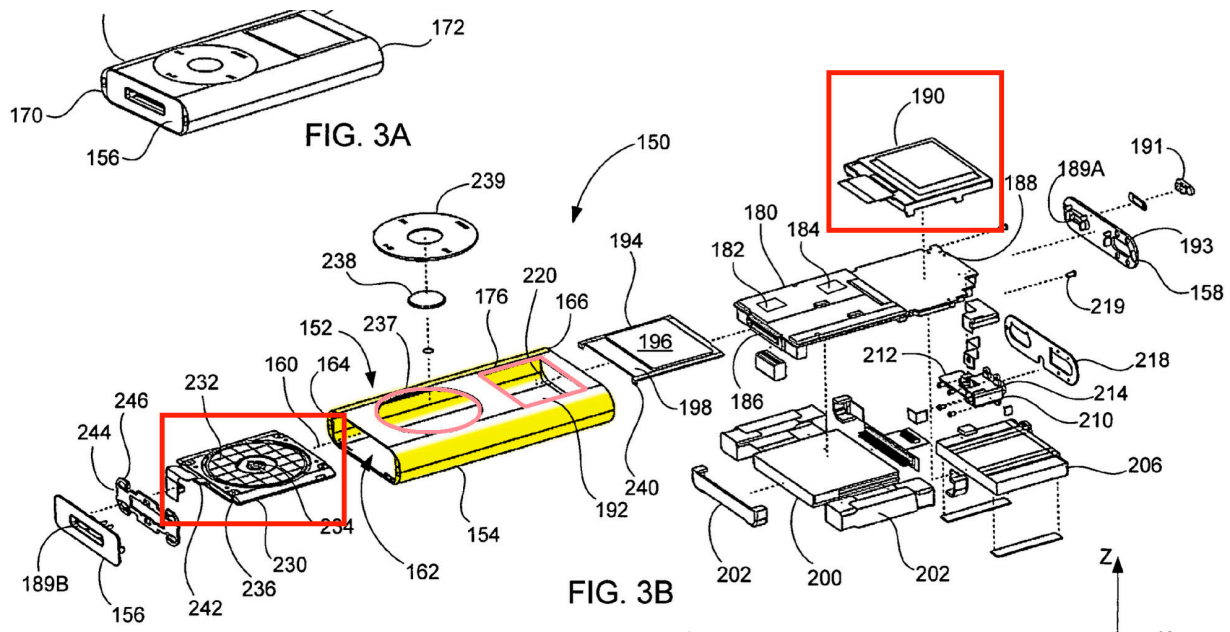


FIG. 1

154. For a device with rounded sides, Zadesky teaches that the seamless enclosure 154 includes “an access opening 192 having a shape that coincides with the shape of” a touch screen, as well as “an access opening 237 having a shape that coincides with the shape of the touch pad 232.” Ex-1005, 12:63-13:16, 9:66-10:10, 15:37-54. I have colored the lateral sides in yellow, the openings in pink, and the user input sections in red squares in Fig. 3B, below. As seen in Fig. 3B, the user input is also located in one or more openings between the lateral sides.



155. Based on the foregoing explanations, Ground 2 teaches limitation [1f].

156. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre].

As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3[22pre]. Therefore, Ground 2 further teaches limitation [22f].

4. Dependent Claims 2, 23

[2] A portable electronic device according to claim 1

[23] A mobile phone according to claim 22

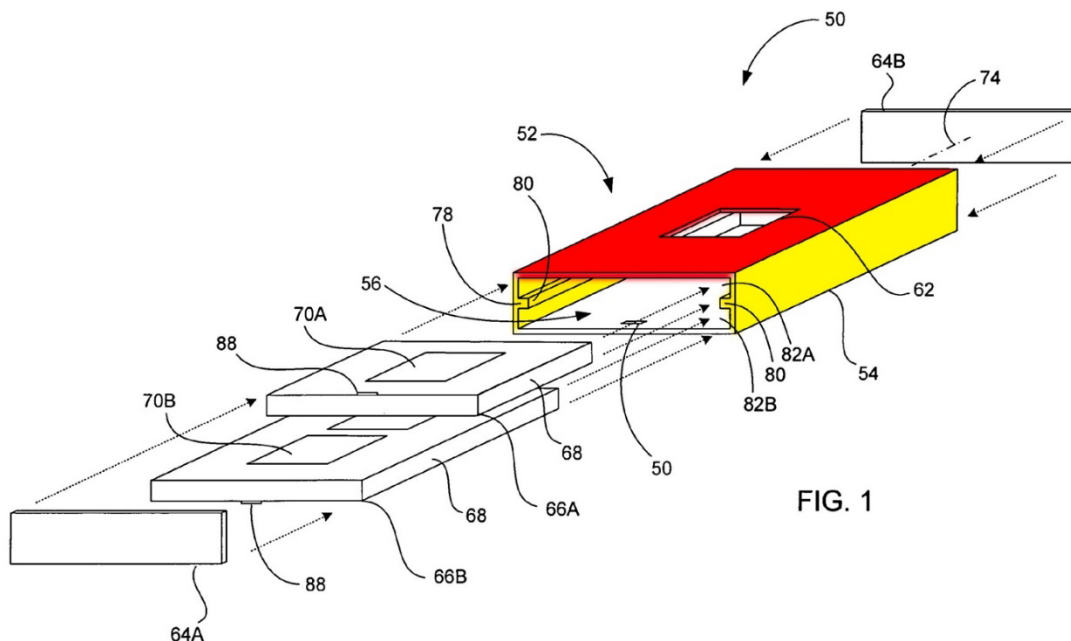
wherein said one piece housing has a front side extending from and between the lateral sides.

157. Ground 2 teaches claims 2 and 23, as explained below.

158. The combination of Nguyen, Zadesky, and Oda teaches a portable electronic device according to claim 1. *See* Section V.B. In addition, Zadesky

teaches that **said one piece housing has a front side extending from and between the lateral sides**. For example, Zadesky teaches that the housing of the device includes a “planar front surface,” which extends from and between the lateral sides. Ex-1005, 2:58-3:2 (“The handheld computing device includes a seamless enclosure having a substantially planar front surface.”).

159. I have highlighted the planar front surface in the embodiment with square edges depicted in Fig. 1 in red, below. I have also highlighted the lateral sides in yellow. As seen in the highlighted portions in Fig. 1, the planar front surface taught in Zadesky extends from and between the lateral sides. As Zadesky teaches that the body is formed using a single piece of metal (*see, e.g.,* Ex-1005, 11:66-12:13), there is no gap between the lateral edges and the front side.



See also Ex-1005, 5:67-6:3 (“the front surface of the main body 54 may be substantially planar for placement of the user interface of the device 50.”), Fig. 1.

160. I have also highlighted in red the front surface shown in another embodiment with rounded sides, in Fig. 9, below. Ex-1005, Fig. 9A. I have also highlighted the lateral sides in yellow. For this embodiment, Zadesky teaches that the seamless enclosure 154 of the device includes a planar front surface 280 and (rounded) lateral sides 284. Ex-1005, 19:2-23. As also seen below, the planar front surface taught in Zadesky extends from and between the lateral sides. As I explained above, the housing is formed from a single piece of material. As such, there is no gap between the lateral edges and the front side.

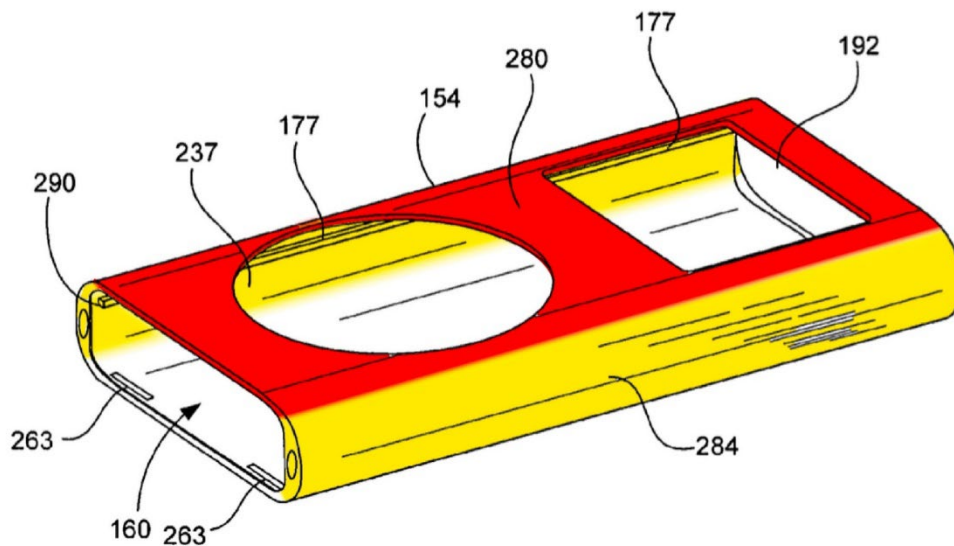


FIG. 9A

Ex-1005, Fig. 9A; *see also* Ex-1005, Figs. 3A-B, 9C.

161. Therefore, Ground 2 teaches claim 2.

162. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre].

As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3[22pre]. Therefore, Ground 2 further teaches claim 23.

5. Dependent Claims 3, 24

[3]	A portable electronic device according to claim 2
[24]	A mobile phone according to claim [23] ⁵ wherein the front side extends parallel to the lateral edges.

163. Ground 2 teaches claims 3 and 24, as explained below.

164. As I have explained above, Ground 2 teaches a portable electronic device according to claims 2 and 23. *See* Section V.B.4.

165. Further, Zadesky teaches that **the front side extends parallel to the lateral edges**. I note that the phrase "lateral edges" does not have any antecedent basis because the phrase does not appear in claims 1 or 2 from which this claim depends. I understand "lateral edges" to mean the edges of the lateral sides recited in claims 1 and 22. Zadesky teaches this additional limitation. For example, as I

⁵ Claim 24 contains a typographical error which omits the claim number from which the claim is dependent. I understand that claim 24 depends from claim 23 based on prosecution history of the '602 patent. *See* Ex-1002, 000108 (claim 48 in the application stage, which corresponds to claim 24 of the '602 patent as issued, depends from claim 47; claim 47 in the application stage corresponds to claim 23 of the '602 patent as issued).

FIG. 3B

See also Figs. 1, 3A-B, 9A, 9C.

169. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre].

As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3[22pre]. Therefore, Ground 2 further teaches claim 24.

6. Dependent Claims 4, 25

[4] A portable electronic device according to claim 3

[25] A mobile phone according to claim 24

wherein the front side forms at least a side of the opening through which the input device is located.

170. Ground 2 teaches claims 4 and 25, as explained below.

171. As I have explained above, Ground 2 teaches a portable electronic device according to claims 3 and 24. *See* Section V.B.5.

172. The combination of Nguyen and Zadesky further teaches **the front side forms at least a side of the opening through which the input device is located.** The phrase “the input device” does not have any antecedent basis. To the extent that this claim can be understood, the phrase is interpreted to mean the “user input section” of claims 1 and 22. As I explained above, Zadesky teaches that the housing has a front side. Zadesky further teaches that the front side forms one or more openings, as shown for the two embodiments below.

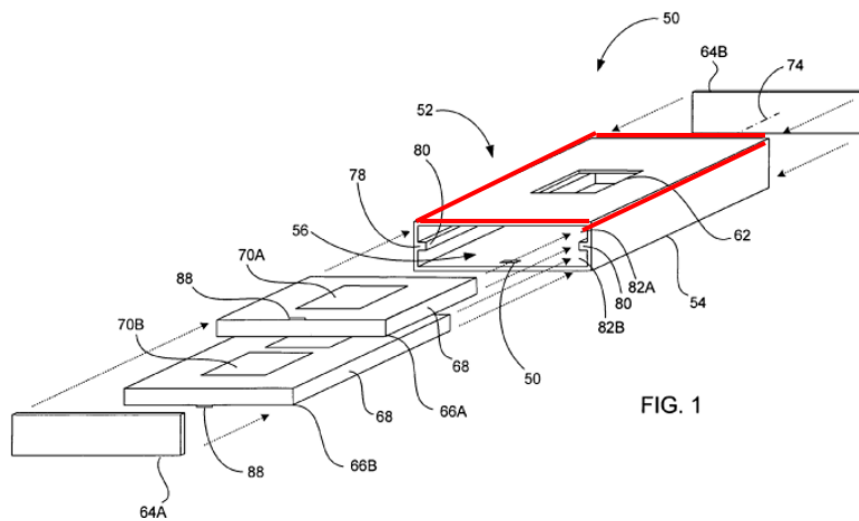


FIG. 1

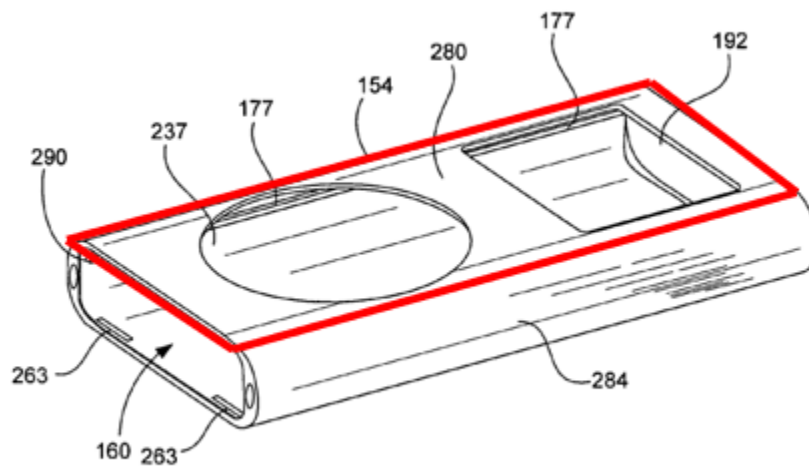
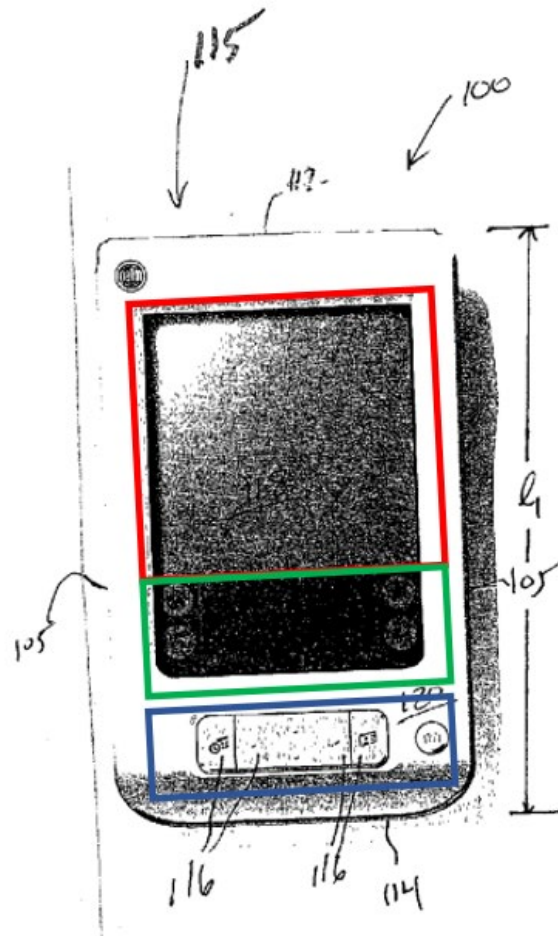


FIG. 9A

173. The combination of Nguyen and Zadesky further teaches that the input device is located in the opening. As I explained above, Nguyen teaches an input device through, for example, its teachings contact-sensitive display, alphanumeric input area, and application buttons. *See* Section V.A.2[1e]; Ex-1004, ¶¶21-22, Fig. 1. Nguyen further teaches that the user input device is located on the front surface. Ex-1004, ¶¶21-22, Fig. 1. I have highlighted Nguyen's user input

device on Fig. 1 below, using red for the contact-sensitive display, green for the alphanumeric input area, and blue for application buttons.



174. As I have explained above, a POSITA would have been motivated to combine the Zadesky's teachings of a one piece body, including its front side, with the teachings of Nguyen. *See* Section V.B.3. In the combination of Nguyen and Zadesky, the user input device is located in one or more openings on the front face of the one-piece body taught by Zadesky. As I have also explained, the user input devices taught in Nguyen and Zadesky are similar and are located in the same place of the device, i.e., the front surface. *See* Section V.B.3. Therefore, a

POSITA would have been motivated to arrange any user input device(s) taught in either Nguyen or Zadesky on the opening on the front side. As an example, it would have been obvious that a touch screen and a wheel as taught in Zadesky are located in one or more openings on the front face of the housing taught in Zadesky. As another example, it would have been obvious that a touch screen, alphanumeric input area, and application buttons, as taught in Nguyen, are located in one or more openings on the front face of the housing taught in Zadesky (replacing the existing user input elements taught in Zadesky).

175. Therefore, Ground 2 teaches claim 4.

176. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 2 further teaches claim 25.

7. Dependent Claims 5, 26

[5]	A portable electronic device according to claim 1
[26]	A mobile phone according to claim 22
	wherein the user input and a front side of the housing lie in a side by side arrangement.

177. Ground 2 teaches claims 5 and 26, as explained below.

178. As I have explained above, Ground 2 teaches a portable electronic device according to claims 1 and 22. *See* Section V.B.3.

179. Zadesky teaches **a front side of the housing**. Ex-1005, 2:58-3:2

(“The handheld computing device includes a seamless enclosure having a substantially planar front surface.”), 5:37-6:4. I have highlighted the front side of the two embodiments shown in Figs. 1 and 9A in red, below.

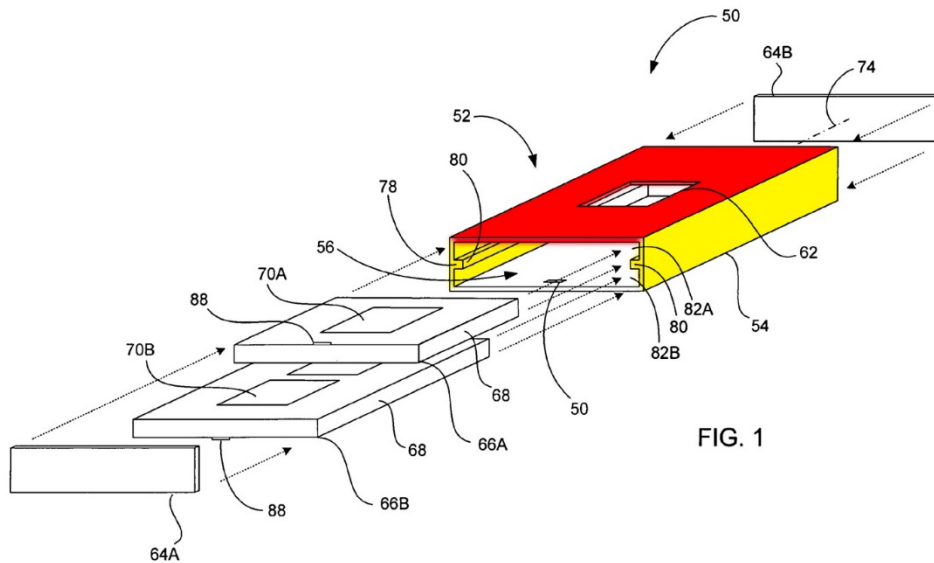


FIG. 1

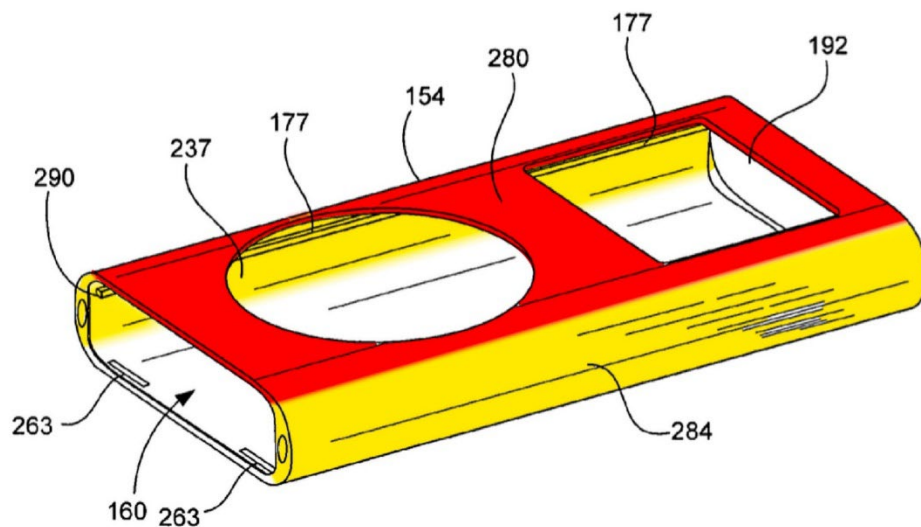
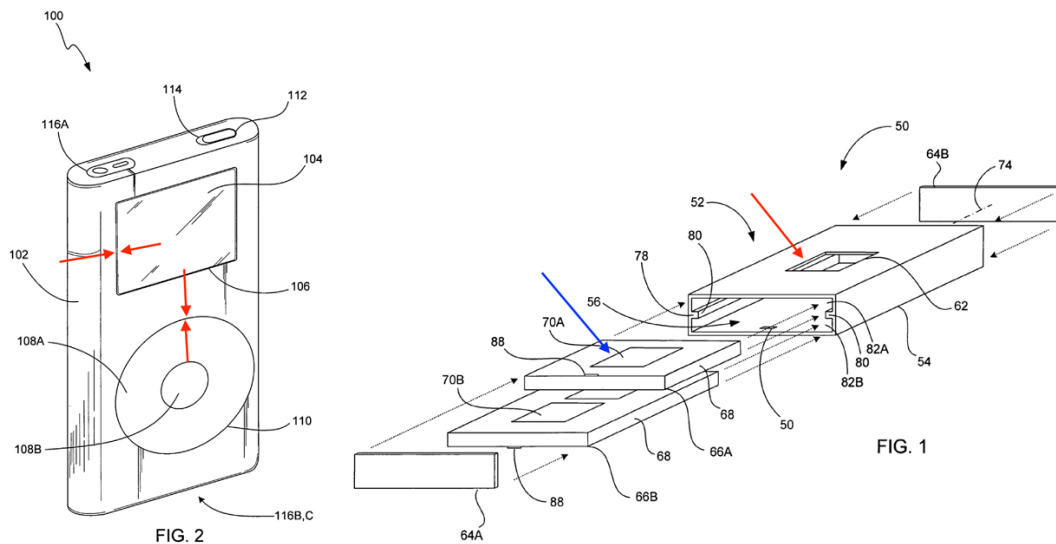


FIG. 9A

180. The combination of Nguyen and Zadesky teaches that **the user input and a front side of the housing lie in a side by side arrangement**. As I explained above, The combination has a front surface that is part of and integral to the one-piece housing. As seen in Zadesky, the user input and the front side lie in a side by side arrangement.



181. Therefore, the combination of Nguyen and Zadesky teaches that the user input and the front side of the housing lie in a side by side arrangement. Thus, Ground 2 teaches claim 5.

182. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 2 further teaches claim 26.

8. Dependent Claims 6, 27

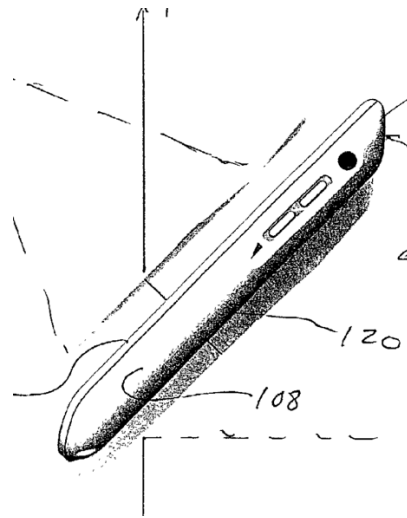
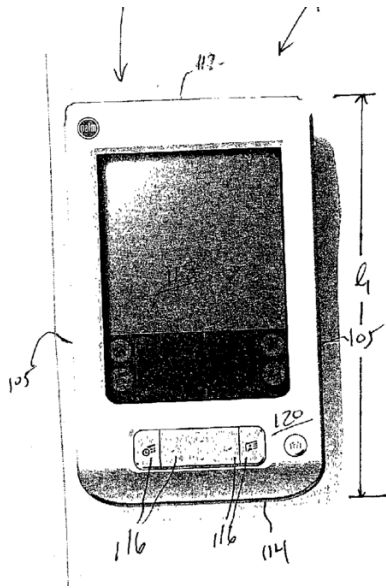
- [6] **A portable electronic device according to claim 1 wherein the one piece housing and the user input form a continuous surface of the portable electronic device.**
- [27] **A mobile phone according to claim 22 wherein the one piece housing and the user input form a continuous surface of the mobile phone.**

183. Claim 6 is substantially similar to claim 27, except that claim 6 is directed to a portable electronic device, while claim 27 is directed to a mobile phone.

184. Ground 2 teaches both claims 6 and 27, as explained below.

185. As I have explained above, Nguyen teaches a portable electronic device according to claim 1. *See* Section V.A.2.

186. The combination of Nguyen and Zadesky teaches that **the one piece housing and the user input form a continuous surface of the portable electronic device**. The phrase “the user input” does not have any antecedent basis. To the extent that this claim can be understood, the phrase is interpreted to mean the “user input section” of claims 1 and 22. As I explained above, Nguyen teaches that the front face of the device provides the user input, including touch screen, the alphanumeric input area, and application buttons. *See* Section V.A.2; Ex-1004, ¶¶21-22, Fig. 1 and 3.



187. As I also explained above, Zadesky teaches an extruded one piece housing that includes a front surface, lateral sides, and rear surface, which are all part of the same housing. *See* Sections V.B.1, V.B.3. Zadesky also teaches the front side of the housing provides user input devices, such as “touch screens” and buttons, similar to the teachings of Nguyen. *See* Sections V.B.1, V.B.3.

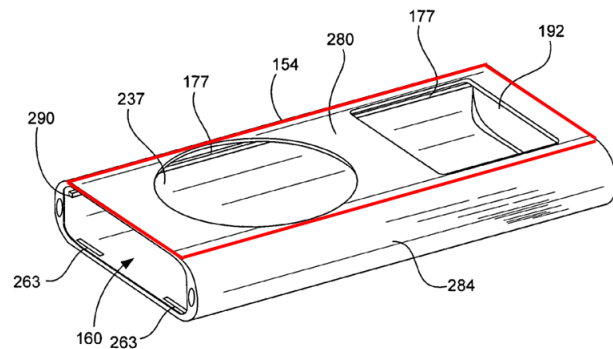
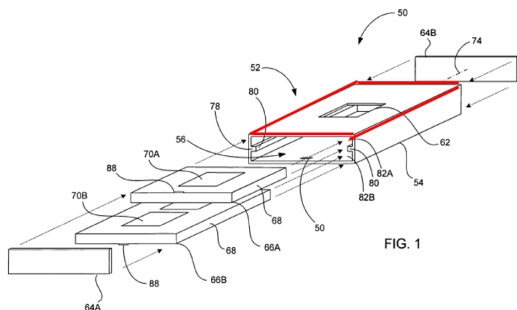
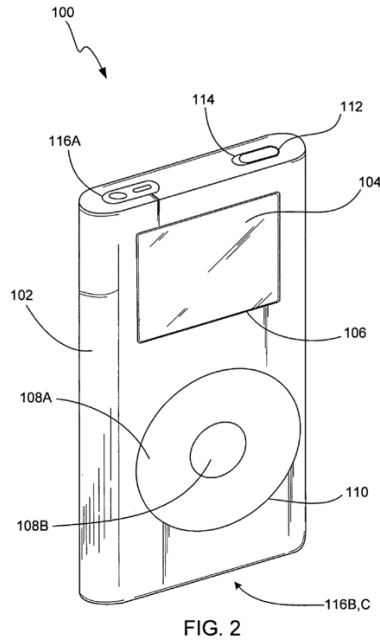


FIG. 9A

188. As taught in Zadesky, when the user input devices are installed, they form a continuous surface along with the front face of the extruded housing.



189. Therefore, a POSITA would understand that the combination of Nguyen and Zadesky, which has an extruded one piece housing as taught by Zadesky, would have a user input section that forms a continuous surface of the portable electronic device. Because the user inputs taught in Nguyen and Zadesky are placed in the same position on the device, include similar components, and serve the same functions, it would have been obvious to place the user input elements on the one piece housing taught in Zadesky to form a continuous surface with the other part of the housing.

190. Therefore, Ground 2 teaches claim 6.

191. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. As I have also explained above, a POSITA would have been motivated to apply

Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 2 further teaches claim 27.

9. Dependent Claims 7, 28

[7] A portable electronic device according to claim 6

[28] A mobile phone according to claim 27

further comprising a bracket wherein the user input section and the one piece housing define an interior volume and the bracket is configured to support said user input section.

192. Ground 2 teaches claims 7 and 28, as explained below.

193. As I have explained above, the combination of Nguyen and Zadesky teaches a portable electronic device according to claim 6. *See* Section V.B.8.

194. Ground 2 further teaches that **the user input section and the one piece housing define an interior volume**. As I explain above for claim 5, the device taught by the combination of Nguyen, Zadesky, and Oda has a front surface, where the front face of the one piece housing and the user input section form in a side by side arrangement. *See* Section V.B.7. As I also explained above, a POSITA would have been motivated to combine Nguyen and Zadesky in this way for a number of reasons, including, for example, both Nguyen and Zadesky teach that the front face of the housing provides a user input section. *See* Sections V.A.2, V.B.3[1e/22e], V.B.6.

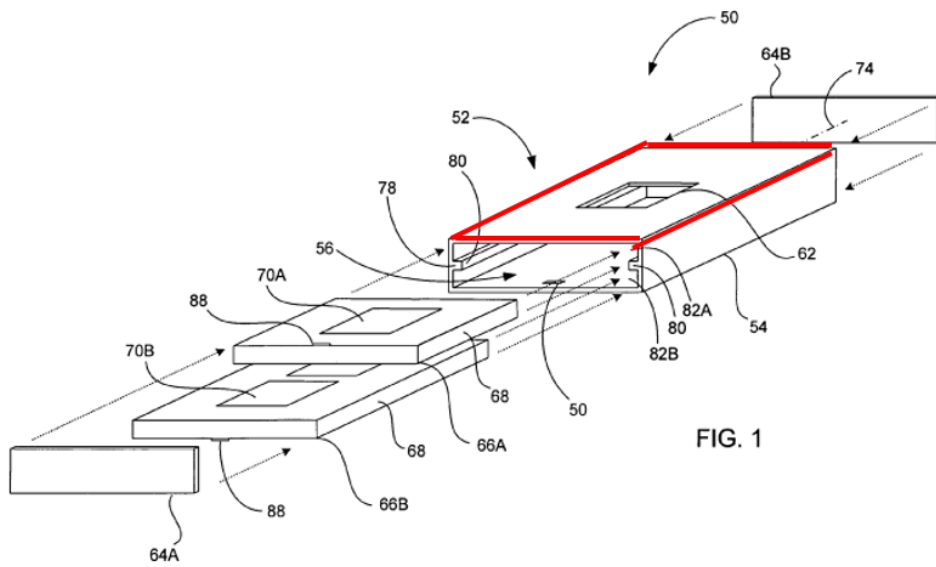


FIG. 1

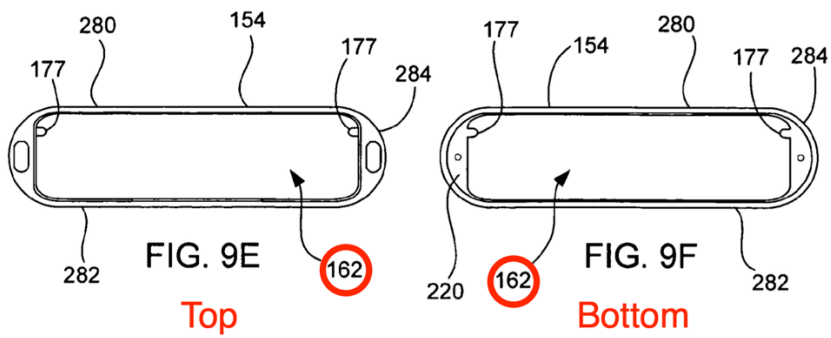


FIG. 9E
Top

FIG. 9F
Bottom

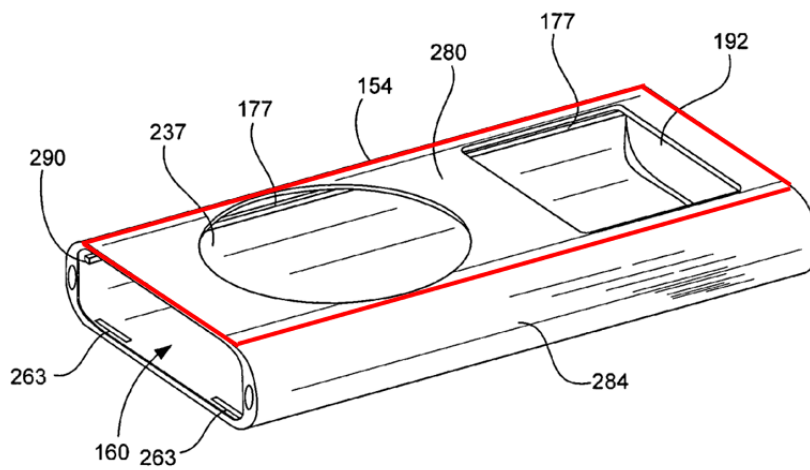


FIG. 9A

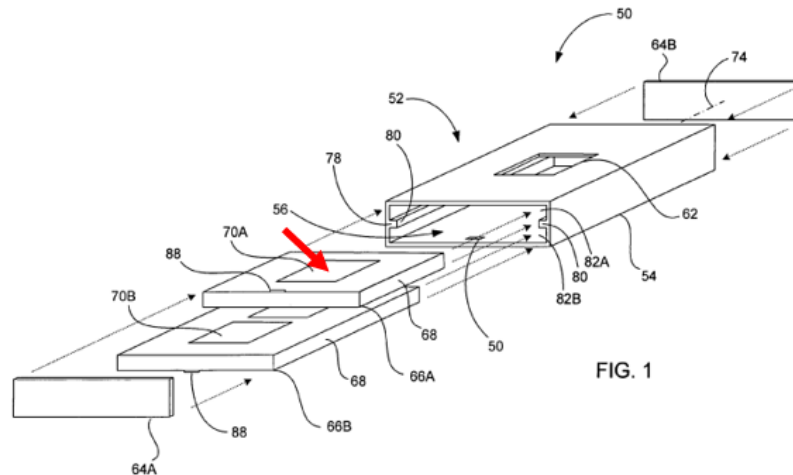
195. Therefore, the combination of Nguyen, Zadesky, and Oda teaches that the one piece housing, plus the user input section on the front face, forms the exterior of the device and defines the interior volume of the device. The interior volume in the embodiment as seen in Fig. 1 is identified as cavity 56; in the embodiment as seen in Fig. 9A, 9E and 9F as an internal hollow core (“lumen”)

162. *See* Section V.A.2[1a], V.A.2[1d]; Ex-1005, 5:16-35, 19:3-23.

196. As I explained above, the combination of Nguyen and Zadesky teaches that the interior of the housing contains electronic components, for example as shown in the block diagram depicted in Nguyen. *See* Section V.A.2[1d]. As taught in Nguyen, internal hardware components, such as a processor, a transceiver, and memory, are located in the interior of the housing. *See* Section V.A.2[1d]. In other words, these components are contained in the interior volume of the housing defined by the user input and the one piece housing.

197. Ground 2 further teaches **a bracket wherein ... the bracket is configured to support said user input section**. As I explained above, Nguyen and Zadesky provide similar teachings regarding the user input section, which is located on the front surface of the device. Section V.B.3[1a]. Zadesky, for example, teaches a “user interface element 70A,” as highlighted in red below, that “allow[s] a user to interact with the computing device.” Ex-1005, 6:4-27. Zadesky teaches that “the user interface elements 70A may correspond to a display and/or

an input device such as a keypad, touchpad, touch screen, joystick, trackball, buttons, switches and/or the like.” Ex-1005, 6:4-27.



198. Zadesky further teaches **a bracket configured to support said user input section**. For example, Zadesky teaches that the extruded tube of the housing includes “internal rails” that support the user interface assembly. Ex-1005, Abstract. Zadesky teaches that a method of manufacturing the portable electronic device “may include extruding a tube with a substantially planar surface and internal rails, cutting the tube to a desired length, forming one or more access openings in the substantially planar surface, sliding the user interface assembly along the internal rails into the tube, and thereafter locating and *supporting the user interface assembly* behind an access opening and adjacent the planar surface of the tube via *the internal rails*.” Ex-1005, 4:60-67; *see also* Ex-1005, 6:41-58. The internal rail system 78 is highlighted in blue below, which provides structural support for the user input 70A.

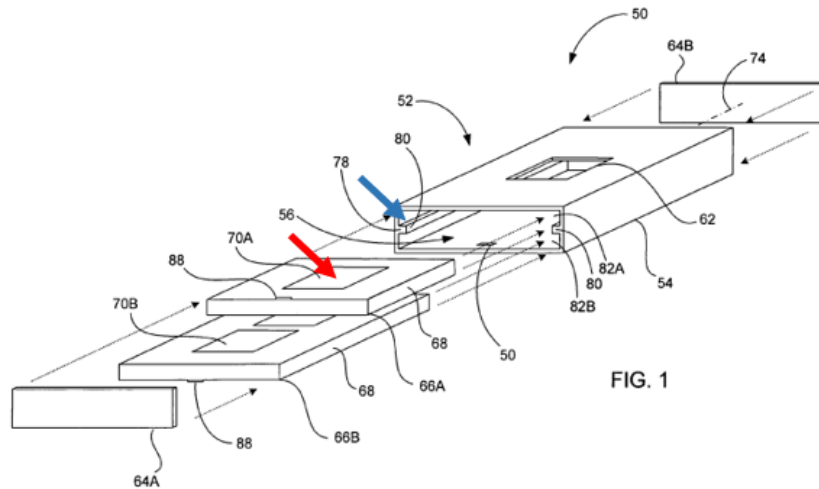


FIG. 1

199. Zadesky also discloses a second embodiment that includes a similar internal rail system configured to support an input device. Ex-1005, 3:3-22, 15:14-16:35. Zadesky teaches that, “[a]s should be appreciated, the side walls, top surface and *rails help constrain the input assembly 230* within the housing 152 during and after insertion.” Ex-1005, 15:55-16:12. The internal rail system is labeled as 176 and 177 (highlighted in blue), while the input assembly is labeled as 230 (highlighted in red). As seen in the Figs. 3B (partial) and 5 below, this rail system functions as a bracket to support the input device. *See also* Figs. 2-6 and 9.

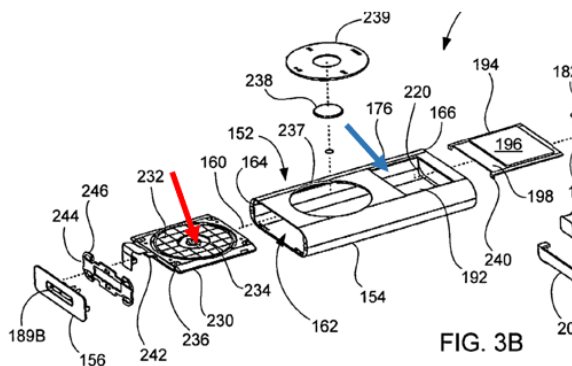


FIG. 3B

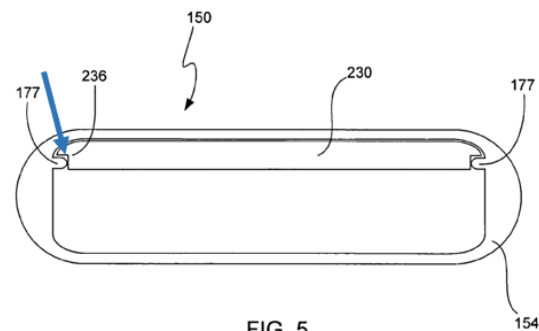


FIG. 5

200. Based on its shape and functions, the internal rail system 78, 176, and 177 is an example of a bracket that supports the user input section. It would have been obvious to a POSITA in the 2006 time frame to apply the internal rail system taught in Zadesky to the combination of Nguyen and Zadesky to support the input sections. Such a design offers several benefits, including ensuring that the input device is steady and simplifying the mounting and installation process. *See* Ex-1005, 15:55-16:12.

201. Therefore, Ground 2 teaches claim 7.

202. In addition, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 2 further teaches claim 28.

10. Dependent Claims 9, 30

[9] A portable electronic device according to claim 1

[30] A mobile phone according to claim 22

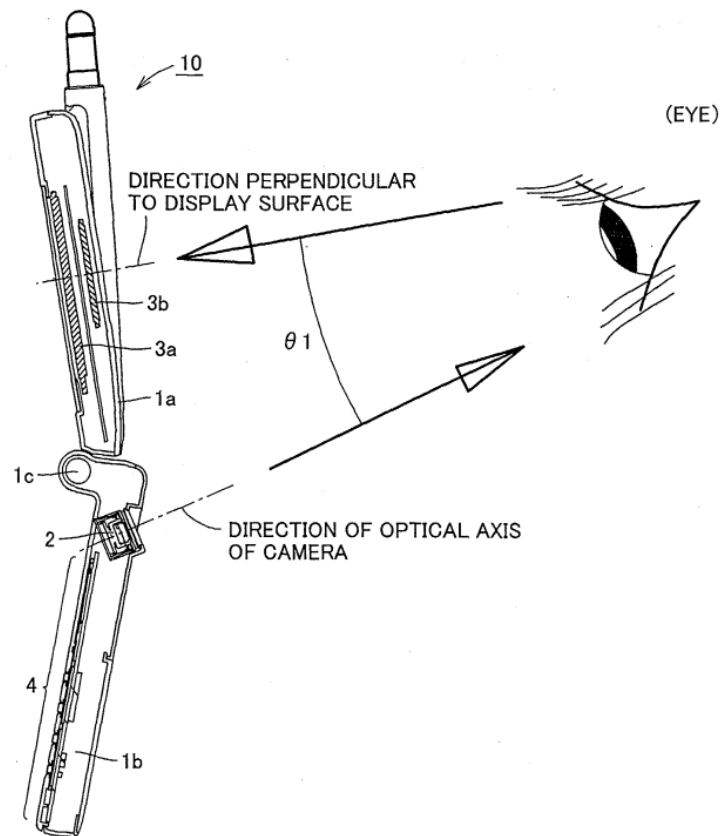
further comprising a cut out portion wherein the cut out portion projects from the rear side of the housing.

203. Ground 2 teaches claims 9 and 30, as explained below.

204. As I explained above, Ground 2 teaches a portable electronic device according to claim 1 and a mobile phone according to claim 22.

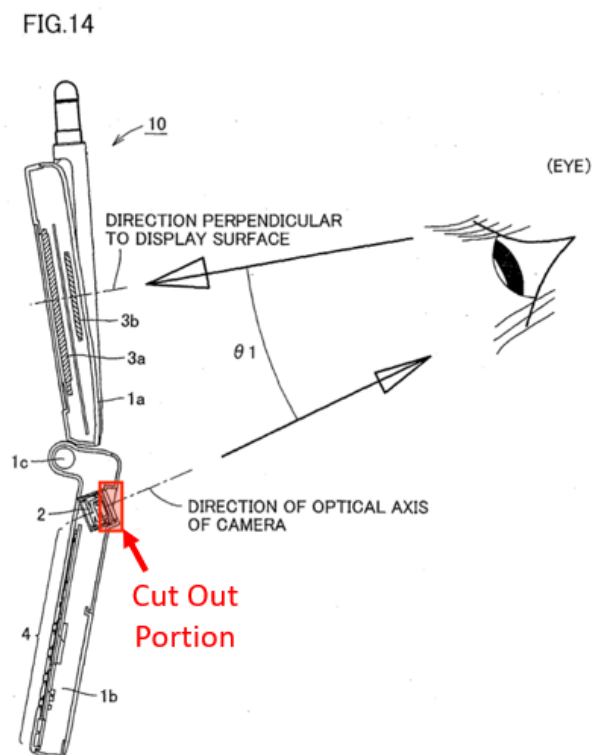
205. Oda further teaches **a cut out portion wherein the cut out portion projects from the rear side of the housing.** For example, Oda teaches a camera arranged on the rear surface of the body, where the cut out for the camera projects from the rear side of the housing, as shown in Fig. 14 below. Ex-1006, ¶¶77-79.

FIG.14

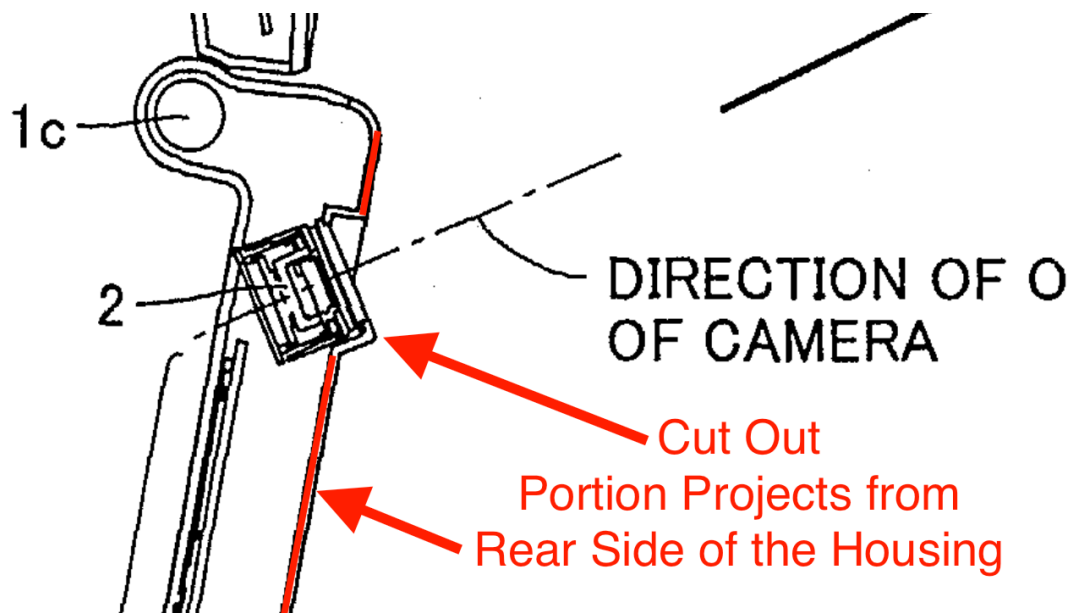


206. Oda teaches that “[t]he camera is fixed to the main body such that an optical axis of the camera extends in a direction different from a direction perpendicular to a display surface of the display device.” Ex-1006, ¶¶10-12. For example, in the embodiment depicted in Fig. 14, Oda teaches that the optical axis

of the camera form an angle, from 10 to 30 degrees, with respect to the normal to the display surface. Ex-1006, ¶¶78-79. A POSITA would have understood, and it would have been obvious, that the cut out portion projects out and protrudes from the surface of the housing, when the camera and housing are of similar thickness before rotating, so that the camera can be oriented at such an angle. I have highlighted the cut out portion, below:



207. I have pointed to the cut out portion that projects from the rear side of the housing highlighted in red in a closeup of Fig. 14 of Oda, so that the cut out portion that projects from the rear side is clearly visible, below:



208. A POSITA would have been motivated to combine Oda's teachings of a cut out portion that projects out with Nguyen and Zadesky. As I explained above, Nguyen teaches a cut out portion in which a camera is located. *See* Section V.A.2[1b]. A POSITA would have been motivated to combine Nguyen and Oda on the teaching of the rear camera and adopt the design of the tilted camera taught in Oda, for reasons I explained above. *See* Section V.B.3[1c/22c].

209. A POSITA would also have understood that making the cut out portion project out from the rear surface provides several other advantages. For example, with the cut out portion of the camera protruding out from the rest of the device body, this design does not require the whole body of the mobile device to be at least as thick as the camera assembly. Thus, this design potentially makes the device thinner and more portable by allowing only the camera portion to be thicker than the rest of the device body, which is a shared goal and Nguyen and Zadesky,

while offering physical protection to the camera through the protruding cut out.

See, e.g., Ex-1004, ¶6; Ex-1005, 1:39-53, 2:14-22; Section V.B.

210. Therefore, Ground 2 teaches claim 9.

211. In addition, as I explained above, a POSITA would have been motivated to apply Oda's teachings of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3[22pre]. Therefore, Ground 2 further teaches claim 30.

11. Dependent Claims 10, 31

[10] A portable electronic device according to claim 9

[31] A mobile phone according to claim [30]⁶

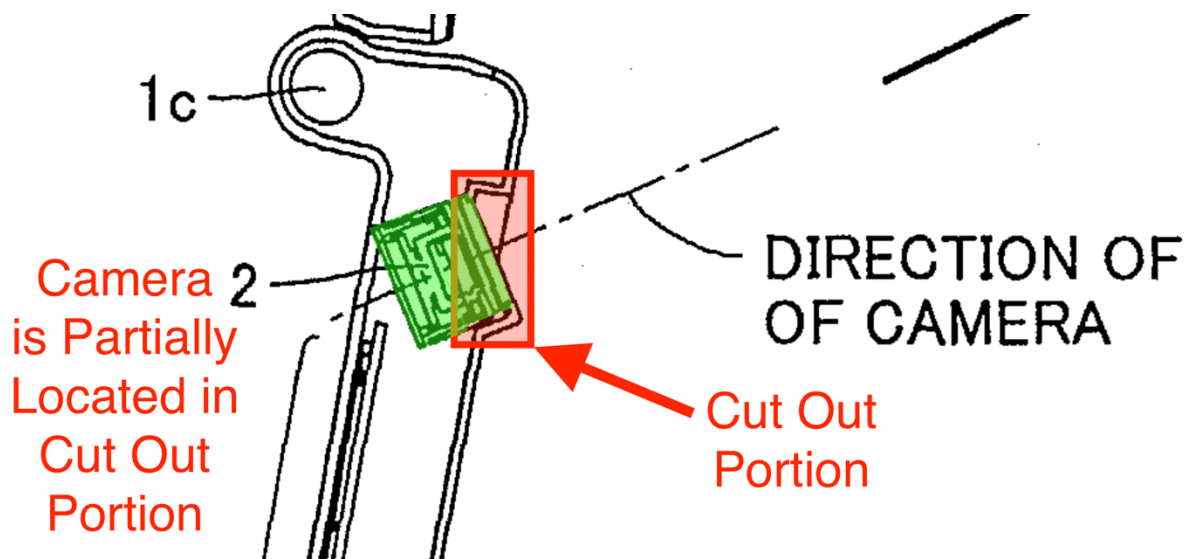
where the camera is partially located in the cut out portion.

212. Ground 2 teaches claims 10 and 31, as explained below.

213. As I explained above, Ground 2 teaches a portable electronic device according to claim 9, as well as a mobile phone according to claim 30. *See* Section V.B.10.

⁶ Claim 31 contains a printing error which omits the claim number from which the claim is dependent. I understand that claim 31 depends from claim 30 based on prosecution history of the '602 patent. *See* Ex-1002, 000109 (claim 55 in the application stage, which corresponds to claim 31 of the '602 patent as issued, depends from claim 54), 000697 (showing claim 54 in the application stage corresponds to claim 30 of the '602 patent as issued).

214. Ground 2 additionally teaches that **the camera is partially located in the cut out portion**. For example, Oda teaches that a camera arranged on the rear side (rear surface) of the body is at least partially located in the cut out portion, as shown in the annotated Fig. 14 below. Ex-1006, ¶¶77-79. Therefore, Ground 2 teaches claim 10.



215. In addition, as I explained above, a POSITA would have been motivated to apply Oda's teachings of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3. Therefore, Ground 2 further teaches claim 31.

12. Dependent Claims 11, 33

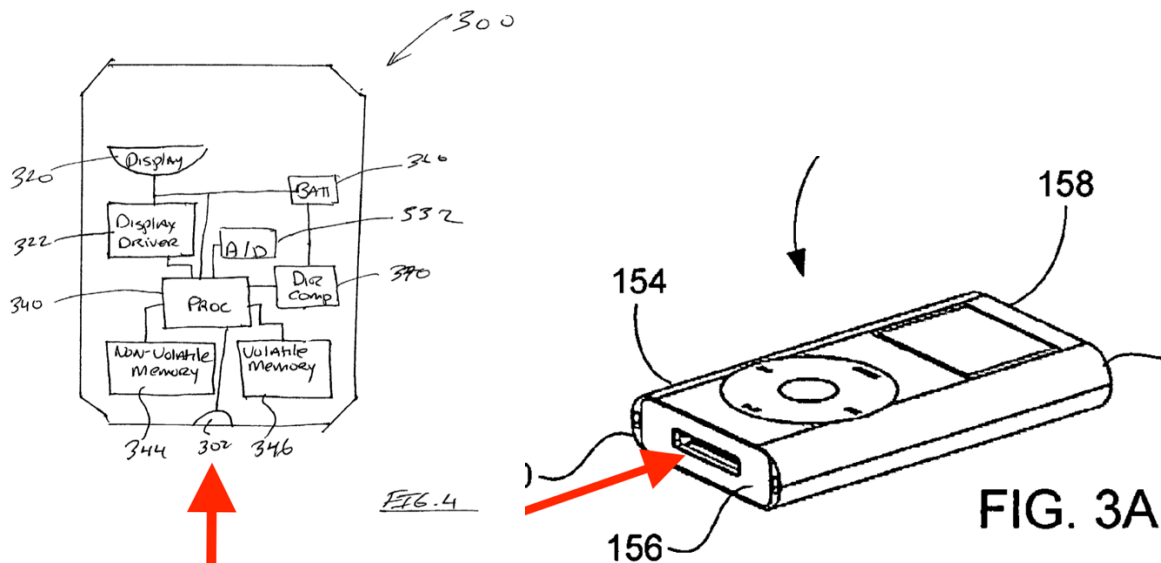
- [11] A portable electronic device according to claim 1
- [33] A mobile phone according to claim [22]⁷
further comprising a door configured to support an electronic module.

216. Ground 2 teaches claims 11 and 33, as explained below.

217. As I explained above, Ground 2 teaches a portable electronic device according to claim 1, as well as a mobile phone according to claim 22. *See* Section V.B.3. As I explained above, Nguyen teaches claim 11, at least because Nguyen teaches an expansion port such as a CompactFlash card slot. *See* Section V.A.3.

218. A POSITA would have been motivated to apply Nguyen's expansion slot teachings to the housing taught in Zadesky. For example, a POSITA would have been motivated to place the expansion port at the bottom end cap, as shown in the figures below. Zadesky already teaches that the end cap includes "an opening ... for the data port." Ex-1005, 12:34-47. Thus, a POSITA would have had a reasonable expectation of success when the expansion port is placed on the bottom end cap. *Compare* Ex-1004 (Nguyen), Fig. 4 *with* Ex-1005 (Zadesky), Fig. 3A.

⁷ Claim 33 contains a typographical error which omits the claim number from which the claim is dependent. I understand that claim 33 depends from claim 22 based on prosecution history of the '602 patent. *See* Ex-1002, 000678 (claim 57 in the application stage, which corresponds to claim 22 of the '602 patent as issued, depends from claim 46), 000703 (showing claim 46 in the application stage corresponds to claim 22 of the '602 patent as issued).



219. In addition and in the alternative, Oda teaches claim 11. As I explained above, Oda teaches a cellular (mobile) phone, which is also a type of portable electronic device. *See* Section V.B.3[22pre]. It would have been obvious that the cellular phone taught by Oda includes a SIM card in order to connect to cellular networks and perform cellular-related functionalities, such as making and receiving cellular phone calls. It would also have been obvious in the 2006 timeframe that, like any other regular mobile phones on the market, the SIM card was located in and fixed to a SIM card tray and was therefore supported by the door. The door kept the card secure and prevented it from falling out of the device, as well as protecting the card from dust and moisture. A POSITA would have understood that one possible location for the door was on an end cap of the extruded housing of the portable electronic device (or mobile phone) as taught in Zadesky.

220. To the extent that a “door” is constructed to require a cover, Oda teaches a plastic cover on the rear side of the device in, e.g., Fig. 23. It would have been obvious to use a plastic cover as a protective cover for the CompactFlash slot or the SIM card tray. This protective cover the keeps dust and moisture out of the slot (door), as well as supporting and securing the electronic module such as the CompactFlash card or the SIM card from falling out of the slot.

221. Accordingly, in addition to the teachings provided by Nguyen, Oda offers additional and alternative teachings for this claim, providing a further reason that Ground 2 teaches claim 11.

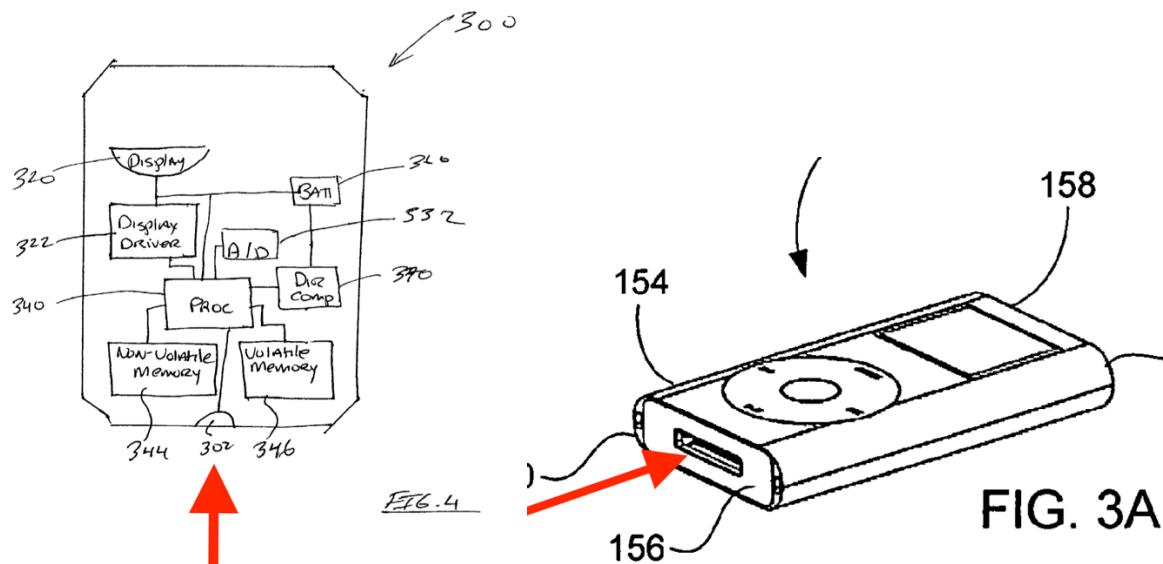
222. As I have also explained above, a POSITA would have been motivated to apply Oda’s teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B.3[1pre]/[22pre]. A mobile phone is also a portable electronic device. Accordingly, the portable electronic device (a cellular phone) comprises a door to support an electronic module. Therefore, Ground 2 teaches claims 11 and 33.

13. Dependent Claims 12, 34

- [12] A portable electronic device according to claim 11**
- [34] A mobile phone according to claim 33**
- wherein the electronic module is configured to interface to the engine section.**

223. Ground 2 teaches claims 12 and 34, as explained below.

224. As I explained above, Ground 2 teaches a portable electronic device according to claim 1, as well as a mobile phone according to claim 22. *See* Section V.B.3. As I also explained above, Nguyen alone teaches claim 12, at least because Nguyen teaches a slot for a CompactFlash card. *See* Section V.A.4. The CompactFlash card is an electronic module that interfaces to the engine section.



225. In addition and in the alternative, Oda also teaches that that **the electronic module is configured to interface to the engine section.** As I explained above for claims 11 and 33, Oda teaches a door supporting a SIM card. It would have been obvious that the SIM card is configured to interface to the engine section (such as the processor) to provide cellular functionalities, such as to transfer data with a cellular station.

226. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone (which is a portable

electronic device) to the combination of Nguyen and Zadesky. *See* Section V.B.

Therefore, Ground 2 further teaches claim 34.

14. Dependent Claims 13, 32

[13]	A portable electronic device according to claim 1 further comprising a second camera located on a front side of the portable electronic device.
------	--

[32]	A mobile phone according to claim 22 further comprising a second camera on a front side of the mobile phone.
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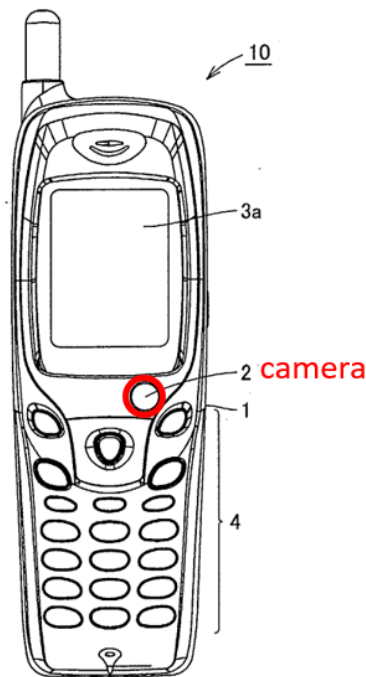
227. Ground 2 teaches claims 13 and 32, as explained below.

228. Claim 13 is substantially similar to claim 32, except that claim 13 is directed to a portable electronic device, while claim 32 is directed to a mobile phone.

229. As I explained above, Ground 2 teaches a portable electronic device according to claim 1. *See* Section V.B.3. Oda further teaches the additional limitation of claim 13, **a second camera located on a front side of the portable electronic device.**

230. Fig. 17A of Oda provides an example where a camera (camera 2) is located on the front side of the portable electronic device.

FIG.17A



231. Oda teaches various arrangements in which two cameras are provided on the electronic device. Ex-1006, ¶¶110-116; *see also* Figs. 1A, 1B, 13B, 13C. In particular, Oda teaches an arrangement in which a first camera is located on a rear side and a second camera is located on a front side of the device. Ex-1004, ¶115 (“Although not shown, such a structure may also be employed that *one of the two cameras may be arranged on the one surface (front surface) of one of the first and second bodies 1a and 1b*, and the other of the two cameras may be arranged on the other surface (rear surface) of the same body (i.e., the above one of the first and second bodies 1a and 1b).”).

232. A POSITA would have been motivated to combine Oda's teaching of a second camera located on a front side of the portable electronic device with Nguyen and Zadesky. As I explained above, Nguyen teaches a camera located on the rear side of the device. *See* Section V.A.2[1c]. A POSITA would have been motivated to add a second camera on the front side of the device, because it allows the mobile device to take photos from an opposite direction, most notably, photos of the user. As taking the user's own picture (a "selfie") is a desirable feature; the prior art provides express motivation to do so. *See* Ex-1006, ¶3 (describing that an operator takes the operator's own picture). Oda provides details regarding the arrangement of cameras in a mobile phone, including the number of cameras and their orientation. Ex-1006, ¶¶9-11, 112-115. Furthermore, having a second camera on the front face will not change the principle of operation of each camera. The incorporation of the second camera on the front side of the device retains the functionalities and principles of operation of both cameras and other components (such as the display and user input) of the device, like each does separately. Therefore, Ground 2 teaches claim 13.

233. As I have also explained, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. A POSITA would have been motivated to combine Oda's teachings of a mobile phone to the combination of Nguyen and Zadesky. Therefore, Ground 2 further teaches claim 32.

15. Independent Claim 15

234. It is my opinion that Ground 2 teaches claim 15.

[15pre] A housing for a portable electronic device comprising:

235. I understand that a preamble generally does not state a claim limitation. However, to the extent that Patent Owner argues that the preamble states a limitation, it is my opinion that it is taught by Ground 2.

236. As I explained above, limitation [15pre] is analogous to limitation [1pre] except that [15pre] recites, “[a] housing for a portable electronic device,” rather than “[a] portable electronic device.” *See* Section V.A.5. The analysis from limitations [1pre] and [1a] applies here. *See* Sections V.B.3[1pre], V.B.3[1a]. Thus, for the reasons explained above, Ground 2 teaches the preamble of claim 15.

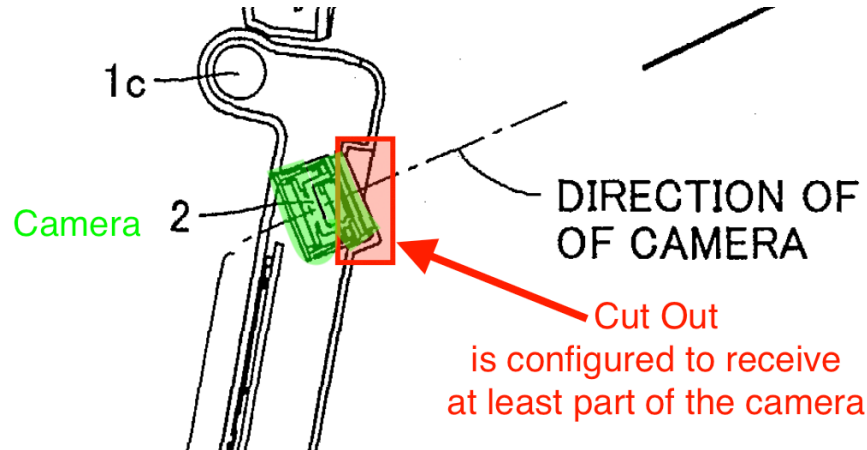
[15a] a one piece housing forming enclosed exterior lateral sides and a rear side;

237. As I explained above, limitation [15a] is analogous to limitations [1a]. *See* Section V.A.5. Thus, for the reasons explained for limitation [1a] above, Ground 2 teaches limitation [15a]. *See* Section V.A.2[1a].

[15b] a cut out in the rear side of said housing, said cut out configured to receive at least part of a camera;

238. As I explained above, limitation [15b] is analogous to limitations [1b] and [1c]. *See* Section V.A.5. Although limitation [15b] also recites “said cut out configured to receive at least part of a camera,” a POSITA would understand that

the camera, which is visible on the exterior the device as seen, for example, in Fig. 14, would need to be located in a cut out to allow the light to pass through the housing for an image to be captured. *See* Ex-1006, ¶10 (“a camera for taking a picture”). This cut out in the rear housing receives at least part of the camera.



239. The analysis from limitations [1b] and [1c] applies here. *See* Sections V.B.3[1b] and V.B.3[1c]. Thus, for the reasons explained above, Ground 2 teaches limitation [15b].

[15c] wherein the housing is configured to receive a battery and an engine section, wherein a user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device, wherein the battery and engine section are configured to be housed in the housing such that the user input section is located above the engine section and the battery, and wherein the user input section is located adjacent the battery and the engine section.

240. As I explained above, Limitation [15c] is analogous to limitations [1e] and [1f]. *See* Section V.A.6. Although limitation [15c] recites “housing is configured to receive a battery and engine section,” instead of “the battery and

engine section are housed in the housing,” a POSITA would understand that when the battery and engine section are housed in the housing, the housing is configured to receive the battery and the engine section. For the same reasons I explained above, the combination of Nguyen, Zadesky, and Oda teaches that a user input is located in an opening between the exterior lateral sides of the one piece housing of the portable electronic device. *See* Sections V.B.3[1e] and V.B.3[1f]. For the same reasons, the combination further teaches that the battery and engine section are configured to be housed in the housing such that the user input section is located above the engine section and the battery. The combination also teaches that the user input section is located adjacent the battery and the engine section. *See* Sections V.B.3[1e] and V.B.3[1f].

241. As the analysis from limitation [1e] and [1f] applies here (*see* Sections V.B.3[1e] and V.B.3[1f]), for the reasons explained above, Ground 2 teaches limitation [15c].

16. Dependent Claim 16

242. It is my opinion that Ground 2 teaches claim 16.

[16] A housing for a portable electronic device according to claim 15 further comprising: a front side extending between the lateral edges, said lateral sides and front side forming an aperture configured to receive the user input wherein the user input and the front side of the housing form a continuous front surface of the portable electronic device.

243. Ground 2 teaches the housing for a portable electronic device according to claim 15. *See* Section V.B. Claim 16 is analogous to the combination of claims 2, 4, and 6, except claim 16 omits “a front side extending from . . . the lateral sides.” These omissions do not materially alter my analysis.

244. The analysis for claims 2, 4, and 6 under Ground 2 applies here. *See* Sections V.B.4, V.B.6, V.B.8. Therefore, Ground 2 teaches claim 16.

17. Dependent Claim 17

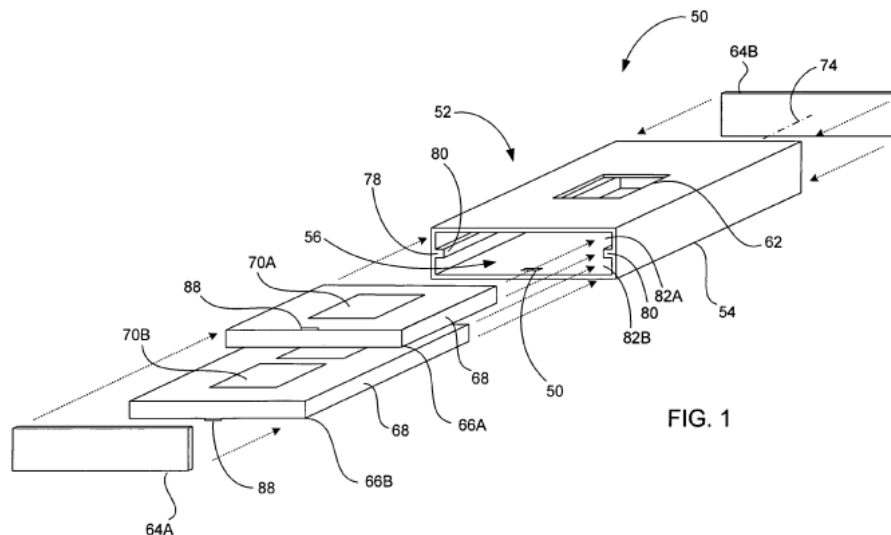
245. It is my opinion that Ground 2 teaches claim 17.

[17] A housing according to claim 15 wherein the one piece housing has been extruded.

246. The combination of Nguyen, Zadesky, and Oda teaches the housing for a portable electronic device according to claim 15. *See* Section V.B. Zadesky further teaches the additional limitation of claim 17, **wherein the one piece housing has been extruded.**

247. As explained by Zadesky, “the extrusion process produces a length of a particular cross sectional shape” and is “a continuous high volume process that produces intricate profiles and that accurately controls work piece dimensions.”

Ex-1005,8:32-51. Zadesky teaches that the one-piece housing has been extruded. For example, Zadesky teaches that the housing is “formed from an extruded tube having open ends and internal rails.” Ex-1005, 2:26-3:2; *see also* Ex-1005, 8:64-9:12, 9:36-54, 12:14-26, 19:32-20:64. Zadesky teaches that the elongated extruded tube “extends along a longitudinal axis” of the device. Ex-1005, 2:48-57.



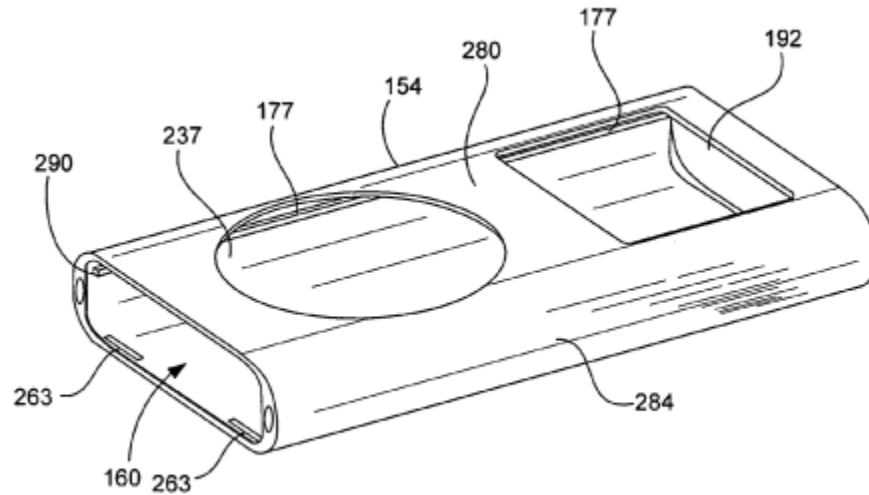


FIG. 9A

249. A POSITA would have been motivated to combine the teachings of Zadesky with the teachings of Nguyen. *See* Section V.B. Therefore, Ground 2 teaches claim 17.

18. Dependent Claim 18

[18] A housing according to claim 15 wherein the one piece housing comprises a metal.

250. The combination of Nguyen, Zadesky, and Oda teaches the housing for a portable electronic device according to claim 15. *See* Section V.B.11. Zadesky further teaches the additional limitation of claim 18, **wherein the one piece housing comprises a metal.**

251. For example, Zadesky teaches that the housing is formed “from a variety of extrudable materials or material combinations including but not limited to metals, metal alloys, plastics, ceramics and/or the like.” Ex-1005, 8:52-63; *see*

also Ex-1005, 12:27-33, 18:18-22. Zadesky further teaches that the metals may be aluminum, titanium, steel, copper, etc. Ex-1005, 8:52-63.

252. Zadesky names aluminum as an advantageous material for the one piece housing. For example, Zadesky teaches that “the main body 54 including the internal rails 80 is formed from an extruded aluminum tube.” Ex-1005, 8:64-9:12. Zadesky explains that some advantages of using aluminum include being light weight and structurally stronger, reduced tooling costs, and corrosion resistance. *Id.*; *see also* Ex-1005, 9:36-54, 12:27-33.

253. A POSITA would have been motivated to combine the teachings of Zadesky with the teachings of Nguyen and Oda. *See* Section V.B. As I have explained, both Zadesky and Nguyen seek to improve the form factor of portable electronic devices, e.g., by making the housing lighter, thinner, more rigid, and more aesthetically pleasing. Ex-1005, 1:39-53; Ex-1004, ¶2. Applying Zadesky’s teaching of one-piece metal to Nguyen would further these common goals. *See* Section V.B.3[1a]. For example, Zadesky teaches that the considerations of selecting materials for the single piece housing include strength (tensile) and density (lightweight). Ex-1005, 8:52-63. Zadesky teaches using aluminum as the metal for the housing is advantageous, in part because “it is light weight and structurally stronger.” Ex-1005, 8:64-9:12.

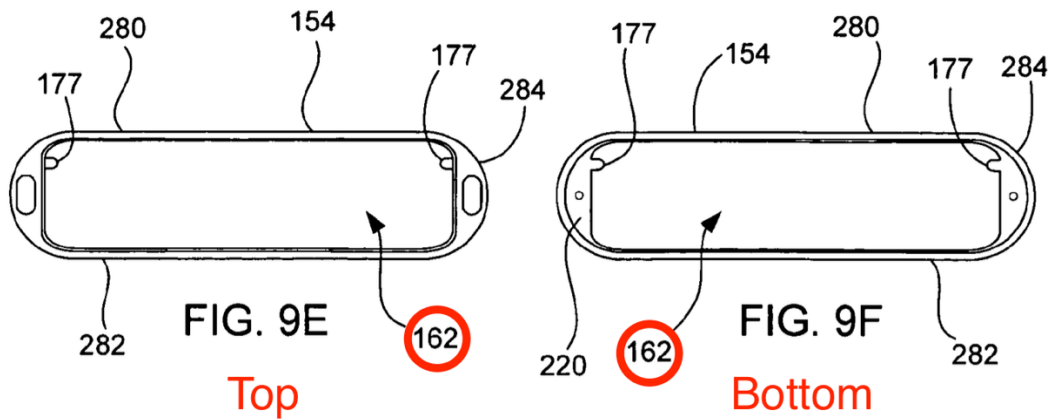
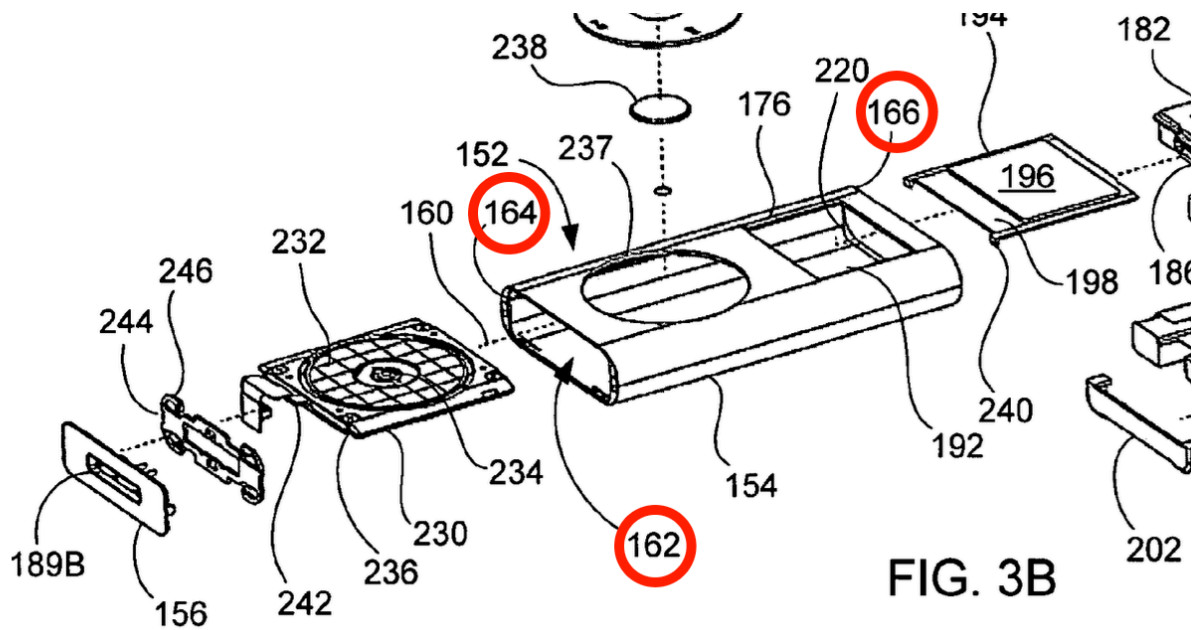
254. Therefore, Ground 2 teaches claim 18.

19. Dependent Claim 19

[19] A housing according to claim 15 wherein the housing has substantially at least one of an open top or bottom aperture.

255. The combination of Nguyen, Zadesky, and Oda teaches the housing according to claim 15. *See* Section V.B. Zadesky further teaches the additional limitation of claim 19, **wherein the housing has substantially at least one of an open top or bottom aperture.**

256. For example, Zadesky teaches that the hollow extrusion (i.e., the housing) includes open top and bottom ends. Zadesky teaches that the extrusion has a hollow core (lumen), which means an open space with two open ends that accommodates internal components. Ex-1005, 2:48-52, 4:39-67. For example, for an embodiment with rounded edges, Zadesky explains that “[t]he seamless enclosure 154 extends along a longitudinal axis 160, and includes an internal hollow core (lumen) 162 which is sized and dimension for receipt of the internal components of the computing device 150 through a first open end 164 and a second open end 166 opposite the first open end 164.” Ex-1005, 11:49-53, 14:12-51, 15:55-66, 18:23-44, 19:3-24; *see also* Figs. 3B, 9E (viewed from the top of the device), 9F (viewed from the bottom of the device), 4:25-29. Zadesky explains that a pair of end caps would cover the two open ends. *See* Ex-1005, 6:6-35, 11:53-56 (“[t]he end caps 156 and 158 cover the open ends 164 and 166 of the seamless enclosure 154 in order to provide a fully contained housing 152.”).



257. As another example, for an embodiment with square sides, Zadesky teaches that the device is of a tube-like configuration, with a main body having a cavity 56 (highlighted in red), a first open end, and a second open end. In other words, Zadesky teaches an integral extruded tube with a hollow core (lumen), or top and bottom apertures.

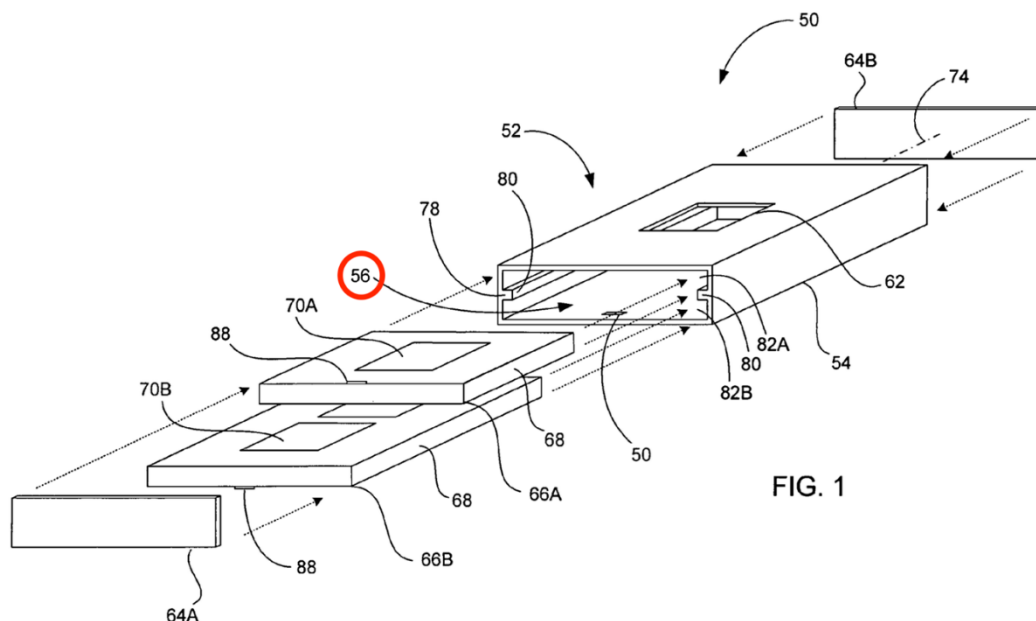


FIG. 1

258. Therefore, Ground 2 teaches claim 19.

20. Dependent Claim 20

[20] A housing according to claim 19 wherein an antenna module is located at a aperture in the housing.

259. Ground 2 teaches claim 20, as explained below.

260. The combination of Nguyen, Zadesky, and Oda teaches the housing for a portable electronic device according to claim 19. *See* Section V.B.19. Oda further teaches the additional limitation of claim 20, **wherein an antenna module is located at a aperture in the housing.**

261. For example, a POSITA would have understood that a cellular phone, such as the ones taught in Oda, requires an antenna module to perform cellular functions. Oda teaches that its cellular phone comprises an antenna module, as

highlighted in red in two representative figures below. Oda teaches a similar antenna module in other figures as well.

FIG.14

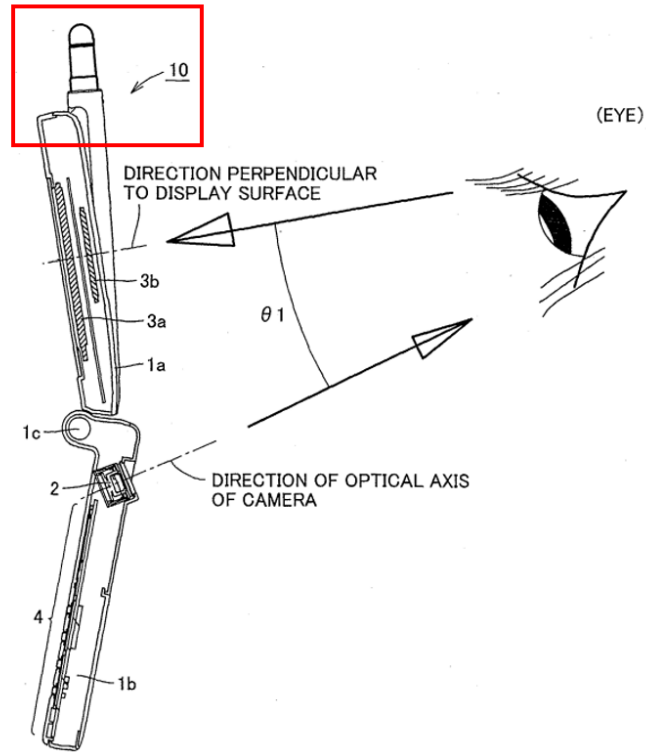
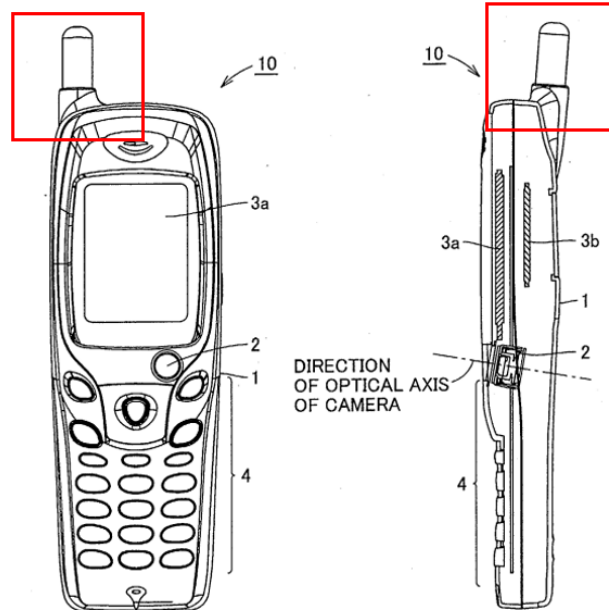


FIG.17A

FIG.17B



Ex-1006, Figs. 14, 17A, 17B.

262. The antenna module **is located at an aperture in the housing**. For example, as I explained above, Zadesky teaches that the housing is extruded with top and bottom apertures. *See* Section V.B.19. In the combination of Nguyen, Zadesky, and Oda, one option for the antenna module is to be located at the top opening (aperture) provided by Zadesky, for example as shown in the figure below.

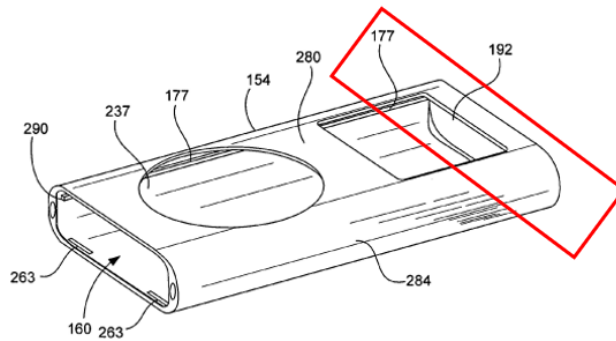


FIG. 9A

263. As shown in the figure above, the one-piece housing of the device has an opening at the top (which would be covered by an end cap). As the antenna module is located at the top opening, it is located at an aperture of the housing.

264. Although this is a preferable arrangement, a POSITA would have understood that the placement of the antenna module is not so limited. A POSITA would have understood that the antenna may be located in another opening or aperture in the housing, as long as the location of the antenna does not disrupt other components of the electronic device and the reception of the wireless signals is not blocked.

265. A POSITA would have been motivated to combine teachings of Oda with teachings of Nguyen and Zadesky. *See* Section V.B. For example, as I explained, it would have been obvious to incorporate Oda's cellular capability to the combination of Nguyen and Zadesky. *See* Section V.B.3. An antenna enables the cellular functionalities, which allows the mobile phone or other types of mobile device to communicate with a cellular base station. *See* Ex-1005, ¶117.

266. Therefore, Ground 2 teaches claim 20.

21. Dependent Claim 21

[21] A housing according to claim 20 wherein the antenna module is enclosed by an antenna cover.

267. Ground 2 teaches claim 21, as explained below.

268. As I explained above, Oda teaches that its cellular phone comprises an antenna module. In addition, Oda also teaches that the antenna module is enclosed by an antenna cover. The antenna cover is the top part (tip) of the antenna depicted in the figures, which I have highlighted below. The antenna styles shown in Oda has a domed protective cover, so that the otherwise sharp antenna module does not poke or injure the user. The same antenna cover is taught in other figures of Oda as well.

FIG.14

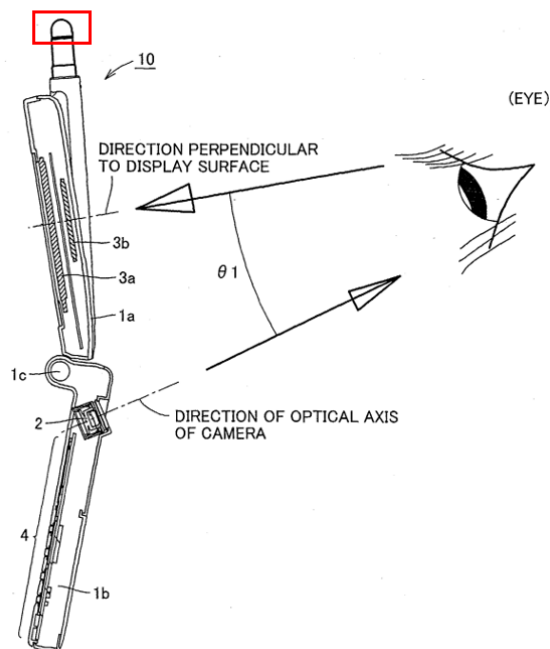
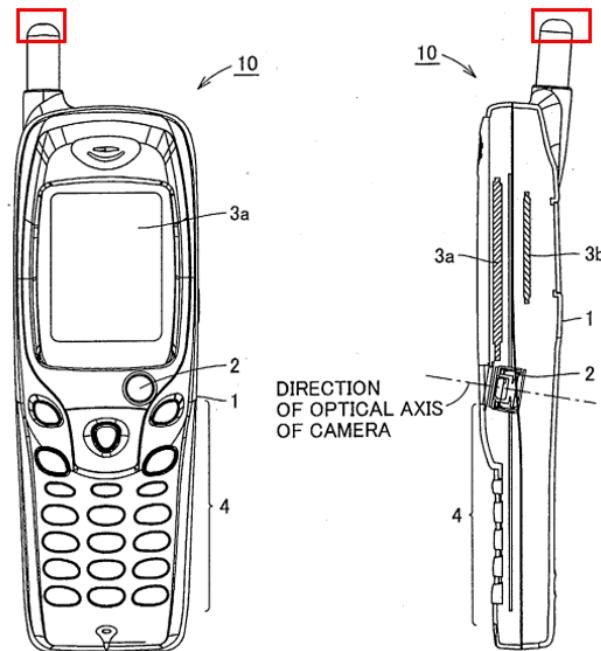


FIG.17A

FIG.17B



Ex-1006, Figs. 14, 17A, 17B.

269. Therefore, Ground 2 teaches claim 21.

22. Dependent Claim 36

[36] A mobile phone according to claim 22 wherein the transceiver is a mobile phone transceiver.

270. Oda teaches a mobile phone device, for example because it teaches that “the embodiments have been described in connection with the cellular phones.” Ex-1006, ¶117; §V.B.3[22pre]. Nguyen teaches that the device includes a transceiver. *See* §V.A.2[1d]. Therefore, the combination teaches a mobile phone transceiver. *See* §V.B.3[1d]. Further, it would have been obvious to a POSITA that a transceiver included in a mobile phone is a mobile phone transceiver to

allow the device to perform cellular communications, such as making and receiving phone calls and transferring data, as Oda teaches. Ex-1006, ¶2.

Therefore, Grounds 4 teaches claim 36.

C. Ground 3: Nguyen in View of Zadesky, Oda, and Gettemy

271. It is my opinion that a POSITA would have found claims 1-36 obvious based on the teachings of Nguyen in view of Zadesky, Oda, and Gettemy.

272. Both Nguyen and Gettemy originate from Palm, Inc. and relate to Palm portable electronic devices. Further, both Nguyen and Gettemy are directed to the form factor for mobile devices, including for example Palm Pilot-style devices. Ex-1004, ¶¶1-2. Gettemy provides additional details on the arrangement of internal components, such as the location of the a processor, memory, circuit board, battery, and transceiver, inside the device housing. Ex-1007, Fig. 4, 8C, 5:36-6:17; *see also* Sections V.C.1-2. Ground 3 combines the teachings of a portable electronic device, such as a mobile phone, as taught by the combination of Nguyen, Zadesky, and Oda with Gettemy's arrangement of internal components within the handheld device. This is a combination of prior art elements according to known methods (as taught by each reference) to yield predictable results (e.g., a portable electronic device).

273. Gettemy is directed to the same type of device as Nguyen and Zadesky. Both Nguyen and Gettemy are directed to a handheld computer, which,

like Zadesky and Oda, is a portable electronic device. Ex-1004, Abstract; Ex-1007, Abstract; Ex-1005, 5:6-14. Therefore, it would have been natural to look to Gettemy, as another Palm reference directed to handheld computers, for details regarding the precise location of internal components.

274. A POSITA would further have been motivated to combine due to the common goals of the references. Nguyen teaches that small device sizes were desired for enhanced mobility. *Id.*, ¶2 (“[S]mall sizes are desired for handheld computers to enhance mobility.”). Nguyen balances mobility with functionality (Ex-1004, ¶3) and teaches that “[t]he small size of the handheld computers are required to accommodate additional hardware components that provide the additional functionalities.” Ex-1004, ¶6. Likewise, Gettemy recognizes that a small form factor, such as one that is palm-sized, makes computer systems lightweight and “exceptionally portable and convenient.” Ex-1007, 1:15-26. Gettemy provides teachings on the internal arrangements of hardware components that would make the devices thinner and improve their mobility, furthering the common goal.

275. The references seek to make the handheld device thinner. Ex-1004, ¶3; Ex-1005, 1:39-53. For example, Zadesky describes that one of its goals is to make the enclosure of the portable electronic device lighter, thinner, stronger, and more rigid, and more aesthetically pleasing. Ex-1005, 1:39-53, 2:14-22. However,

the pursuit for a compact design of portable electronic devices inevitably raised the challenge of “having to fit the various internal components as efficiently as possible into a small housing.” Ex-1007, 1:27-30. This was more so with the increased demand for additional functions to be performed by various devices. *See* Ex-1004, ¶6.

276. Moreover, like Nguyen and Zadesky, Gettemy seeks to reduce the costs of manufacturing. For example, Zadesky teaches that, besides being smaller, lighter, and stronger, enclosures that are more cost effective are more desirable. Ex-1005, 2:14-23. Zadesky teaches that its housing is formed via an extrusion process, in part because “extrusion has low tooling costs.” Ex-1005, 8:34-51. Zadesky further teaches that the selection of the housing material also depends on tooling costs, which a POSITA would have understood to choose a housing material that minimizes the tooling costs. Ex-1005, 8:52-63. Based on the same objectives, for example, Gettemy teaches that a simplified layout design process would reduce manufacturing costs. Ex-1007, 2:11-15, 2:62-3:4. As such, applying Gettemy’s teaching of the arrangement of components within the housing to the combination of Nguyen, Zadesky, and Oda advances the common goal of reducing the costs in the manufacturing process.

277. The combination would not have changed the principles of operation for any reference. Applying Gettemy’s arrangement of internal electronic

components would not have changed the principle of operation for Gettemy, Nguyen, Oda, or Zadesky, particularly when Nguyen already taught those same components for a similar Palm form factor, as explained above. *Compare* Ex-1004, Fig. 1 *with* Ex-1007 Fig. 2; *see also* Ex-1004, ¶34; Ex-1007, 5:37-6:17. Thus the combination with Gettemy would not impact the overall form factor or exterior housing, including, for example, Zadesky's teaching of the metal housing or Oda's teachings of a cellular phone and cameras. The operation of internal electronic components in the combination would perform in the same way as they do in Nguyen, Zadesky, Oda, and Gettemy.

278. A POSITA with the given level of education and experience (defined above in Section III) would have been knowledgeable regarding layouts for these components in mobile devices and could readily have applied Gettemy's teachings, particularly since Nguyen and Gettemy both originated from Palm and are directed to similar handheld devices. Ex-1004, Fig. 1, Abstract; Ex-1007, Fig. 2, Abstract. Therefore, a POSITA would have had a reasonable expectation of success in combining the references.

1. U.S. Patent No. 6,618,044 ("Gettemy") (Ex-1007)

279. I have reviewed the Gettemy reference. I understand that Gettemy was not cited or considered during prosecution of the '602 Patent, based primarily

on the fact that Gettemy is not cited on the face of the patent, nor have I seen the reference discussed in the prosecution history.

280. Gettemy is entitled “Selectively Relocatable and Universal Interface Module with Circuitry for a Display Screen.” Gettemy was filed on May 25, 2000 and was issued on September 9, 2003. Based on the adopted priority date of March 29, 2006 of the '602 patent, I understand Gettemy is prior art to the '602 patents under at least pre-AIA §§102(a) and 102(e).

281. Gettemy is a Palm patent directed to a portable computer system form factor. Ex-1007, Abstract, 1:9-10, 5:37-54, Fig. 2.

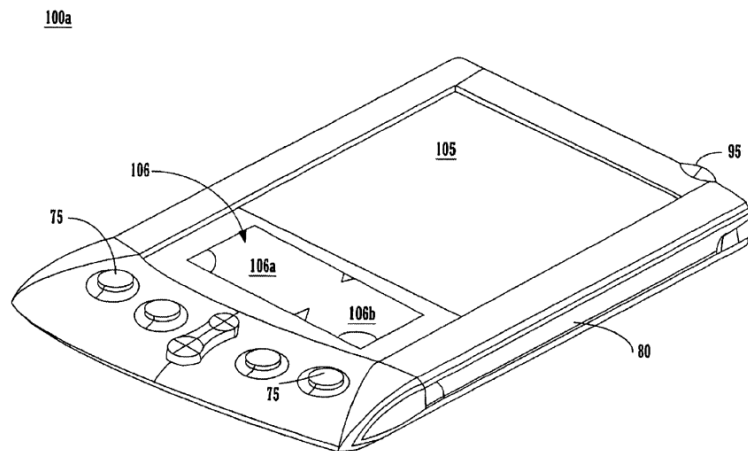


FIGURE 2

282. Gettemy provides detailed teachings regarding the locations, layout, and arrangements of the external and internal components of the portable electronic device. Ex-1007, 2:17-25. Gettemy teaches external components including a touch screen 105 and other input devices (including an alphanumeric

input device 106 and programmable buttons 75) on the front surface of the device, as well as internal components including a PC board 225, a processor, a volatile memory, a non-volatile memory, a battery 215, and a receiver/transmitter device 108. Ex-1007, 5:1-25, 5:36-6:12.

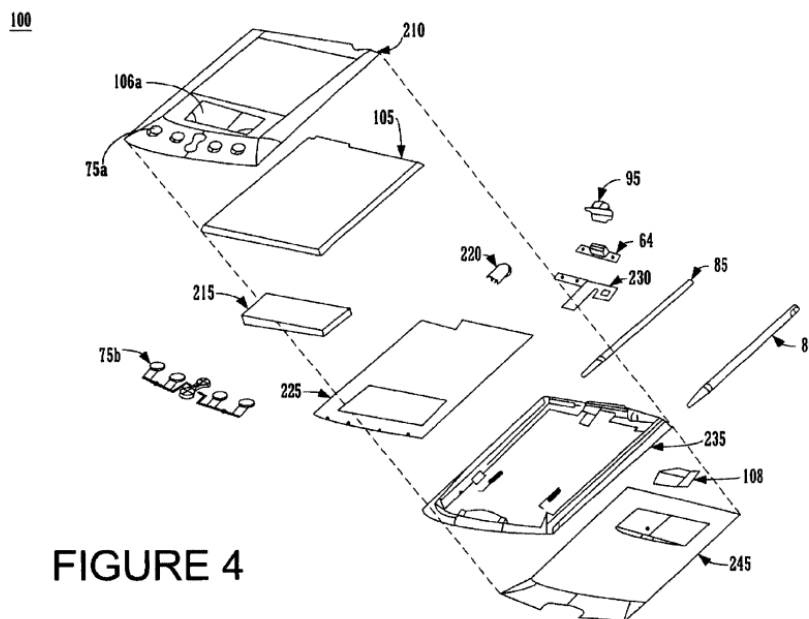


FIGURE 4

283. Gettemy is analogous art to the '602 patent because it is directed to a portable electronic device. Ex-1007, Abstract. For example, Gettemy's teachings concern the design and components of an electronic device. Ex-1007, 2:17-24.

2. Independent Claims 1, 22

[1pre]-[1c]; [22pre]-[22c]

284. I explained above how Nguyen (Ground 1) teaches limitations [1pre] through [1c], as well as the combination of Nguyen, Zadesky, and Oda (Ground 2) teach limitations [1pre] through [1c] and [22pre] through [22c]. Ground 3 relies on

the same teachings for these limitations and therefore satisfies limitations [1pre], [1a], [1b], [1c], [22pre], [22a], [22b], [22c] for the same reasons explained above for Grounds 1 and 2.

[1d/22d] an engine section comprising a printed circuit board, a transceiver, a processor and a memory;
--

285. As I explained above, the combination of Nguyen, Zadesky, and Oda teaches **an engine section comprising a printed circuit board, a transceiver, a processor and a memory**. *See* Section V.B.3[1d].

286. Gettemy reinforces Nguyen’s teaching of an engine section comprising a printed circuit board, a transceiver, a processor and a memory. For example, Gettemy teaches a printed circuit board along with a memory and processor. Ex-1007, 5:48-50 (“A flexible circuit 230 is shown along with a printed circuit (PC) board 225 containing electronics and logic (e.g., memory, communication bus, processor, etc.)”). Gettemy teaches that a processor 101 is “coupled with the bus for processing information and instructions.” Ex-1007, 5:66-6:17. Gettemy also teaches that the portable computer system includes at least two types of memory: a volatile memory 102 (e.g., random access memory, RAM) and a non-volatile memory 103 (e.g., read only memory, ROM). *Id.*

287. Gettemy further teaches that the engine section comprises a transceiver. *See* Ex-1007, 4:5-8 (“Portable computer system 100 has the ability to

transmit and receive data and information over a wireless communication interface (e.g., a radio interface).”). Specifically, Gettemy teaches the portable computer system including “both a wireless infrared communication mechanism and a signal (e.g., radio) receiver/transmitter device.” Ex-1007, 4:65-67. Gettemy further teaches that “[t]he receiver/transmitter device 108 is coupled to the antenna 85 and also coupled to communicate with the PC board 225.” Ex-1007, 5:55-65. Therefore, Gettemy teaches that the transceiver and the PCB are part of the same engine section.

288. Fig. 4 below shows the printed circuit board 225, which includes a processor 101, a volatile memory 102, and a non-volatile memory 103 (not drawn), as well as a transceiver 108. Ex-1007, Fig. 4. The printed circuit board, transceiver, processor, and memory taught in Gettemy are part of an engine section.

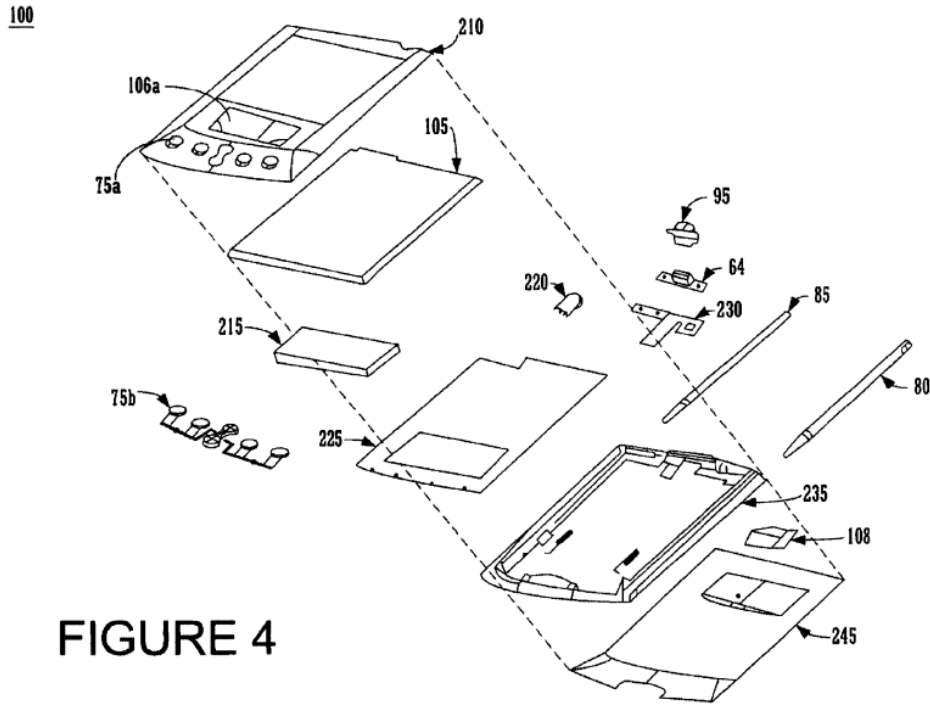


FIGURE 4

289. **Motivation to Combine and Expectation of Success.** A POSITA would have been motivated to combine Gettemy's teachings with Nguyen, Zadesky, and Oda. Nguyen and Gettemy teach a number of identical internal components. For example, both Nguyen and Gettemy teach a processor, a memory, a transceiver, and a battery. Ex-1004, ¶¶34-35, ¶39; Ex-1005, 5:37-65; *see also* Sections V.A.2[1d]-[1e], V.C.2[1d]-[1e]. Nguyen provides a block diagram illustrating these components. Ex-1004, Fig. 4. A POSITA would have been motivated to apply Gettemy's teaching of the internal arrangement of these components to the combination of Nguyen, Zadesky, and Oda because doing so would have amounted to the use of known technique to improve a similar system in the same way.

290. The references therefore provide motivation to combine because Gettemy teaches an arrangement of internal components for a thin handheld device. Ex-1007, 2:17-25. Gettemy addresses the need of “having to fit the various internal components as efficiently as possible into a small housing.” Ex-1007, 1:27-35, 2:1-10. In view of the goal of a thin, handheld form factor, recognized both Nguyen and Gettemy, a POSITA would have looked to Gettemy, both of which are designs of the Palm company, to design the layout of internal components of an electronic device in a small form factor.

291. A POSITA would have had a reasonable expectation of success when combining Gettemy’s internal layout with Nguyen and Zadesky because it merely provides additional details regarding the precise location of internal components that Nguyen (and Zadesky and Oda) already teaches. Ex-1004, ¶34. These were standard components common to most all handheld devices, including a processor, memory, transceiver, circuit board, and battery. Ex-1004, ¶34; Ex-1007, 5:37-6:17. By the relevant timeframe, I had designed numerous portable electronic devices, which included these common components.

292. Therefore, Ground 3 teaches limitation [1d].

[1e/22e]a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section;

293. As I explained above, the combination of Nguyen, Zadesky, and Oda teaches **a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section.** See Sections V.B.3[1e], V.B.3[22e].

294. To the extent that the combination of Nguyen, Zadesky, and Oda does not expressly teach that the user input section is located adjacent the battery and the engine section, Gettemy teaches these limitations. As I explained above, Gettemy teaches a user input section that is substantially similar to Nguyen's user input section. Like Nguyen, Gettemy teaches that its user input section includes a touch screen, an alphanumeric input area (e.g., a handwriting recognition pad), and programmable buttons. Ex-1007, 5:1-25.

295. For example, as shown in Fig. 4, the user input section (including the touch screen display device 105) (highlighted in red) is located adjacent to the battery 215 (highlighted in green). In addition, Gettemy teaches that the user input section (including the touch screen display device 105) (highlighted in red) is located adjacent to the engine section, which includes the PCB 225 (highlighted in blue).

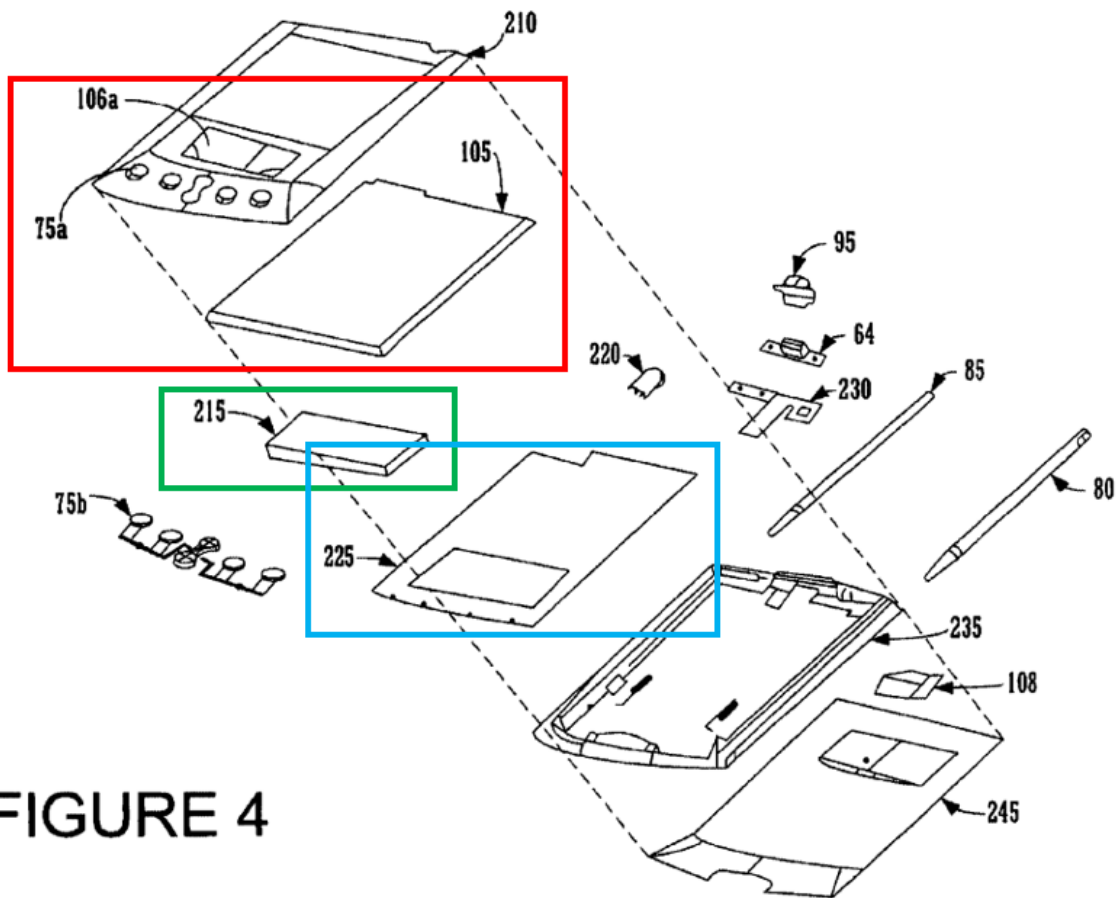


FIGURE 4

296. Gettemy also teaches this limitation through its illustration of Figs. 8A-E. As shown below in Fig. 8A (showing certain internal components from the back or bottom side of the device), a user input section, e.g., a touch screen 105 (highlighted in red), is located adjacent to a battery 820 (highlighted in green), as well as two flexible circuits 630 and 640 and interface module 620 (highlighted in blue). Ex-1007, 9:18-34 (“[I]nterface module 620 is positioned in a location behind (below) display device 105 and coupled to interface module 620 using first flexible circuit 630. With interface module 620 in this position, space is available

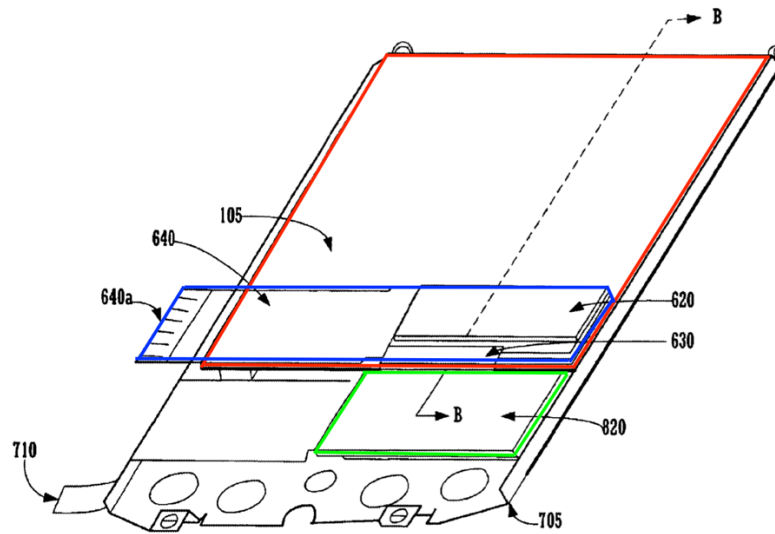
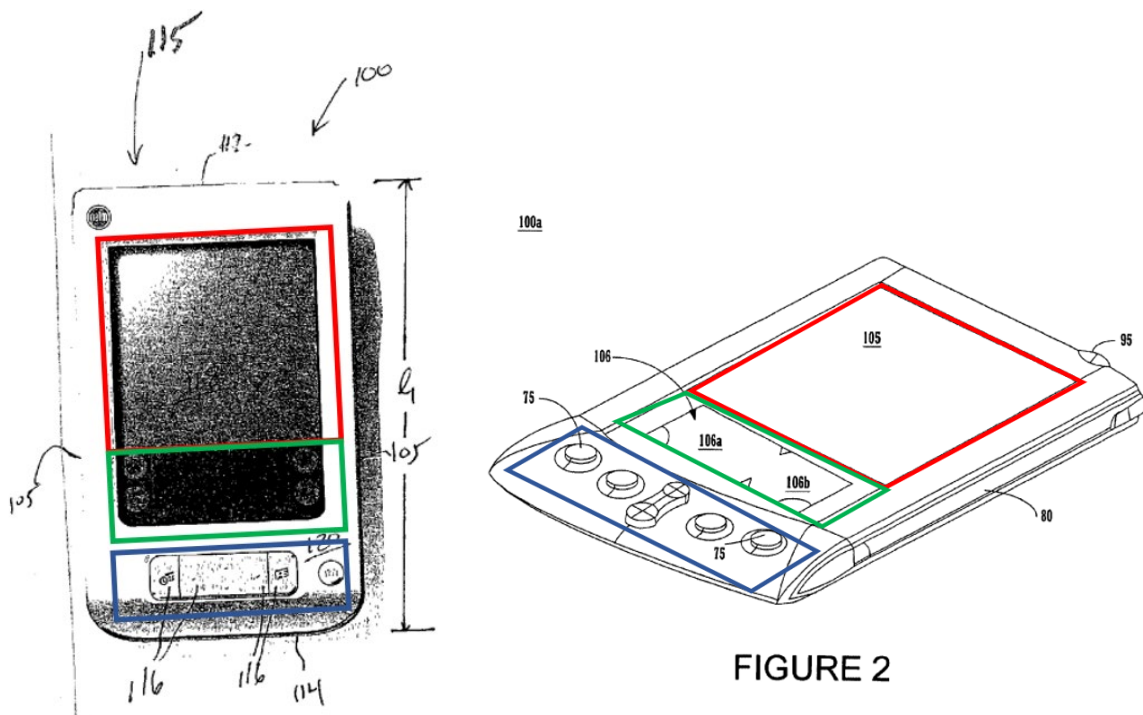


FIGURE 8A

297. Gettemy teaches that an interface module contains circuitry needs to connect with and operate devices and is coupled to the printed circuit board. Ex-1007, Abstract. A POSITA would have understood, and it would have been obvious, that a flexible circuit 630 and an interface module 620 are part of the engine section because they contribute to the signal processing of the mobile device. Therefore, Gettemy also teaches that the user input section is located directly adjacent the battery and the engine section.

298. **Motivation to Combine and Expectation of Success.** A POSITA would have been motivated to apply the teachings of Gettemy to a device taught by

the combination of Nguyen, Oda, and Zadesky. For example, Nguyen and Gettemy teach substantially similar user input sections. Nguyen teaches a contact sensitive display, an alphanumeric input area (e.g., a handwriting recognition area), and application buttons. Ex-1004, ¶22. Similarly, Gettemy teaches a touch screen, an alphanumeric input area (e.g., a handwriting recognition pad), and programmable buttons. Ex-1007, 5:1-25. I have highlighted the touch screens in red, alphanumeric input area in green, and buttons in blue on both devices.



299. The combination would not have changed the principles of operation for any reference. Gettemy's teaching regarding the arrangement of the user input section and internal electronic components would not have changed the principle

of operation for Gettemy, Nguyen, Zadesky, or Oda, particularly when Nguyen already taught those same components for a similar Palm form factor, as explained above. *Compare* Ex-1004, Fig. 1 *with* Ex-1007 Fig. 2; *see also* Ex-1004, ¶34; Ex-1007, 5:37-6:17. For example, the combination with Gettemy would not impact the overall form factor or the exterior input section.

300. Therefore, Ground 3 teaches limitations [1e] and [22e].

- [1f] **wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.**
- [22f] **wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the mobile phone.**

301. As I explained above, the combination of Nguyen and Zadesky teaches **the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.** *See* Section V.B.3[1f].

302. As I explained above, Nguyen describes the internal components of the portable electronic device in a block diagram. *See* Section V.A.2[1d]. Gettemy specifically shows the battery and engine sections are housed in the housing in the exploded view shown in Fig. 4. Furthermore, in the combination of Nguyen and Zadesky, the extruded housing has the user input in an opening between the lateral sides of the one piece housing. *See* Section V.B.3[1f].

Therefore, Ground 3 teaches the limitation [1f]. *See* Section V.C.2 (explaining motivation to combine Gettemy with Nguyen and Zadesky).

303. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 3 further teaches limitation [22f].

3. Dependent Claims 7, 28

[7] A portable electronic device according to claim 6

[28] A mobile phone according to claim 27

further comprising a bracket wherein the user input section and the one piece housing define an interior volume and the bracket is configured to support said user input section.

304. Ground 3 teaches claims 7 and 28, as explained below.

305. As I have explained above, the combination of Nguyen, Zadesky, and Oda (Ground 2) teaches claims 7 and 28.

306. Gettemy further teaches **a bracket wherein the user input section and the one piece housing define an interior volume and the bracket is configured to support said user input section.** Gettemy reinforces Nguyen's teaching that **the user input section and the housing define an interior volume.** For example, as I explained above, Gettemy teaches that the touch screen display device 105, dedicated and/or programmable buttons 75, and a hand recognition pad

106 are located on the top surface of the device. *See* Section V.C.2[1e]. Gettemy further teaches that electronics and logic, such as memory and processor, are located inside the housing of the portable computer system. Ex-1007, 5:37-6:16, Figs. 4, 5. Therefore, Gettemy reinforces Nguyen's teaching that the user input section and the housing define an interior volume.

307. As I explained above, Ground 2 also teaches **a bracket ... configured to support said user input section**, for example through Zadesky's teaching of internal rails. *See* Section V.B.9.

308. To the extent that the "bracket" must refer to a separate mounting bracket, Ground 3 teaches these claims. Gettemy expressly teaches a mounting bracket that supports the user input section. For example, Gettemy teaches a bracket (705) installed inside a portable computer system. Gettemy teaches that certain components are mounted on the bracket, as shown in Fig. 8B below. Ex-1007, 9:10-10:8, Fig. 8B; *see also* Ex-1007, Figs. 7A-8E. I have highlighted the bracket in red.

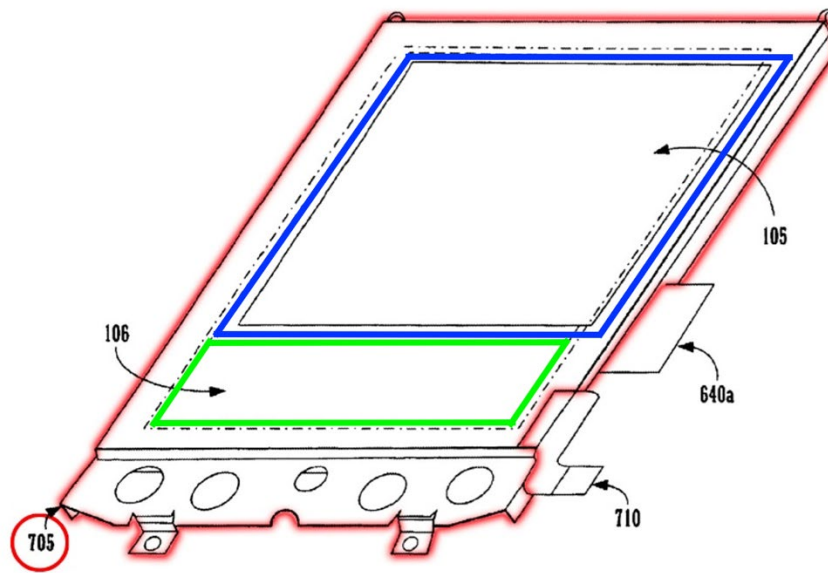


FIGURE 8B

309. For example, as seen in Fig. 8B, Gettemy teaches that a “relocatable interface module 620 for a display device 105” is mounted on the bracket. Ex-1007, 9:10-17; *see also* Ex-1007, 8:33-40. Gettemy teaches that the interface module provides “universal interface with any of the various types of display technologies.” Ex-1007, 6:66-7:8. As a particular example, Gettemy teaches that the display device 105 (highlighted in blue) is a touch screen, which is part of the user input section. Ex-1007, 5:1-12. Therefore, Gettemy teaches that the bracket supports the user input section.

310. As another example of the user input, Fig. 8B shows that the alphanumeric input device 106 (highlighted in green), which is also part of the user input section, is also mounted on the bracket 705. Ex-1007, 9:10-16, 35-39, 48-52.

Thus, Gettemy teaches that a separate mounting bracket is configured to support a user input section.

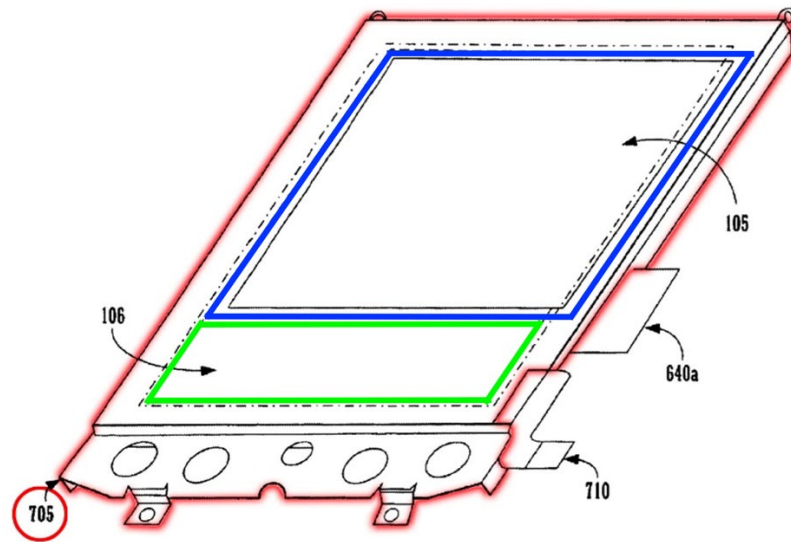


FIGURE 8B

311. Therefore, Ground 3 teaches claim 7.

312. As I have also explained above, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. Therefore, Ground 3 further teaches claim 28.

4. Dependent Claims 8, 29

- | | |
|------|---|
| [8] | A portable electronic device to claim 1 |
| [29] | A mobile phone according to claim 22 |
| | wherein the battery is located adjacent the engine section in a side by side arrangement. |

313. Ground 3 teaches claims 8 and 29, as explained below.

314. As I have explained above, Ground 3 teaches a portable electronic device according to claim 1 and a mobile phone according to claim 22. *See* Section V.C.2.

315. As I also explained above, Nguyen teaches that the housing contains a battery and an engine section. *See* Section V.A.2[1d], [1e]. To the extent that Nguyen does not explicitly teach the battery is located adjacent the engine section in a side by side arrangement, Gettemy teaches this limitation. For example, as shown in Fig. 4, below, Gettemy teaches that the battery 215 (highlighted in green) is located adjacent the PC board 225 (highlighted in blue), which is a primary part of the engine section and contains electronics and logic components such as a processor and memory, in a side by side arrangement.

100

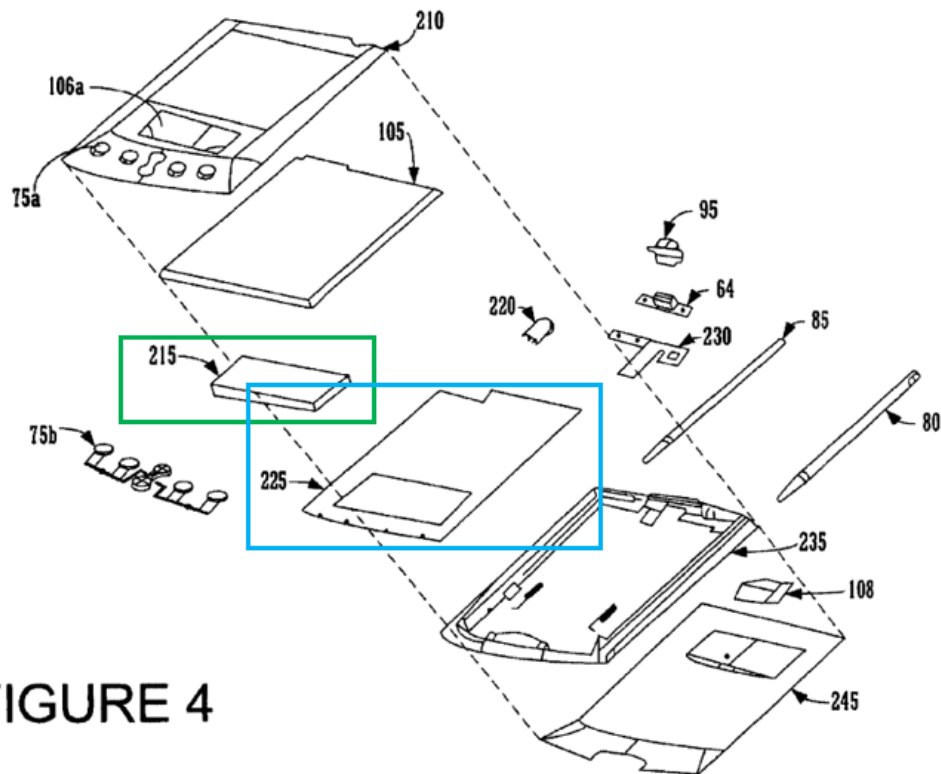


FIGURE 4

316. Gettemy also teaches this limitation through its illustration of Fig. 8C. As shown in Fig. 8C, below, the battery 820 is located adjacent flexible circuits 630 and 640 and an interface module 620 in a side by side arrangement. Ex-1007, 9:18-47. As I have explained above for limitation [1e], a flexible circuit 630 and an interface module 620 are part of the engine section. Therefore, Gettemy's Fig. 8C also teaches that the user input section is located directly adjacent the battery and the engine section.

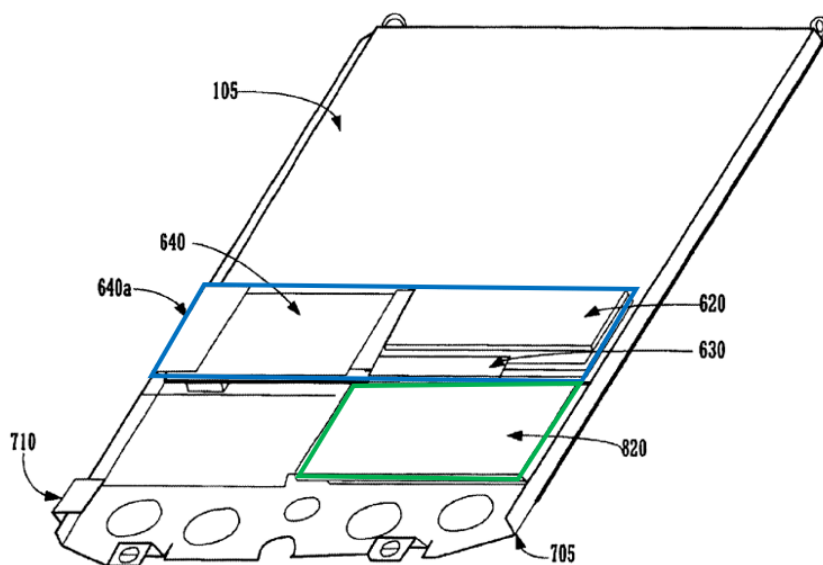
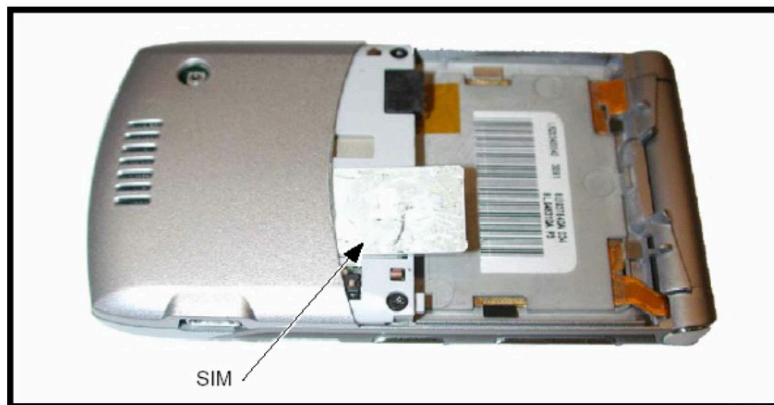
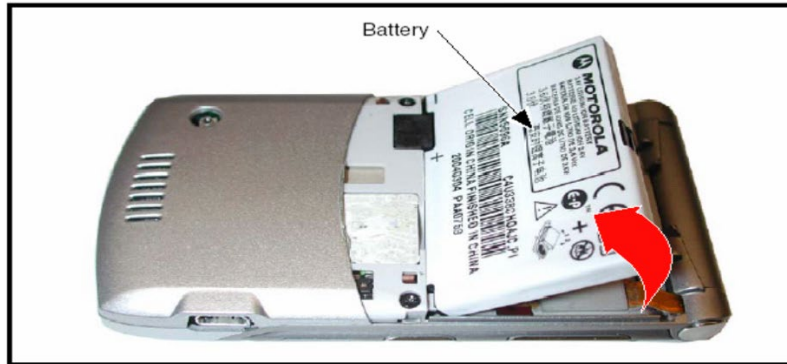


FIGURE 8C

317. Indeed, it would have been obvious in the 2006 timeframe that the battery is located adjacent the engine section in a side by side arrangement. For example, the Motorola RAZR, which the applicant admitted was prior art (*see* Ex-1001, 1:23-39), had a side by side arrangement of the battery and the engine section. *See* Ex-1015, 000015-16.



318. Therefore, Ground 3 teaches claim 8.

319. As I have also explained above, Oda teaches a mobile phone. *See* Section V.B.3[22pre]. Therefore, Ground 2 further teaches claim 29.

5. Dependent Claims 11, 33

- [11] A portable electronic device according to claim 1
- [33] A mobile phone according to claim [22]⁸
further comprising a door configured to support an electronic module.

320. Ground 3 teaches claims 11 and 33, as explained below.

321. As I explained above, the combination of Nguyen, Zadesky, and Oda (Ground 2) teaches claims 11 and 33 for at least two reasons: first, Nguyen teaches an expansion slot that supports a CompactFlash card; second, Oda teaches a door that supports a SIM card. *See* Section V.B.12.

322. Gettemy reinforces Nguyen’s teaching of an expansion slot that accommodates an external storage device. For example, Gettemy teaches that “the present invention provides flexibility in the layout design process, and it also provides flexibility if there is a need to make modifications to a design as a result of changes to existing features (such as a new location for *an expansion slot*).” Ex-1007, 7:13-27 (emphasis added); *see also* Ex-1007, 2:1-10. A POSITA would have understood that Gettemy teaches an expansion slot to expand the device’s

⁸ Claim 33 contains a typographical error which omits the claim number from which the claim is dependent. I understand that claim 33 depends from claim 22 based on prosecution history of the ’602 patent. *See* Ex-1002, 000110 (claim 57 in the application stage, which corresponds to claim 22 of the ’602 patent as issued, depends from claim 46), 000695-96 (showing claim 46 in the application stage corresponds to claim 22 of the ’602 patent as issued).

storage. Further, Gettemy teaches that the “[p]ortable computer system 100 also includes an optional data storage device 104 (e.g., memory stick) coupled with the bus 110 for storing information and instructions.” Ex-1007, 5:66-6:17. Gettemy also teaches that “[d]ata storage device 104 can be removable.” *Id.* As is well-known to a POSITA, a memory stick has similar functions and purposes to a CompactFlash card, e.g., providing removable external storage to the portable computing device. Therefore, Gettemy reinforces Nguyen’s teaching of a door that supports the electronic module such as an external storage device.

323. To the extent that a “door” is constructed to require a cover, Oda teaches a plastic cover on the rear side of the device for a battery storage compartment as depicted in Fig. 3, as shown below.

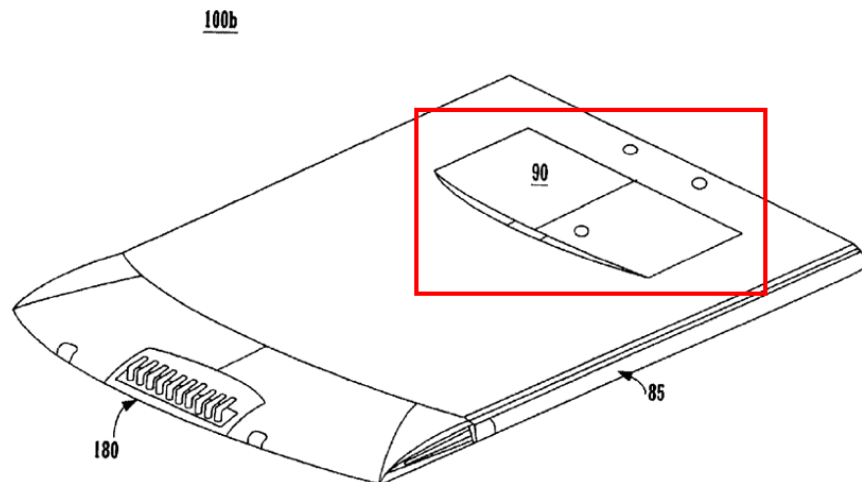


FIGURE 3

324. It would have been obvious to use a plastic cover as a cover for the door of the storage card (i.e., an expansion port) or SIM card (i.e., a SIM tray) -- it was also typical at this time to have the battery and electronic modules such as flash cards and or SIM card protected with the same door cover. In addition, the expansion port or the SIM tray may be optionally placed at the back, providing a motivation to use the cover like the one above. Gettemy teaches flexibility of design process and making modifications to the design. Ex-1007, 7:22-28; *see also* Ex-1007, 2:1-14, 7:10-37. A POSITA would have understood that Gettemy teaches moving the expansion slot or the SIM tray to be accessible for the user. If the expansion slot or SIM tray is moved to the back, the storage card and SIM card could be removed conveniently by the user through the door that resembles the battery cover.

325. Therefore, in addition to the teachings in Nguyen and Oda as I explained, Gettemy provides a further reason that Ground 3 teaches claim 11.

326. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 3 also teaches claim 33.

6. Dependent Claims 12, 34

- [12] A portable electronic device according to claim 11**
- [34] A mobile phone according to claim 33**
- wherein the electronic module is configured to interface to the engine section.**

327. Ground 3 teaches claims 12 and 34, as explained below.

328. As I explained above, the combination of Nguyen, Zadesky, and Oda (Ground 2) teaches claim 12 and 34 for at least two reasons: first, Nguyen teaches a CompactFlash card that is configured to interface to the engine section; second, Oda teaches a SIM card that is configured to interface to the engine section. *See* Section V.B.13.

329. As I also explained above for claim 11, Gettemy reinforces Nguyen's teaching of an expansion slot. *See* Section V.A.3, V.C.5. Accordingly, Gettemy reinforces Nguyen's teaching that the electronic module (such as a storage card) is configured to interface to the engine section. *See* Sections V.A.4, V.B.13.

330. For example, Gettemy teaches that "[p]ortable computer system 100 includes an address/data bus 110 for communication information, a central processor 101 coupled with the bus for processing information and instructions." Ex-1007, 6:1-4. As I explained above, Gettemy further teaches that the system includes "an optional data storage device 104 (e.g., memory stick) coupled with the bus 110 for storing information and instructions." Ex-1007, 6:8-12; *see also* Ex-

1007, Fig. 5. Therefore, a POSITA would have understood, and it would have been obvious, that an optional data storage device, such as a CompactFlash card or a memory stick, interfaces with the engine section.

331. Therefore, in addition to the teachings in Nguyen and Oda as I explained, Gettemy further teaches claim 12 in the combination.

332. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 3 also teaches claim 34.

7. Dependent Claims 14, 35

[14] A portable electronic device according to claim 1

[35] A mobile phone according to claim 22

wherein the user input section is located directly adjacent the battery and the engine section.

333. Ground 3 teaches claims 14 and 35, as explained below.

334. As I have explained above, Nguyen (Ground 1) teaches a user input section located above the engine section and a battery. *See* Section V.A.2[1e].

335. To the extent that Nguyen does not expressly teach this claim, Gettemy provides additional teachings that reinforce and complement Nguyen's teaching. As shown in Fig. 4, the user input (highlighted in red), including the touch screen device 105, dedicated and/or programmable buttons 75, and a

handwriting recognition pad (e.g., an alpha-numeric input device 106), are located directly above (adjacent) the battery 215 (highlighted in green) and the engine section (shown with PC board 225, highlighted in blue).

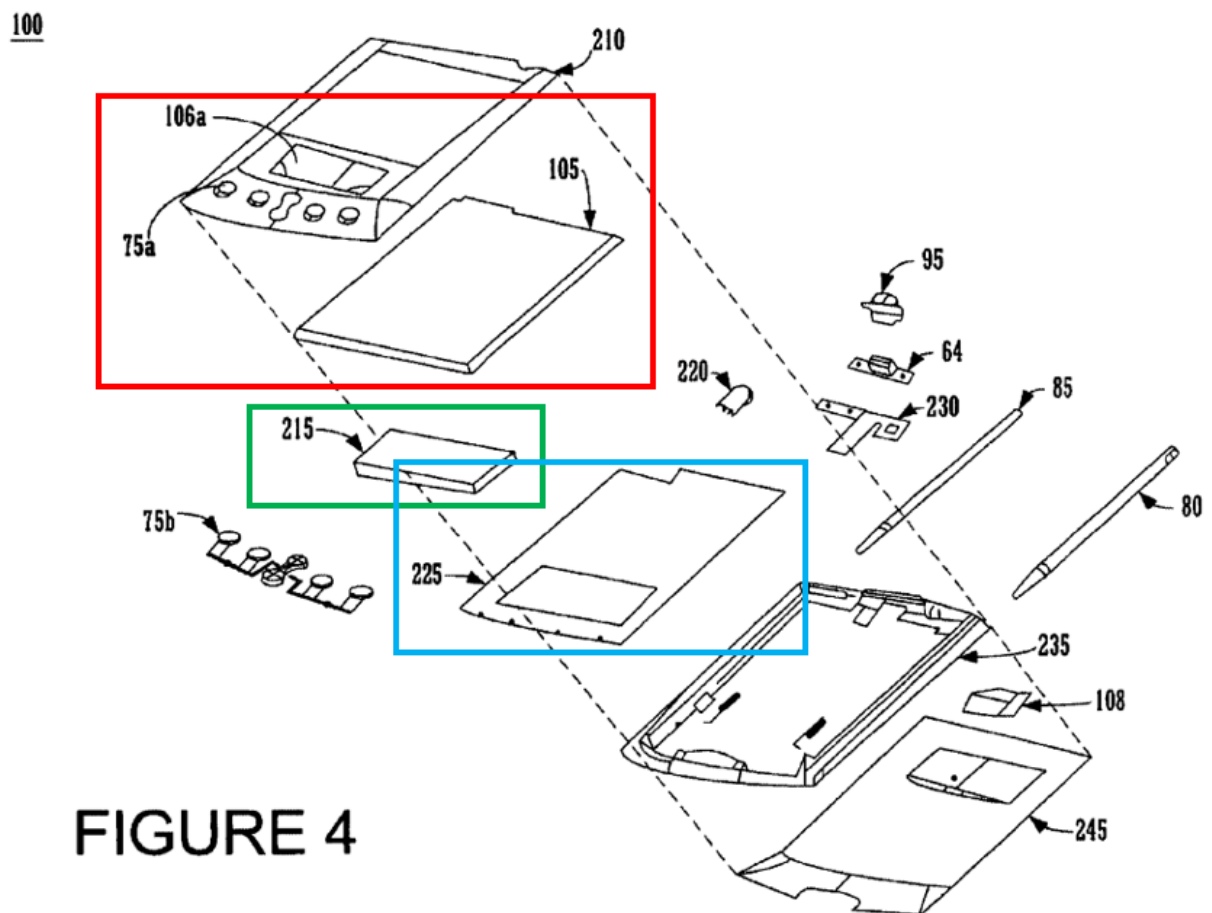


FIGURE 4

336. Gettemy also teaches this claim through its illustration of Fig. 8A. As shown in Fig. 8A, below, a touch screen 105 (highlighted in red) of the user input section is located directly adjacent to a battery 820 (highlighted in green) and the engine section (including two flexible circuits 630 and 640 and interface module 620) (highlighted in blue). Ex-1007, 9:18-39 (“[I]nterface module 620 is

positioned in a location behind (below) display device 105 and coupled to interface module 620 using first flexible circuit 630. With interface module 620 in this position, space is available adjacent to display device 105, and thus a component 820 (e.g., a battery) can be installed in the available space.”); *see also* Ex-1007, Fig. 8B. As I have explained above for limitation [1e], a flexible circuit 630 and an interface module 620 are part of the engine section. Therefore, Gettemy’s Fig. 8B, seen from above, and Fig. 8A, seen from below, teaches that the user input section is located directly adjacent the battery and the engine section.

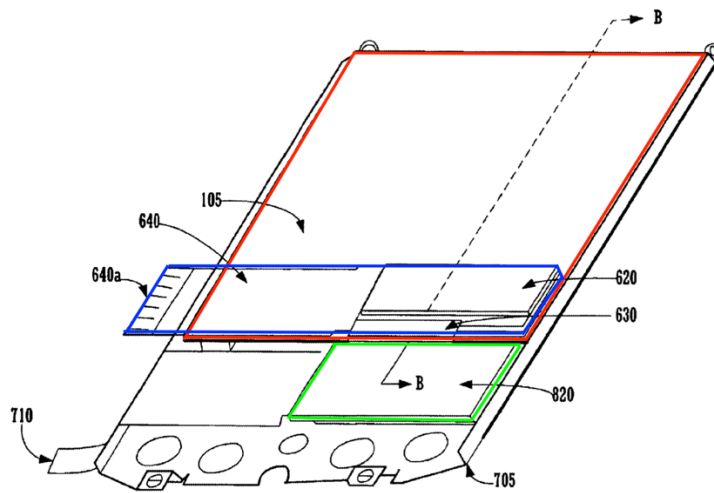


FIGURE 8A

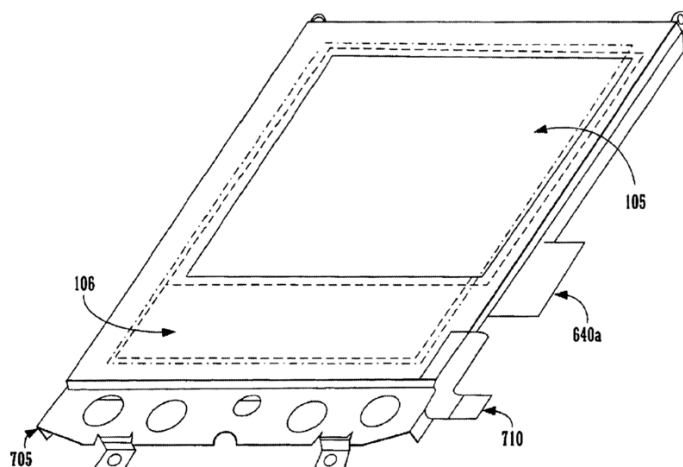


FIGURE 8B

337. Therefore, Ground 3 teaches claim 14.

338. As I have also explained above, a POSITA would have been motivated to apply Oda's teaching of a mobile phone to the combination of Nguyen and Zadesky. *See* Section V.B. Therefore, Ground 3 also teaches claim 35.

8. Dependent Claim 20

[20] A housing according to claim 19 wherein a antenna module is located at a aperture in the housing.

339. As I have explained above, the combination of Nguyen, Zadesky, and Oda teaches claim 20, for example through Oda's teaching of an antenna. *See* Section V.B.20. Gettemy reinforces the teachings because Gettemy teaches an "antenna" that is coupled to a receiver/transmitter device. Ex-1007, 5:29-30, 5:53-54, 5:59-61. Thus, Ground 3 teaches claim 20.

9. Dependent Claim 21

[21] A housing according to claim 20 wherein the antenna module is enclosed by a antenna cover.

340. As I have explained above, the combination of Nguyen, Zadesky, and Oda teaches claim 21, for example through Oda's teaching of an antenna tip. *See* Section V.B.20. Gettemy reinforces the teachings because Gettemy teaches an "antenna" that is coupled to a receiver/transmitter device. Ex-1007, 5:29-30, 5:53-54, 5:59-61. Therefore, Ground 3 teaches claim 21.

10. Claims 2-6, 9, 10, 13, 15-19, 23-27, 30-32, 36

341. The combination of Nguyen, Zadesky, and Oda teaches these claims, as explained for Ground 2. *See* Section V.B. Therefore, Ground 3 teaches these claims. *See* Section V.C.2 (explaining motivation to combine Gettemy with Nguyen, Zadesky, and Oda).

VI. BACKGROUND AND QUALIFICATIONS

342. This section contains a summary of my educational background, career history, publications, and other relevant qualifications. My full curriculum vitae is attached as Appendix 1 to this declaration.

343. I am currently a tenured Full Professor at Purdue University in the Industrial Design Program. I have been teaching at Purdue since 1989. In 1996–97, I served as a Fulbright Professor at the University of Art and Design Helsinki.

I have been involved in industrial design for 38 years and have experience in both the practical and academic areas of the industrial design field.

344. I received a Master of Fine Arts degree in Industrial Design in 1988 from the University of Illinois at Urbana-Champaign. I have also received a Bachelor of Art degree with a major in Fine Art in 1982 from Northwestern College, Orange City, Iowa.

345. Before teaching, I worked as an industrial designer at Hari and Associates in Skokie, Illinois. I have designed a variety of products as an industrial designer. I have designed consumer products including electronics and other product designs during my 30+ years of design experience, a few examples are: cell phones for Samsung, an iPod speaker for Klipsch, a hand controller for BraunAbility, and a video game controller for ExerTron for use with a Nintendo video game system, fishing pliers, handheld deep tissue therapy tools, the Kudo Crafters Clamp and a USB drive for Filadex.

346. I have participated in numerous design competitions and exhibitions worldwide, and my design work has been recognized nationally and internationally. My designs have received recognition at various international design competitions, including; Award of Excellence in the Taiwan International Design Competition, Finalist in the Korean International Travel Souvenir Design Competition, Second Place in Neste Forma Finlandia 3 International Plastic Design

Competition, and Silver Winner in Idea95 Industrial Designers Excellence Award, A'Design Gold, and an IDA Gold.

347. My designs have been exhibited both nationally and internationally, including at the Museum of Modern Art in New York, the Cooper Hewitt National Design Museum (Smithsonian) in New York, the Groninger Museum (Netherlands), the Veletrzní Palác Prague (Czech Republic), and the Biennale Internationale Design 2000 and 2002, which was sponsored by the Museum of Modern Art in Saint-Étienne (France).

348. I am a named inventor of 12 issued patents, and my designs have been reproduced in various publications. For example, my designs have been published in several periodicals: I.D. Magazine, Domus Magazine, Innovation (IDSA), Design (London), Plastics, Design Kunststoff (Germany), Design (Taiwan), and Machine Design. My designs have also been published several books; Chair Show 4, Mutant Materials in Contemporary Design (MOMA), Design Now, Convergence of Art and Design International, and Access by Design.

A. Compensation

349. For my efforts in connection with the preparation of this declaration I have been compensated at my standard rate for this type of consulting activity. My compensation is in no way contingent on the results of these or any other proceedings relating to the above-captioned patent.

B. Materials and Other Information Considered

350. I have considered information from various sources in forming my opinions. I have reviewed and considered each of the exhibits listed in the attached Appendix 2 (Materials Considered in the Preparation of This Declaration) in forming my opinions.

VII. UNDERSTANDING OF THE LAW

351. I am not an attorney. In forming my opinions in this Declaration, I applied the relevant legal principles provided to me by counsel, which are summarized in Appendix 4.

VIII. RESERVATION OF RIGHTS

352. My opinions are based upon the information that I have considered to date. I am unaware of any evidence of secondary considerations with respect to the '046 Patent that would render any of the challenged claims non-obvious. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the owner of the '046 Patent and to take into account new information that becomes available to me.

353. 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.

Executed on June 30, 2024.

By:

A handwritten signature in blue ink, reading "Steven Visser". The signature is fluid and cursive, with the first name "Steven" and last name "Visser" clearly legible.

Steven Visser

APPENDIX 1: CURRICULUM VITAE OF STEVEN VISSER

Curriculum Vitae

Steve Visser

Education

- 1988 **University of Illinois at Champaign-Urbana**
MFA in Industrial Design
- 1982 **Northwestern College**
BA in Fine Arts, Sculpture

Academic Appointments

- 2006-Present **Professor**
Industrial Design
Patti and Rusty Rueff School of Design, Art and Performance
Purdue University
- 1996-2006 **Associate Professor**
Industrial Design
Patti and Rusty Rueff School of Visual and Performing Arts
Purdue University
- 1990-1996 **Assistant Professor**
Industrial Design
Department of Visual and Performing Arts
Purdue University
- 1989-1990 **Visiting Assistant Professor**
Industrial Design
Department of Creative Arts
Purdue University
- 1986-1988 **Teaching Assistant**
University of Illinois at Champaign-Urbana

Professional Positions

- 1990-Present **Steve Visser Design**
Industrial Design Consultant
West Lafayette, IN
- 2005-2014 **DesigNapkin**
Co-Founder
West Lafayette, IN
- 1988-1989 **Hari and Associates**
Industrial Designer
Skokie, IL

Awards and Honors

2021	DAC World's Leading Designers World's 7 th Best Designer in 2021 Leading Expert in Differently Abled and Senior's Assistance Design
2019	Distinguished Professor (2019-2022) School of Art and Design, Wuhan University of Technology, Wuhan, China
2018	Appliance Design: Excellence in Design Award Gold Prize (see Design Competitions and Exhibitions)
2017	A'Design Award & Competition Gold Award (see Design Competitions and Exhibitions)
2015	SAI Faculty Fellow Domus Academy, Milan, Italy (see Fellowships and Residencies)
2014	Associate Fellow American Academy in Rome, Rome, Italy (see Fellowships and Residencies)
2007	Honorary Professor Nanjing University of Science and Technology, Nanjing, China
2005	Regional Competition: Indiana Venture Idol Winner: Coolest Idea (see Design Competitions and Exhibitions)
2004	National Design Competition: ID Magazine Honorable Mention (see Design Competitions and Exhibitions)
2003	Taiwan International Design Competition Award of Excellence (see Design Competitions and Exhibitions)
2003	International Eyewear Design Competition: Opus Design Award Award Winner (see Design Competitions and Exhibitions) Japan
1999	Malaysian Polytechnic Curriculum Development Project Politeknik Johor Bahru, Pasir Gudang, Malaysia (see Grants)
1997	Fulbright Scholar University of Art & Design Helsinki, Helsinki, Finland (see Fellowships and Residencies)
1995	National Design Competition: Idea95 Industrial Designers Excellence Award Silver Winner (see Design Competitions and Exhibitions)
1993	Neste Forma Finlandia 3 International Plastic Design Competition 2 nd Place (see Design Competitions and Exhibitions) Finland

Membership

1992-Present	Industrial Designers Society of America (IDSA)
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Design Competitions and Exhibitions

- 2021 **Red Dot Award**
Finalist
4110 entries from 49 countries
Design Concept 2021
Category: Bathroom and Hygiene
July 4
Pompeii Washbasin
- 2019 2019 KSBDA World Culture and Shaping Invitational Exhibition
Russian State University
Moscow, Russia
August 20-30, 2019
Industrial Designer: Steve Visser
Herculano Coffee Table
- 2018 **Convergence Art & Design International**
Best Creativity Award
Professional Exhibition
Shaoxing, China
November 15-18
Industrial Designer: Steve Visser
Herculano Coffee Table
- 2018 **Appliance Design: Excellence in Design Award**
Gold Prize 2018
Medical Equipment and Devices Category
Troy, MI
June 1
Industrial Designers: Steve Visser, Max Cao
Engineers: Rob Bettcher, Justin Kline
BraunAbility Q Series Wheelchair Lift
Published online
<https://www.appliancedesign.com/articles/95865-autoadapt-q-series-mobile-access-lift>
- 2018 **11th Annual IDA Awards Competition**
Gold Award
1st place in Design for Society / Design for Elders
Thousands of entries from 95 countries
Los Angeles, CA
May 22
Industrial Designers: Steve Visser, Max Cao
Engineers: Rob Bettcher, Justin Kline
BraunAbility Q Series Wheelchair Lift
Published in
IDA Design Awards 2017, page 209
- 2018 **A'Design Award & Competition**
Bronze A'Design Award
Furniture, Decorative Items and Homeware Design Category
Milan, Italy
April 15
Industrial Designer: Steve Visser
Herculano Coffee Table
Published in
<https://competition.adesignaward.com/design.php?ID=58604>
A'Design Award & Competition Award Winning Designs 2017-2018, Page 1082

2017-2018

A'Design Award & Competition
Golden A'Design Award in Differently Abled and Seniors' Assistance Design Category
Golden awards given to the top 3%
Milan, Italy
April 15
Industrial Designers: Steve Visser, Max Cao
Engineers: Rob Bettcher, Justin Kline
BraunAbility Q Series Wheelchair Lift
Published in
A'Design Award Winning Entries 2016-2017 Award Winning Product Design. 160.

Traveling Exhibition: *A'Design Award Winning Entries 2016-2017*

Italy	MOOD Museum of Design, Como	June 6-26, 2017
India	Festival of Architecture and Interior Designing, Mumbai	September 22-23, 2017
Hungary	Budapest Projekt Galéria, Budapest	October 8-31, 2017
China	International Industrial Design Fair, Shezhen	November 5-7, 2017
China	Utopa International Design Exhibition, ZhuZhou City	December 26, 2017-March 20, 2018

2017

SOFA Exhibit
Co-lead group of 10 students who developed exhibit for *Connect* at the Sculptural Object
Functional Art and Design Expo at Navy Pier
2017 Connect Winner
Chicago, IL
November 2-5
Nature or Nurture: A 3D Printed Space

2016

Juror
1st Greater China Smart Home Appliances Design Competition
Hong Kong
November 4

2016

Juror
Appliance Design Excellence in Design Competition
Troy, MI

2016

Juror
International Housewares Association Student Design Competition
Chicago, IL
January 13-14

2015

One-Person Design Exhibition
Domus Academy/NABA
Milan, Italy
July 21-August 4
Inspirations from Ancient Rome

2013

Invitational International Design Exhibition
4th International Innovation Design and Education Forum Exhibition
Nanjing, China
September 18-19
Exclamation Stacking Chair
Published in
Cross-Disciplinary and Integration: Portfolio of "Nanjing Innovation" International Universities' Design Exhibition. Pages 20-24

2012-2013

Juror
Appliance Design Excellence in Design Competition
Troy, MI

- 2012 **Invitational International Exhibition**
Groovy Stuff Booth
International Casual Furniture and Accessories Market
The Merchandise Mart
Chicago, IL
September 20-23, 2012
Apple² Pedestal Table
- 2012 **Juror**
Nanjing Innovation Design Competition
Nanjing, China
August 13-14
- 2011 **Poster Session**
Mudd Design Workshop
Claremont, CA
May 28-30
Design for Relieving: Home-based Healthcare Products
Primary Author: Cheryl Qian
Poster Layout and Co-Author: Steve Visser
- 2009 **Invitational International Design Summit and Exhibition**
Nanjing, China
October 25-26
StoneStalk Bench
- 2009 **Juried National Exhibition**
BECA Gallery "Next" exhibition
New Orleans, LA
February 5-28
Woodstalk Bench
- 2007 **Invitational International Design Summit and Exhibition**
Nanjing, China
November 7-8
Astro Lounge Chair
- 2006 **Juried Exhibition at the Industrial Designers Society of America**
National Education Conference
Austin, TX
September 17-20
Astro Lounge Chair
- 2005 **Juried Exhibition at the Industrial Designers Society of America**
National Education Conference
Washington, D.C.
August 21-23
Giwa: Build-it-yourself Souvenir
BLU Network: Borrow Lend Unite
Safety Stove: for South Africa
Flip: Invertible Organizer
- 2005 **International Travel Souvenir Design Competition**
Selected Design (about 630 entries from 39 countries, 142 selected)
Ministries of: Culture & Tourism, Commerce, Industry & Energy,
Korean Association of Industrial Design, ICSID
Kintex Exposition Center
Gyeonggi, South Korea
April 14-17
Giwa: Build-it-yourself Souvenir
Published in
International Travel Souvenir Design Competition 2005 Korea
(Seoul, South Korea: Gyeonggi Tourism Organization), 41

- 2005 **Satellite Salone International Invitational Design Exhibition**
(Only two schools from the USA were invited to exhibit in the Satellite Salone, Purdue University and Pratt Institute)
Milan Furniture Fair
Milan, Italy
April 13-18
Giwa: Build-it-yourself Souvenir
Safety Stove: for South Africa
- 2004 **50th Annual International Design Competition: I.D. Magazine**
Honorable Mention (over 2000 entries/ 159 selected)
New York, NY
July
Design Team: Steve Visser and Scott Shim
BLU Network: Borrow Lend Unite
Published in
I.D. Magazine 50th Annual Design Review
Volume 52, number 5, (July 2004): 184
- 2004 **International Aluminum Extrusion Competition**
Selected for Exhibition (109 entries from 9 countries/ 36 selected)
ET Foundation
International Aluminum Extrusion Seminar and Exposition
Orlando, FL
May 18-21
Design Team: Scott Shim and Steve Visser
Birdie Aluminum Extrusion Concept
- 2003 **International Eyewear Design Competition: Opus Design Award 2003**
Award Winner (1771 entries from 62 countries/ 313 winners)
Eyeteck Co., Ltd.
Tokyo, Japan
December 1
Design Team: Steve Visser and Scott Shim
Shades Eyewear
- 2003 **Taiwan International Design Competition: Creating a Digital Culture Design**
Award of Excellence (356 entries from 25 countries/ 20 selected)
Taiwan Design Center
Taiwan Industrial Development Bureau
Taipei, Taiwan
November 8-30
Design Team: Steve Visser and Scott Shim
BLU Network: Borrow Lend Unite
Published in
Taiwan Design Center, 2003 Taiwan Creative Design Expo (Taipei, Taiwan: Taiwan Industrial Development Bureau), 115.
- 2002 **Invitational Exhibition at the Biennale Internationale Design 2002**
Museum of Modern Art, Saint-Étienne
Saint-Étienne, France
November 16-24
Civil Interactive Play Table
- 2001-2002 **29th Annual National Juried Toys Designed by Artists Exhibition**
Decorative Arts Museum
Arkansas Art Center
Little Rock, AR
November 22, 2001-January 6, 2002
Principal Designer: Steve Visser
Designer: Nicolé Visser
Herman the Dino

- 2001-2002 **National Furniture Design Competition: The Chair Show 4**
 Selected Design (234 entries, 45 selected)
 Southern Highland Craft Guild
 Asheville, NC
Quantum Armchair
- Traveling Exhibition: The Chair Show 4
 Asheville, NC Folk Art Center September 30, 2001-January 13, 2002
 Wausaw, WI L. Y. W. Art Museum February 2-April 7
 Greenville, NC Wellington Gray Gallery June 6-September 21
 Published in
 David McFadden, *The Chair Show 4* (Asheville, NC: Southern Highland), 44.
- 2001 **International Eyewear Design Competition: Opus Design Award 2001**
 Award Winner (1639 entries from 30 countries/ 138 award winners)
 (The only winner from the USA)
 Eyetec Co., Ltd.
 Tokyo, Japan
 September 13-14
Egypt Eyewear
- 2001 **Herman Miller Office-Supply Creation National Competition**
 Honorable Mention
 Herman Miller
 www.hermanmillerred.com
 Zeeland, MI
 Principal Designer: Steve Visser
 Designer: Nicolé Visser
Herman the Dino
- 2000 **Biennale Internationale Design 2000 Invitational Exhibition**
 Museum of Modern Art, Saint-Étienne
 Saint Étienne, France
 October 7-15
Egypt Eyewear
Demi Fruit Bowl
- 2000 **2000 Objects for the New Millennium Juried Exhibition**
 Gallery 91
 New York, NY
 July-September
Forest Eyewear
- 2000 **Mid-States Crafts Regional Juried Exhibition**
 Evansville, IN
 January-March
Forest Eyewear
- 1998-1999 **Unlimited by Design National Invitational Exhibition**
 Cooper Hewitt National Design Museum (Smithsonian)
 New York, NY
 November 17, 1998-March 21, 1999
 Principal Designer: Steve Visser
 Engineer: Ashok Midha
Compliers® Flexural Fishing Pliers

- 1995-1997 **Mutant Materials in Contemporary Design International Invitational Exhibition**
Museum of Modern Art
New York, NY
May 24-August 22
Principal Designer: Steve Visser
Design Team: Miro Tasic and Brian McGreevy
Engineer: Ashok Midha
Compliant Fishing Pliers
Published in
Paola Antonelli, *Mutant Materials in Contemporary Design Exhibition Bulletin* (New York: Museum of Modern Art), 6.
- Traveling Exhibition: Mutant Materials
Netherlands Groninger Museum, Groninger September 13-December 7, 1997
Czech Republic Veletržní Palác, Prague May 15-August 17, 1997
- 1996-1997 **Innovations for Living/Industrial Design Excellence Awards 1989-1995**
National Invitational Exhibition
Brook Steven's Gallery at Milwaukee Institute of Design
Milwaukee, WI
October 18, 1996-August 23, 1997
Design Team: Kyle Bennett and Steve Visser
Kudo Crafters Clamp
- 1995-1996 **National Design Competition: Good Design Award Exhibition**
Selected Design (500 entries/ 120 selected)
The Chicago Athenaeum: Museum of Architecture and Design
Chicago, IL
October 24, 1995-January 13, 1996
Principal Designer: Steve Visser
Design Team: Don Herring, Dan Julian and Don Woods
ExerTron™ Video Game Controller
- 1995-1996 **National Design Competition: Good Design Award**
Good Design Award (Nearly 500 entries/ 80 selected)
The Chicago Athenaeum: Museum of Architecture and Design
Chicago, IL
October 24, 1995-January 13, 1996
Principal Designer: Steve Visser
Engineer: Ashok Midha
Compliers® Flexural Fishing Pliers
- 1995 **Idea95: National Design Competition**
Silver Winner for New Product Concepts (766 entries/ 56 selected)
Industrial Designers Excellence Award
IDSA National Conference
Santa Fe, NM
September 13-16
Design Team: Kyle Bennett and Steve Visser
Kudo Crafters Clamp
Published in
Innovation: Journal of the Industrial Designers Society of America, 14, no. 4, (Fall 1995): 207.
Cited in
Business Week (June 7, 1993): 102.
- 1995 **Permanent Collection**
The Chicago Athenaeum: Museum of Architecture and Design
Chicago, IL
Principal Designer: Steve Visser
Engineer: Ashok Midha
Compliers® Flexural Fishing Pliers

- 1994 **94 Nagaoka International Design Competition**
 Selected Design (615 entries from 40 nations/ 57 selected)
 Shinanogawa Technopolis
 Nagaoka City, Japan
 October 21-23
 Design Team: Bennett Kyle and Visser Steve
Kudo Crafters Clamp
 Published in
Interior Exterior International Design Competition 9 (Nagaoka, Japan: Shinanogawa Technopolis), 59
- 1994 **Permanent Collection**
 Museum Die Neue Sammlung (Invitational)
 Industrial Design Collection
 Munich, Germany
 Principal Designer: Steve Visser
 Design Team: Miro Tasic and Brian McGreevy
 Engineer: Ashok Midha
Compliant Fishing Pliers
- 1993 **Idea93: National Design Competition**
 Silver Winner, for New Product Concepts (678 entries/ 26 selected)
 Industrial Designers Excellence Award
 IDSA National Conference
 Atlanta, GA
 August 11-14
 Principal Designer: Steve Visser
 Designers: Miro Tasic and Brian McGreevy
 Engineer: Ashok Midha
Compliant Fishing Pliers
 Published in
Innovation: Journal of the Industrial Designers Society of America 12, no. 4 (Fall 1993): 125.
 Cited in
Business Week (June 7, 1993): 78.
- 1993 **Neste Forma Finlandia: International Plastics Design Competition 3**
 Second Prize \$18,000 (576 entries from 36 countries/ 2nd)
 Neste Corporation
 Espoo, Finland
 Principal Designer: Steve Visser
 Design Team: Miro Tasic and Brian McGreevy
 Engineer: Ashok Midha
Compliant Fishing Pliers
- | | | |
|---|--|-----------------|
| Traveling Exhibition: Neste Forma Finlandia 3 | | |
| Finland | Tapiola, Espoo | April 19-25 |
| Sweden | Svenska Måssan in Gothenburg | May 10-15 |
| France | Parc de la Villette, Paris | June 7-13 |
| Germany | Rhein Ruhr Center, Mulheim-Ruhr | June 21-27 |
| Belgium | Zuiderdokken, Antwerp | September 20-26 |
| Italy | Milan | October 4-10 |
| Portugal | Espinho, near Oporto | October 20-26 |
| UK | National Exhibition Center, Birmingham | November 7-11 |
- Published in
 David Vickery, *Neste Forma Finlandia International Plastic Design Competition 3* (Helsinki: Abbeygate), 12
- 1992 **Architectonics: Regional Juried Exhibition**
 Performing Arts Center
 Fort Wayne, IN
 October 22-November 20
Nurkka Corner Floor Lamp

1984 **Solo Exhibition of Recent Sculptures**
Concordia College
Seward, NE

Patents

2019 **Soft Tissue Therapy Tool**
Issued July 16
Design Patent Number D854,178
Inventors: Michael Cochard and Steven Visser

2018 **Vehicle Lift Platform Hand Switch**
Issued September 4
Design Patent Number D827,586
Inventors: Robert E. Bettcher, Justin M. Kline, Austin Metzger, Steven Visser, Yingxiao Cao

2017 **Vertical Channel Vehicle Lift Arm**
Issued October 31
Design Patent Number D801,619
Inventors: Robert E. Bettcher, Justin M. Kline, Steven Visser, Yingxiao Cao

2017 **Closed Vehicle Lift Arm**
Issued October 10
Design Patent Number D799,776
Inventors: Robert E. Bettcher, Justin M. Kline, Steven Visser, Yingxiao Cao

2017 **Vehicle Lift Platform**
Issued September 12
Design Patent Number D797,396
Inventors: Robert E. Bettcher, Justin M. Kline, Steven Visser, Yingxiao Cao

2002 **Support Structure for a Chair**
Issued October 8
Design Patent Number D463,925
Inventor: Steve Visser

2001 **Rotary Assembly Table**
Issued April 24
Design Patent Number D440,786
Inventors: Steve Visser, Sang-Gyeun Ahn, Laura Drake, Haolong Ma, Seung-Jo Park

1997 **Resilient Clamp**
Issued May 6
Patent Number 5,625,931
Inventors: Steve Visser and Kyle Bennett

1997 **Video Game Controller**
Issued August 19
Design Patent Number D382,604
Inventor: Steve Visser

1996 **Compliant Pliers**
Issued June 4
Patent Number 5,522,290
Inventors: Ashok Midha and Steve Visser

- 1996 **Video Game Controller**
 Issued November 12
 Design Patent Number D375,531
 Inventor: Steve Visser
- 1996 **Video Game Controller**
 Issued October 29
 Patent Number 5,568,928
 Inventors: Bruce Munson and Steve Visser

Designs Reproduced in Publications

- 2019 **Steve Visser, “Herculano” Coffee Table**
 Published in
 2019 KSBDA Purdue International Invitational Exhibition
 July 26, (West Lafayette, IN USA), 24-25
- 2018 **Steve Visser, “Herculano” Coffee Table**
 Published in
 2018 CADI Convergence Art & Design International
 November 11, 2018 (Shaoxing, China), 90
- 2013 **Steve Visser, “Exclamation” Chair**
 Published in
 Cross-Disciplinary and Integration: Portfolio of “Nanjing Innovation” International Universities’
 Design Exhibition
 July 25, 2013 (Nanjing, China), 20-21
- 2009 **Steve Visser, “StoneStalk” Pedestal**
 Published in
 Portfolio of '09 International Universities Design
 09 国际校际设计作品展组委会
 南京理工大学设计艺术系 2009 年 9 月 10 日 (Nanjing, China) 8-9
- 2008 **Steve Visser and Scott Shim, Timex Season and profile of DesignNapkin design firm**
 Published in
 Charlotte and Peter Fiell, *Design Now*
 (London: Taschen Publishing) 118-123
- 2004 **Steve Visser and Scott Shim “BLU Network: Borrow Lend Unite”**
 Published in
Design (Taipei, Taiwan)
 Vol.114 (December/January): 71
- 2002 **Steve Visser, “Quantum Armchair”**
 Published in
American Style Magazine
 (Winter 2001-2002): 16
- 2001 **Steve Visser, “Ateria Reliquary”**
 Published in
 Luisa Collina and Giuliano Simonelli, Eds.
Designing Designers: Training Strategies for the Third Millennium
 (Milan, Italy: Politecnico di Milano), 73
- 1997 **Steve Visser and Kyle Bennett, “Kudo Crafters Clamp”**
 Published in
 George Covington and Bruce Hannah, *Access by Design*
 (New York: Van Nostrand Reinhold), 201

- 1996 **Steve Visser and Kyle Bennett, “Kudo Crafters Clamp”**
Published in
Universal Design Excellence Project
(Takoma Park, MD: Universal Designers and Consultants, Inc. in cooperation with The National Endowment for the Arts and the National Building Museum) slides.
- 1996 **Steve Visser, and Ashok Midha, “Compliers™ Flexural Fishing Pliers”**
Published in
Design Report (Hamburg, Germany)
(January/February 1996)
- 1995 **Steve Visser, and Ashok Midha, “Compliers™ Flexural Fishing Pliers”**
Published in
Plastics
(May 1995): 7
- 1994 **Steve Visser, Miro Tasic, and Ashok Midha, “Compliant Fishing Pliers”**
Published in
Taka Sihvola, Mikko, *Design in Finland 1994*
(Helsinki: The Finnish Foreign Trade Association), 60
- 1994 **Steve Visser, Miro Tasic, and Ashok Midha, “Compliant Fishing Pliers”**
Published in
Innovation: Award-Winning Industrial Design
(Glen Cove, NY: PBC International, Inc.), 82
- 1993 **Steve Visser, Miro Tasic, and Ashok Midha, “Compliant Fishing Pliers”**
Published in
Paola Antonelli, *Mutant Materials in Contemporary Design*
(New York: Museum of Modern Art and Rizzoli Press), 35
- 1993 **Steve Visser, Miro Tasic, and Ashok Midha, “Compliant Fishing Pliers”**
Published in
Design (London) 534 (June 1993): 8
Form Function Finlandia (Helsinki) no. 2 (June 1993): 91
K Plastic & Kautscherl Zeikey (Germany) (May 1993): 10
Plastverarbeiter (Heidelberg, Germany) 44 no. 5 (1993): 73
Form (Zurich, Germany) no. 143 (1993): 129
Design in Kunststoff (Germany) no. 44 (1993): 72-74
Domus (Milan, Italy) no. 752 (September 1993): 80-81
Kunstof Magazine (Doetinchem, Netherlands) no. 5 (May 1993): 32
Machine Design (July 9, 1993): 12

Industrial Design Activities

- 2022 **Polar Ice Coffee Table (furniture design)**
Steve Visser Design
West Lafayette, IN
- 2021 **Pompeii Washbasin (fixture design)**
Steve Visser Design
West Lafayette, IN
- 2020 **Root Coffee Table (furniture design)**
Root Coffee Table (furniture design)
Steve Visser Design
West Lafayette, IN

2018-2019	Neonatal Crib (medical design) Save The Children Blantre, Malawi (Africa) Design Director: Steve Visser Design Team: Qiuying Joyce Xu, Lauren Para, Daniel Madrinan-Chiquito, Engineering Team: Yuehwern Yih, Sidi Deng, Maxwell Silla, Francis Masi Medical Team: Bina Valsangkar, Queen Dube, Nenani Chisema
2018-2019	Kangaroo Mother Care Hospital Bed (furniture design) Save The Children Blantre, Malawi (Africa) Design Director: Steve Visser Design Team: Dewey Yu, Daniel Madrinan-Chiquito, Engineering Team: Yuehwern Yih, Maxwell Silla, Francis Masi Medical Team: Bina Valsangkar, Queen Dube, Nenani Chisema
2018	Walnut and Cast Pewter Inlay Coffee Bar (furniture design and development) Revolution Community Church Logansport, IN Design Director: Steve Visser Design Team: David Marchese and Keith Williams
2017	Herculaneum Coffee Table II (furniture design) Steve Visser Design West Lafayette, IN
2017	Truss Arch (public space design) City of West Lafayette West Lafayette, IN
2016	Fuzion Mini (product design) FASTR, Inc. Indianapolis, IN
2015-2016	Herculaneum Coffee Table (furniture design) Steve Visser Design West Lafayette, IN
2015	River Desk and Silver Apple² Pedestal (furniture design and development) Steve Visser Design West Lafayette, IN
2015	Hand Pendant (product design) Braun-Ability Winamac, IN Design Team: Steve Visser and Yingxiao Cao
2015	QLD Wheelchair Lift (product design) Design Team: Steve Visser and Yingxiao Cao Braun-Ability Winamac, IN
2014	Balance Stool, Egg Bowls, Umbrella Birdfeeder, and Button Clock (product design) Association of Craft Producers Kathmandu, Nepal
2014	3 Horned Trivet, Copper Candle Holder (product design) Design Team: Sari Visser and Steve Visser Association of Craft Producers Kathmandu, Nepal

2011-2014	Mini Massage Tool (product design) Soft Tissue Therapy Tools, Inc. Indianapolis, IN
2013	Circle Chair (furniture design and development) DesigNapkin West Lafayette, IN
2012	Exclamation Chair (concept development) DesigNapkin West Lafayette, IN
2011-12	Apple² table line (furniture design and development) DesigNapkin West Lafayette, IN
2009-2010	Fuzion ST3 (product design and development) Soft Tissue Therapy Tools, Inc. Indianapolis, IN
2007	Pendant Lighting Design, Origins 212 Collection (product design) Omega Lighting Tupelo, MS Principal Design: Steve Visser and Scott Shim
2006-2007	Track Lighting Design (product design) Omega Lighting Tupelo, MS Principal Design: Steve Visser and Scott Shim Design Team: Milan Jovanovic,
2006-2007	Bike Seat Design (product design) David Porter Kansas City, MO Principal Design: Scott Shim and Steve Visser
2006	Cell Phone Design (product design) Samsung Electronics Sacramento, CA Principal Design: Scott Shim and Steve Visser
2006	MXR programmable light (product design) Apollo Design Technology, Inc. Ft. Wayne, IN Principal Design: Scott Shim and Steve Visser
2005-2006	Portable Electronics (product design) Klipsch Audio Corp. Indianapolis, IN Principal Design: Steve Visser and Scott Shim Design Team: Nick Poteracki, Milan Jovanovic, Faraz Shah and Scott Collins
2005-2006	Wardrobe Valet (product design) Proman Products, LLC. Loves Park, IL Principal Design: Scott Shim and Steve Visser

2005	Identity Mouth Guard (product design) Reliance, Inc. Taipei, Taiwan Principal Designers: Scott Shim and Steve Visser Design Team: Nick Poteracki, Colt Stander, Bria Helgersen, Jason Boyer, and Brian Beaver
2005	USB Drive (concept design) Filadex, Inc. West Lafayette, IN
2004-2005	Contact Lens Travel Case (product design) Reliance, Inc. Taipei, Taiwan
2004	Sanitary Toilet Care System (product design) Dr. Seok-Jin Kim Indianapolis, IN Principal Designer: Steve Visser Design Team: Milan Jovanovic and Alex Cantoni
2001	Civil Interactive Play Table (furniture design) Imagination Station West Lafayette, IN
2001	Knock-Down Stool (concept development) Matt Striebel Bloomington, IN Principal Designer: Steve Visser Design Team: Laura Drake and Kyungsook Song
2001	Interactive Trolley Exhibit (exhibit design) Imagination Station/CityBus West Lafayette, IN Principal Designer: Steve Visser Design Team: Nathaniel Grady, Michael Lah and Kiley Reed
2001	Quantum Armchair (furniture design) Patent assigned to Purdue Research Foundation West Lafayette, IN
1999-2000	Fiber Optic Cross (design/ build commission) St. Thomas Aquinas Church West Lafayette, IN
1999	Wooden Decorative Products (product design) Reliance, Inc. Taipei, Taiwan Principal Designer: Steve Visser Design Team: Braden Smith and Haolong Ma
1999	Self-Watering Flowerpots (concept design) Reliance, Inc. Taipei, Taiwan
1998	Faucet Design (product design) Delta Faucet Indianapolis, IN Principal Designer: Judd Lord Design Team: Steve Visser and Loren Hill

1995-1996	Portable Bassinet (product design) Redmon, Inc. Peru, IN Principal Designer: Steve Visser Design Team: Don Herring, Don Woods and Dan Julian
1993-1995	Compliers® Flexural Fishing Pliers (product design) Compliers, Inc. West Lafayette, IN Principal Designer: Steve Visser Engineer: Ashok Midha
1994	Stenfors Temperature Control System (product design) Stenfors, OY Oulu, Finland Principal Designer: Steve Visser Design Team: Kyle Bennett and Don Woods
1994	Computer Interface Device (product graphics) Interserve, Inc. Rockford, IL
1994-1995	ExerTron™ Video Game Controller (product design) ExerTron, Inc. Muncie, IN Principal Designer: Steve Visser Design Team: Don Herring and Scott Jost
1994	Tele-Talker™ (product design) Amuze Technologies Indianapolis, IN Principal Designer: Steve Visser Design Assistant: Braden Smith
1994	Kudo Crafters Clamp (product design) Fiskars, Inc. Madison, WI Design Team: Kyle Bennett and Steve Visser
1993	Mini Printer (concept design) Quixale America, Inc. NPC Limited Taipei, Taiwan Principal Designer: Chao-Hsi Wu Design Team: Steve Visser and Brian McGreevy
1993	ZARD printer sharing system (concept design) Power Print Systems Rossville, IN Principal Designer: Steve Visser Design Team: David Winn and Brian McGreevy
1992	Trim Line Vending Machine (concept design) Standard Changemakers, Inc. Indianapolis, IN

1992 **Display Case** (furniture design commission)
Elastic Mechanism Lab
Mechanical Engineering Building
Purdue University

1992 **River Valley Evangelical Free Church** (logo design)
West Lafayette, IN

1991 **Tricorder Radio Frequency Meter** (product design)
Trilithic, Inc.
Indianapolis, IN
Principal Designer: Steve Visser
Design Assistant: Braden Smith

1991 **Water Soluble Packaging System** (concept development)
Great Lakes Chemical
West Lafayette, IN
Principal Designer: Steve Visser
Design Assistant: Richard Johnson

1991 **ECG Analyzer** (product graphics)
Vetronics, Inc.
Lafayette, IN

1990 **KG Software** (logo design)
Micro Data Base Systems, Inc.
Lafayette, IN

1989 **Ansco Vision AL 35mm camera** (product design)
Haking, Inc.
Hong Kong
Principal Designer: Hari Matsuda
Design Assistant: Steve Visser

1989 **Whistler 750 radar detector** (product design)
Whistler, Inc.
Westford, MA
Principal Designer: Hari Matsuda
Design Assistant: Steve Visser

1989 **Shure Beta 58 wireless microphone** (design detailing)
Shure Brothers, Inc.
Chicago, IL

1989 **Whistler 2se radar detector** (product graphics)
Whistler, Inc.
Westford, MA

1989 **Point of purchase poster** (graphic design)
Ansco, Inc.
Glen View, IL

1989 **Coulter blood analyzer** (product design)
Coulter, Inc.
Miami, FL
Principal Designer: Robert Coons
Design Assistant: Steve Visser

- 1989 **Ansco Vision Gift Pack (package design)**
 Ansco, Inc.
 Glen View, IL
 Principal Designer: Hari Matsuda
 Design Team: Peter Langmar and Steve Visser
- 1988 **Top Flight Video Game Clam Pack (package design)**
 Konomi, Inc.
 Chicago, IL
 Principal Designer: Hari Matsuda
 Design Assistant: Steve Visser
- Expert Witnessing**
- 2022-2023 **Molo Design Ltd. vs. Chanel Inc. Canada (expert witness, utility patent)**
 Gowling WLG LLP.
 Ottawa Canada
 • Work on Expert Report on Validity, November 2022-March 2023
- 2022 **Hasbro Inc. vs. GelBlasters et. al.(expert witness, utility patents)**
 Fish & Richardson P. C.
 Boston MA
 • Review and Analyze Infringement Contentions, August- October 2022
- 2021-2023 **Sure Fit Home Products LLC vs. Maytex Mills (expert witness, design patents)**
 Goldberg Cohen LLP
 New York, NY.
 • Submit Expert Report on Infringement, November 21, 2022
 • Review claim construction
- 2021 **Gunner Kennels vs. Luck Duck (expert witness, utility patents)**
 Banner & Witcoff, Ltd.
 Washington DC/ Chicago IL
 • Work on Expert Report on Validity, November-December 2021
 • Submit Expert Report on Infringement, November 5, 2021
- 2021 **Greenfield vs. Mold-Rite Plastics LLC (expert witness, design patents)**
 Bond, Schoeneck & King PLLC
 Syracuse, NY.
 • Prepare preliminary opinions on infringement/validity, August 2021
- 2020-2022 **Samuel Stamping Technologies vs. Therma-Tru Corp. (expert witness, design patent)**
 Vorys, Sater, Seymour and Pease, LLP
 Cleveland, OH
 • Review and Analyze Validity Contentions, October 2022
 • Declaration regarding claim construction brief, February 18, 2021
 • Prepare rebuttal expert report on §112 issue, December 15, 2020
- 2019-2021 **RTC Industries, Inc. vs. Fasteners For Retail, Inc. (expert witness, utility patent)**
 Banner & Witcoff, LTD
 Washington, DC/ Chicago, IL
 • Completed deposition as expert, May 5, 2020
 • Declaration in IPR2019-00994, January 28, 2020
 • Declaration in IPR2019-00994, August 8, 2019
- 2018-2021 **J.R. Simplot vs. McCain Foods USA, Inc. (expert witness, design patents)**
 Jones Day
 Cleveland, Ohio
 • Give deposition on invalidity, validity, infringement and non-infringement, September 29, 2021
 • Prepare rebuttal expert report on invalidity, August 20, 2021

- Prepare rebuttal expert report on infringement, August 21, 2021
 - Prepare expert report on infringement, July 9, 2021
 - Prepare expert report on invalidity, July 9, 2021
- 2019-2020 **Gamevice, Inc. vs. Nintendo Co. Ltd. (expert witness, utility patents)**
 Quinn Emanuel Trial Lawyers, and LTL Attorneys, LLP
 Los Angeles, CA
- Prepare declaration regarding Daubert motion, April 6, 2020
 - Give deposition on invalidity, February 18, 2020
 - Give deposition on non-infringement, February 17, 2020
 - Prepare rebuttal expert report on non-infringement, February 6, 2020
 - Prepare expert report on invalidity, December 20, 2019
 - Declaration regarding claim construction, March 12, 2019
- 2019-2020 **Pavo Solutions, LLC. vs. Kingston Technology (expert witness, utility patent)**
 Russ, August & Kabat
 Los Angeles, CA
- Testified at trial, Santa Ana, CA, March 3-4, & 11, 2020
 - Declaration regarding Daubert motion, August 2, 2019
 - Completed deposition as expert witness, June 4, 2019
 - Prepare expert report on validity, April 5, 2019
 - Prepare expert report on infringement, March 8, 2019
- 2018 **Honeywell vs. Aprilaire (expert witness, design patent)**
 Kirkland and Ellis, LLP
 Washington, DC
- Completed deposition as expert, December 11, 2018
 - Gave declaration in summary judgment motion, December 4, 2018
 - Prepare expert report on validity, September 27, 2018
 - Prepared expert report on infringement, August 20, 2018
- 2018 **J.R. Simplot vs. McCain Foods, Ltd. (expert witness, design patent)**
 Norton Rose Fulbright Canada, LLP
 Toronto, Canada
- Review design patents, October 2018
- 2017 **C&S Marketing vs. GoPro (expert witness, design patent)**
 Kilpatrick Townsend & Stockton, LLP
 San Francisco, CA
- Prepare declaration on invalidity, May 21, 2017
 - Prepare expert report on invalidity, February 10, 2017
 - Prepare expert report of non-infringement, March 31, 2017
- 2017 **Nordock, Inc. vs. Systems, Inc. (expert witness, design patent)**
 Sokol Law Office
 Milwaukee, WI
- Prepare supplemental declarations for summary motion, September 14, 2017
 - Prepare declaration for summary motion, August 24, 2017
- 2017 **Gamon vs. Campbell Soup (expert witness, utility, and design patents)**
 Reed Smith, LLP
 Philadelphia, PA
- Completed deposition as expert, Indianapolis, IN, November 10, 2017
 - Prepare declarations on invalidity 111', D646', and D645', October 13, 2017
- 2015-2017 **Luv N' Care vs. Sauvinex (expert witness, contract dispute)**
 Banner & Witcoff, Ltd.
 Washington, DC
- Completed deposition as expert, Lafayette, IN, August 25, 2017
 - Prepare rebuttal expert report on copying, June 21, 2017
 - Completed deposition as expert, Lafayette, IN, September 4, 2015

- Prepared expert report on copying, June 18, 2015
- 2016 **Gamon vs. Campbell Soup (expert witness, utility patents)**
Cozen O'Connor
New York, NY
 - Prepared declarations on invalidity 111' and 326', October 14, 2016
- 2016 **IGT vs. Aristocrat Technologies (expert witness, design patent)**
Covington and Burling, LLP
Washington, DC
 - Prepared declaration on invalidity, March 15, 2016
- 2015-2016 **Sonos vs. Denon (expert witness, design patent)**
Lee Sullivan Shea & Smith, LLP
Chicago, IL
 - Prepare declaration on validity, October 26, 2016
 - Prepare declaration on claim construction, September 9, 2016
- 2015-2016 **Sonos vs. Denon (expert witness, design patent)**
KPPB, LLP
Anaheim, CA
 - Prepare supplemental declaration on validity, September 29, 2016
 - Prepared declaration on validity, March 30, 2016
 - Completed informal interview with USPTO, Alexandria, VA, February 13, 2016
- 2015 **CATR vs. Kingston Electronics (expert witness, utility patent)**
Renaissance IP Law Group, LLP
Portland, OR
 - Completed deposition as expert, Lafayette, IN, September 21, 2015
 - Prepared declaration on validity, July 16, 2015
- 2014-2015 **Cablz vs. Chums (expert witness, utility patent)**
Stoel Rives, LLP
Salt Lake, UT
 - Prepare declaration on invalidity, January 22, 2015
 - Completed deposition as expert, Dallas, TX, August 15, 2014
 - Prepared declaration on invalidity, August 1, 2014
 - Prepared rebuttal report on invalidity, August 1, 2014
 - Prepared report on invalidity, May 26, 2014
- 2013-2014 **PNY vs. Phison Electronics (expert witness, utility patent)**
Fish and Richardson, PC
Dallas, TX
 - Completed deposition as expert, Dallas, TX, July 23, 2014
 - Prepare declaration on validity, July 8, 2014
- 2013-2014 **M-Edge vs. Amazon (expert witness, utility patent)**
Alston and Bird, LLP
Washington, DC
 - Completed deposition as expert, Chicago, IL, April 10, 2014
 - Prepared report on non-infringement, March 7, 2014
 - Prepared report on invalidity, January 30, 2014
- 2012-2013 **MSA vs. Nifty Home Products (expert witness, design patent)**
Gibson & Demier, LLP
Woodbridge, NJ
 - Completed deposition as expert, Woodbridge, NJ, May 8, 2013
 - Prepared report on infringement, March 15, 2013

- 2012-2013 **Frito-Lay vs. Medallion Foods, Inc. (expert witness, trademark)**
Baker Botts, LLP
Dallas, TX
- Testified at trial, Sherman, TX, February 15, 2013
 - Completed deposition as expert, Dallas, TX, November 20, 2012
 - Prepared report on trademark, October 8, 2012
- 2012-2013 **Nordock, Inc. vs. Systems, Inc. (expert witness, design patent)**
Sokol Law Office
Milwaukee, WI
- Testified at jury trial, Milwaukee, WI, March 19 & 25, 2013
 - Testified in claim construction hearing, Milwaukee, WI, January 30, 2013
 - Gave declaration in summary judgment motion, November 5, 2012
 - Prepared rebuttal report, July 20, 2012
 - Prepared report on infringement/validity, June 20, 2012
- 2012 **Sofpool, LLC vs. Kmart and Big Lots (expert witness, design patent)**
Troutman Sanders, LLP
Irvine, CA
- Gave declaration in summary judgment motion, October 29, 2012
 - Gave declaration in claim construction hearing, June 18, 2012
 - Prepared report on infringement, March 2, 2012
 - Prepared report on validity, February 10, 2012
- 2010-2011 **Spellbound vs. Pacific Handy Cutter/Stanley Black & Decker (expert witness, utility patents)**
Miller Canfield
Chicago, IL
- Prepared rebuttal second supplemental report, October 11, 2011
 - Gave declaration on statement of facts, September 26, 2011
 - Gave declaration in support of summary judgment, August 5, 2011
 - Prepared second supplemental report, August 5, 2011
 - Gave declaration in support of summary judgment, February 7, 2011
 - Prepared rebuttal expert report, February 14, 2011
 - Prepared supplemental expert report, December 29, 2010
 - Gave declaration on infringement and validity, December 17, 2010
 - Prepared expert report, December 7, 2010
- 2010-2011 **Microsoft vs. Datel, Inc. (expert witness, design patents)**
Howard, Rice, Nemerovski, Canady, Falk & Rabkin, PC
San Francisco, CA
- Completed deposition as expert, June 8, 2011
 - Prepared rebuttal report, May 27, 2011
 - Prepared expert report, April 11, 2011
 - Worked on ITC expert report, June-August 2010
- 2010 **Magnadyne vs. Best Buy/EverWin (expert witness, design patent)**
Troutman Sanders, LLP
Irvine, CA
- Completed deposition as expert, Detroit, MI, June 3, 2010
 - Prepared supplemental expert report on invalidity, May 19, 2010
 - Prepare declaration, April 12, 2010
 - Prepared expert report on invalidity, March 24, 2010
- 2009 **Plastipak (expert witness, design patent)**
Dykema Gossett, LLP
Chicago, IL
- Provided opinion on patent infringement, September 2009

- 2008 **Trover Group, Inc. vs. Diebold (expert witness, design patent)**
Thompson & Knight, LLP
Dallas, TX
- Prepared preliminary reports on invalidity and non-infringement, September–November 2008
- 2008 **Hanamint Corp. vs. Home Casual (expert witness, design patent)**
Fabyanske, Westra, Hart & Thomson, P.A.
Minneapolis, MN
- Completed deposition on expert report, July 10, 2008
 - Prepared supplemental expert report on invalidity, April 30, 2008
 - Prepare expert report on invalidity, March 28, 2008
- 2007-2008 **Sofpool, LLC vs. Intex Recreational Corp. (expert witness, design patents)**
Baker & Daniels, LLP
Indianapolis, IN
- Testified in jury trial as a design expert, Marshall, TX, April 15, 2008
 - Prepared expert report on non-infringement March 7, 2008
 - Gave declaration for markman hearing February 19, 2008
 - Prepared expert report on invalidity, February 18, 2008
- 2006-2007 **Calphalon vs. Meyer (expert witness, design patent)**
Dykema Gossett, LLP
Chicago, IL
- Testified in jury trial as a design expert, June 12, 2007
 - Completed deposition on expert report, Chicago, IL, May 9, 2006
 - Prepared expert report for Meyer Inc. in a design patent dispute, April 22, 2006
- 2006 **Zuna Corporation vs. Atico, Walgreen & Target (expert witness, utility patent)**
Wiley Rein & Fielding, LLP
Washington, D.C.
- Reviewed patents, claim construction and manufactured products in view of a utility patent owned by Zuna Corporation, February-March
- 2005-2006 **Fisher-Price vs. Evenflo (expert witness, utility patent)**
Milbank, Tweed, Hadley & McCloy, LLP
Washington, D.C.
- Testified in preliminary injunction hearing as a design expert, May 24, 2006
 - Completed deposition on the expert report, Buffalo, NY, December 22, 2005
 - Prepared expert report on infringement, October 11, 2005
- 2005 **Fabio Perini S.p.A. vs. Chan Li Machinery Co. Ltd. (expert witness, utility patent)**
Baker & McKenzie, LLP
Washington, D.C.
- Worked as non-testifying expert in an International Trade Regulation & Customs case involving an Italian manufacturer and a Taiwanese Manufacturer. October-December
 - Created visual images to help explain the issues involved in the case.
 - Created claim charts for US patents 5,979,818 and Re 35,729
- 2003-2004 **Fisher-Price vs. Graco (expert witness, utility patent)**
Milbank, Tweed, Hadley & McCloy, LLP
Washington, D.C.
- Assisted in preparation for Markman hearing, Philadelphia, PA, March 2004
 - Testified in Preliminary Injunction hearing, Philadelphia, PA, November 2003
 - Prepared a preliminary report for a lawsuit between Fisher-Price and Graco, Inc. concerning a product that Graco, Inc. produces and patent 6,520,862 that Fisher-Price owns, July-September 2003

- 2001-2003 **Fisher-Price vs. Safety Ist (expert witness, utility and design patents)**
 Milbank, Tweed, Hadley & McCloy, LLP
 Washington, D.C.
- Testified in a trial concerning seven products and on four patents in dispute, Wilmington, DE, January 14-15, 2003
 - Gave declaration for court on claim construction, March 28, 2002
 - Prepared expert report on five products that Safety Ist produces and five patents that Fisher-Price owns, January 15, 2002
- 2001 **Stein Industries vs. Display Specialties (expert witness, design patent)**
 Fish & Richardson, PC
 Minneapolis, MN
- Reviewed patent history and depositions in the case, July-August 2001
- 2001 **The Kong Company vs. Mann Design (expert witness, utility patent)**
 Fish & Richardson, PC
 Minneapolis, MN
- Gave opinions on definition of claim language in patent 6,129,053 and visual comparisons with design patent 388,559, March, 2001
- 2000 **3-M vs. Cabot (expert witness, utility, and design patents)**
 Fish & Richardson, PC
 Minneapolis, MN
- Completed deposition, Indianapolis, IN, September 2000
 - Gave declaration, April 2000
 - Prepared expert report, March 21, 2000

International Fellowships and Residencies

- 2022-2023 **Purdue Sabbatical: Design Process from the Real World**
 Selected for full year sabbatical with the support of the College of Liberal Arts at Purdue University. The project involved interviewing designers from around the world about the design processes they use. Interviews were conducted in 6 continents with industrial designers working on a variety of products.
 Buenos Aires Argentina, Sydney Australia, Prague Czech Republic, Helsinki Finland, Budapest Hungary, Turin Italy, Rabat Morocco, Bangkok Thailand, and Providence RI and Santa Barbara, CA.
 July 2022-May 2023
- 2015 **SAI Faculty Fellow**
 Selected for four-week residency at Domus Academy in Milan. The project was focused on industrial design inspiration from Etruscan objects.
 Milan, Italy
 July 19-August 14
- 2014 **Designer in Residence**
 Served as a designer in residency at the Association of Craft Producers in Nepal. The project was focused on designing crafts for fair trade industry.
 Kathmandu, Nepal
 September 1-October 22
- 2014 **American Academy in Rome Associate Fellow**
 Selected for four-week residency at the American Academy in Rome. The project was focused on industrial design inspiration from 1st Century Rome.
 Rome, Italy
 April 28-May 24
- 2013 **International Workshop**
 Organized and team-taught 48 students during an intensive 48-hour design challenge with student in China.
 Nanjing, China
 September 20-22

- 2002 **Study Abroad Program**
Taught British Style course at Oxford University.
Oxford, UK
June 30-August 4
- 2000 **International Faculty Exchange**
Taught at the University of Lapland for six weeks; included a Product Design course for international students from several countries within Europe, and an Advanced Research and Design course with a group of Finnish students designing a robot for domestic yard work.
Rovaniemi, Finland
April 1-May15
- 1999 **Malaysian Polytechnic Curriculum Development Project Phase II**
One of 16 professors that consulted for the Malaysian Ministry of Education, by assisting with the development and implementation of a new curriculum at Politeknik Johor Bahru, Pasir Gudang, Malaysia. The grant included support for one month in the USA and one month in Malaysia. Funding was provided through the World Bank.
Johor Bahru, Pasir Gudang, Malaysia
July and September 1999
- 1996-1997 **Fulbright Scholar**
Won a scholarship to teach and research at the University of Art and Design Helsinki. Teaching included courses in Industrial Design, Materials and Processes and Compliant Mechanisms. Research focused on creative endeavors with computer aided industrial design.
Helsinki, Finland
August 1996-August 1997
- Lectures**
- 2022 **The Good The Bad and The Ugly**
University of Illinois at Champaign/Urbana
Champaign IL
March 3
- 2021 **MFA Guest Critique**
University of Illinois at Champaign/Urbana
Champaign IL
December 10
- 2020 **Order in a Chaotic World: Gestalt Theory and Design Perception**
Universidad del Norte
Bogotá, Columbia (Virtual due to COVID)
September 30
- 2019 **NSF Workshop for Engineering Design and Systems Engineering**
Discussion Leader "The Future of Work" Breakout Session
West Lafayette, IN
October 7
- 2019 **Employing Design Perception to Drive Product Creation**
Huazhong University of Science & Technology
Wuhan, China
March 12
- 2019 **Design Perception, How We See Products**
Design Education Symposium
Lecture at Wuhan University of Science and Technology
Wuhan, China
March 11

- 2017 **The Entrepreneurial Designer: Design Focused Entrepreneurship, Product Design, and Business Models**
Design innovation & Entrepreneurship Forum
Busan, South Korea
December 14
- 2016 **Panelist: Industrial Design Education Symposium**
National Conference IDSA
Detroit, MI
August 17
- 2015 **Domus Academy**
Perception: How We Identify Great Design
Milan, Italy
July 28
- 2013 **Keynote Lecture at the 4th International Innovation Design Education Forum**
Perceiving Design: Design Perceived
Nanjing, China
September 19
- 2013 **Breaking the Rules of Visual Perception**
Steve Visser and Cheryl Qian
IDSA National Education Symposium
Chicago, IL
August 21
Published online:
www.idsa.org/sites/default/files/Visser_Paper_Breaking_the_rules_of_Visual_Perception.pdf
- 2013 **Beyond the Computer Screen: Applying Information Visualization in Product Design**
Cheryl Qian, Steve Visser and Victor Chen
IDSA National Education Symposium
Chicago, IL
August 21
Published online:
www.idsa.org/sites/default/files/Qian-Paper_BeyondTheComputerScreen.pdf
- 2012 **What You Can Get From 48 Hours: The Future of Design Leadership**
Steve Visser, Cheryl Qian and Victor Chen
IDSA National Education Symposium
Boston, MA
August 15
Published online:
<http://www.idsa.org/what-you-can-get-48-hours-future-design-leadership>
- 2011 **A Collaborative Effort: Integrating Interaction Design Evaluation Into Product Design Process**
Cheryl Qian and Steve Visser
Eastman IDSA National Education Conference
New Orleans, LA
September 14
Published online:
www.idsa.org/sites/default/files/ACollaborativeEffortIXDEvaluation.pdf
- 2011 **Keynote Lecture at the International Innovation Design & Education Forum**
Integrating Interaction Design and Industrial Design
Nanjing, China
August 15

- 2011 **Integrating User Experience Research Into Industrial Design**
 Education: Interaction Design Program at Purdue
 Cheryl Qian, Steve Visser and Victor Chen
 National Collegiate Inventors and Innovators Alliance Conference
 Washington, DC
 March 25
 Published online:
<http://nciia.org/sites/default/files/u7/Qian.pdf>
- 2010 **Interaction Design at Purdue University**
 Cheryl Qian and Steve Visser
 Eastman IDSA National Education Conference
 Portland, OR
 August 5
- 2010 **The Interactive Face of Design**
 Cheryl Qian, Petronio Bendito and Steve Visser
 Faces of Design, IDSA Mideast Conference
 Grand Rapids, MI
 May 1
- 2009 **Panelist: Industrial Design Education**
 Midwest District Conference IDSA
 Minneapolis, MN
 April 4
- 2007 **Keynote Lecture at the ICHEM Conference**
 How to Effectively Incorporate Corporate Sponsored Projects and Design Competition into
 Design Curriculum
 Wuxi, China
 November 6
- 2007 **Keynote Lecture at International Nanjing Forum of Industrial Design Education**
 How to Effectively Incorporate Corporate Sponsored Projects and Design Competition into
 Design Curriculum
 Nanjing, China
 November 8
- 2006 **Workshop Co-Leader with Jim O'Grady from Calgary Canada**
 National Collegiate Inventors and Innovators Alliance conference
 Portland, OR
 March 23
- 2005 **Panel Leader: Design Competitions and Tenure**
 Eastman IDSA National Education Conference
 Washington, D.C.
 August 22
- 2005 **Entrepreneurship in Industrial Design: A Case Study**
 Kookmin University
 Seoul, South Korea
 April 19
- 2005 **Entrepreneurship in Industrial Design Lecture and Workshop**
 Seoul National University
 Seoul, South Korea
 April 18

- 2004 **Panelist: Industry Sponsored Student Research Models**
Eastman IDSA National Education Conference
Art Center
Pasadena, CA
October 24-26
- 2003 **Strategies: Corporate vs. Entrepreneurial Design**
Notre Dame University
Notre Dame, IN
November 4
- 2001 **Entrepreneurship/Corporate Sponsorship: Purdue's Two-Sided Gold Coin**
International Convention of University Courses in Industrial Design:
Milan International Furniture Fair
Milan, Italy
April 7-8
Published in:
Designing Designers. Training Strategies for the Third Millennium
p. 69-74
- 2001 **Seminar on Entrepreneurial Design**
IDSA Midwest District Conference: Designing the Experience
Chicago, IL
March 23
- 2001 **Entrepreneurship/Corporate Sponsorship: Purdue's Two-Sided Gold Coin**
Published in:
IDSA Design Education Proceedings
p. 405-412
- 2000 **Design in the USA**
University of Lapland
Rovaniemi, Finland
April 18
- 1999 **Finding Opportunities**
Seminar: Designing In the New Millennium
Politeknik Johor Bahru
Pasir Gudang, Malaysia
July 24
- 1999 **Brainstorming Workshop**
IDSA Midwest District Conference: The Creative Culture
Madison, WI
April 9
- 1998 **Compliance: Utilizing Plastic's Flexible and Rigid Characteristics.**
In IDSA Design Education Proceedings: Why Design?
Long Beach, CA
September 22-24, CD ROM
- 1997 **Entrepreneurial Design Center: Blurring the Boundaries Between Design Education, Business and Manufacturing**
Co-Authored: Steve Visser and Tom Gatis
Published in:
IDSA Design Education Proceedings
Washington, D.C.
June 23-25, CD ROM

- 1997 **Compliant Mechanism Workshop**
Two-week workshop for 20 students at The University of Lapland
Rovaniemi, Finland
April 28-May 7
- 1997 **American Design & Compliers® Design Process**
To 40 students at the University of Lapland
Rovaniemi, Finland
May 6
- 1997 **East Meets West: The Design Cultures of Asia and America**
Joint lecture with Professor Lee of South Korea
Approximately 150 students and faculty attended
University of Art and Design
Helsinki, Finland
January 15
- 1996 **Machine Age Design in America**
To Industrial Design Freshmen
University of Art and Design Helsinki
Helsinki, Finland
December 12
- 1996 **An Introduction to Industrial Design**
To 40 students at the Tampere Polytechnic
Tampere, Finland
November 5
- 1996 **Venturing In Industrial Design**
American Voices conference
Turku, Finland
October 10
- 1996 **Venturing Organizations, a Case Study**
To 70 Industrial Design/Business Management students
University of Art and Design Helsinki
Helsinki, Finland
September 12
- 1996 **The Design Process for Compliers®**
To Industrial Design Freshmen
University of Art and Design Helsinki
Helsinki, Finland
December 5
- 1995 **Entrepreneurs: A Natural Resource in Short Supply and Educating**
Design Students in the Art of Venturing
IDSA Design Education Conference
Santa Fe, NM
September 13-16
- 1994 **Inventionalism: Designers Reject Expressionistic Pleasures of the 80's and Replace Them with an Adoration for Innovation**
Co-Authored; Steve Visser and John Peasley
Dearborn, MI
August 16-18
Published in:
IDSA Design Education Conference Proceedings: Design Futures
p. 133-139

- 1994 **Compliant Mechanisms: Materials and Processes**
Lecture and mini workshop
University of Michigan
Ann Arbor, MI
March 8
- 1993 **Drawing Workshop**
Taught a three-day workshop on design drawing techniques to twelve students from Helsingin Taideteollinen Korkeakoulu (University of Art and Design Helsinki)
Helsinki, Finland
April 20-22
- 1993 **Plastic Design**
Helsingin Taideteollinen Korkeakoulu (University of Art and Design Helsinki)
Helsinki, Finland
April 22
- 1993 **Parallel Design at Purdue: Mechanical Engineering and Industrial Design Team-Up.**
Co-Author; Steve Visser and Ashok Midha
Georgia Institute of Technology
Atlanta, GA
August 10-12
Published in:
IDSA Design Education Conference Proceedings
p. 245-249
- 1991 **Industrial Design Process and Education**
Rovaniemi Institute of Industrial Arts and Handicrafts
Rovaniemi, Finland
December 18
- 1991 **Industrial Design Process and Education**
Helsingin Taideteollinen Korkeakoulu (University of Art and Design Helsinki)
Helsinki, Finland
December 17
- 1991 **What is Industrial Design?**
Lecture including a three-screen multi-media presentation developed by students in A&D 355
Presentation Techniques
Purdue University
October 29
- 1990 **Art Education vs. Design Education**
University of California
San Bernardino, CA
April 10
- Major Professor Master's in Industrial Design**
- 2021 Jae Chae
2020 Keith Williams and Daniel F. Mandrinan Chiquito
2019 Xiao Ma
2018 Yingxiao Max Cao
2016 Amie Barnes, Wilson Zhang and Hongmin Jin
2015 Angie Wang
2013 Zoey Feng and Robert Sibley
2011 Di Wu
2010 Xi Chen, Sara Rockwell and Larry Fenske
2009 Hao Hua

Grants/Corporate Sponsorship

2019	LumiSource, LLC Organized a design project for the design of lamps for millennials. Chicago, IL
2018-2019	Save the Children Co-PI for a project to reduce infant mortality by integrating family-centered kangaroo mother (KMC) care into health systems. Designed and developed smart furniture for use in neonatal and KMC facilities in resource limited countries Malawi, Africa
2015-2016	Hasbro, Inc. Co-led student interdisciplinary design project working with major toy manufacturer to explore concepts focused on solar powered and mechanical toys. Providence, RI
2015	BraunAbility (3 Co-PI's) Co-PI for the BraunAbility Queensland project. It was a project to re-design a wheelchair lift for the European Market. The team of three professors and three RA's worked together for 12 months to improve the design of a wheelchair lift by reducing the weight, reducing noise and improving the visual design of the lift. Winamac, IN
2015	Evonik Organized a 48-hour intensive design project. The goal was to develop new ways to promote Evonik plastics to Industrial Designers. Lafayette, IN
2014	Kimberly Clark Professional Co-Organized student design project working with major safety manufacturer to explore concepts focused on the clean-room gowns. Atlanta, GA
2014	Hasbro, Inc. Directed a student design project to explore toy concepts focused on Play-Doh. Providence, RI
2013	GE Appliance Organized graduate student design project working with major appliance manufacturer to explore concepts focused on the laundry. Louisville, KY
2013	National Furniture Arranged corporate sponsored project exploring office stool designs for the Junior Industrial Design Students. Worked with Glen Fuller who taught the class. Jasper, IN
2013	HON Furniture Arranged 48-2-Design workshop for 96 industrial design students. The project was to design furniture for the office storage accessories. Muscatine, IA
2013	Hasbro, Inc. Arranged student design project working with major toy manufacturer to explore toy concepts focused on preschool children. Providence, RI
2012	Caterpillar Arranged Corporate sponsored project for senior industrial design students. The project was to explore how Caterpillar could expand its brand. Peoria, IL
2012	Weber Grill Arranged 48-2-Design workshop for 50 industrial design students. The project was to design products to improve the grilling experience. Chicago, IL

2011	National Furniture Arranged corporate sponsored project exploring occasional table designs for the Junior Industrial Design Students. Worked with Victor Chen who taught the A&D 305 class. Three of the students were hired to bring their designs to production. The production designs were introduced at Neocon 2012. Jasper, IN
2010	GE Healthcare Arranged multi-course project exploring home monitoring of patients with: multiple sclerosis, cerebral palsy, arthritis, and Parkinson's. Milwaukee, WI
2010	The Hon Company Arranged 48-2-Design workshop for 50 industrial design students. The project was to design furniture for the future of education. Muscatine, IA
2010	Hasbro, Inc. Led student design project working with major toy manufacturer to explore toy concepts focused on the Stretch Armstrong movie. Providence, RI
2009	DePuy, Inc. a Johnson & Johnson Company Arranged sponsored project with DePuy, Inc. for the juniors. This project focused on designing for the Paralympics. Warsaw, IN
2009	MCS Frames Arranged sponsored project focusing on future frame trends. Chicago, IL
2008	Whirlpool interaction Design Grant to develop new interaction design area within industrial design at Purdue University. Benton Harbor, MI
2007	Rolodex (Newell Rubbermaid) Managed students design project sponsored by office-supply manufacturer, researched millennial's organizational needs and helped identify new market opportunities for the company. Chicago, IL
2007	Radio Flyer Led student design project sponsored by toy manufacturer to create future concept for ride-on toys. Chicago, IL
2004	Whirlpool Corp. Organized student design project exploring new concepts for refrigeration storage. This innovative intensive project spanned two weekends and included 32 students creating 256 concepts within 48 hours. Benton Harbor, MI
2001	Hill-Rom Led Packadorm Project: design project sponsored by a major manufacturer of hospital beds and equipment. The project was to design a safer and more efficient method of transporting equipment and patients in the hospital environment. Batesville, IN
2001	Campbell Hausfeld Led power paint equipment research and design project. Student project to explore what women want in power paint equipment. Nashville, TN
2000	International Programs Global Initiative Initiated an exchange program with the University of Lapland and Purdue University. Rovaniemi, Finland
1999	Dr. Martens Shoes Organized a corporate sponsored project for the junior level Industrial Design students. The project included a five-day trip to New York provided by Dr. Martens for all participating students and faculty. The students also had a chance to work with professional designers, marketers, and executives from Dr. Martens. New York, NY

1999

Samsung Corporation

Campus liaison for the Prometheus Design Competition.
Seoul, South Korea

1995

Purdue Research Foundation

Summer Faculty Grant
Computer Design of Complex Compliant Mechanisms

APPENDIX 2: MATERIALS CONSIDERED IN THE PREPARATION OF THIS DECLARATION

Exhibit No.	Description
1001	U.S. Patent No. 9,473,602 to Jorgensen (“the ’602 patent”)
1002	Prosecution File History for the ’602 patent (“Prosecution History”)
1004	U.S. Patent Application Publication No. 2003/0222845 (“Nguyen”)
1005	U.S. Patent No. 7,515,431 (“Zadesky”)
1006	European Patent Application Publication No. 1,482,733 (“Oda”)
1007	U.S. Patent No. 6,618,044 (“Gettemy”)
1008	U.S. Patent Application Publication No. 2006/0121938 (“Hawkins”)
1009	ITC 337-TA-1038 Apple's Opening Claim Construction Brief
1010	Haller, Design Secrets: Products 2
1011	U.S. Patent No. 7,787,618 (“the ’618 patent”)
1012	Prosecution File History for the ’618 patent
1013	Prosecution File History for U.S. Patent No. 8,953,780
1014	Prosecution File History for U.S. Patent No. 8,615,077
1015	V3-Razr Repair Manual, Motorola Technical Support Group
1016	ITC 337-TA-1038 Nokia Claim Construction Reply Brief
1017	Excerpts from Chris Lefteri, <i>Metals Materials for Inspirational Design</i>
1018	International Design Magazine, August 2002
1019	Innovation – Industrial Design Excellence Yearbook, Quarterly of the Industrial Design Society of America
1020	Prosecution File History for U.S. Patent No. 8,363,824

APPENDIX 3: CHALLENGED CLAIMS

[1pre] A portable electronic device comprising:

[1a] a one piece housing forming enclosed exterior lateral sides and a rear side;

[1b] a cut out in the rear side of said housing;

[1c] a camera located in said housing and extending to said cut out at said rear side;

[1d] an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

[1e] a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section;

[1f] wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the portable electronic device.

2. A portable electronic device according to claim 1 wherein said one piece housing has a front side extending from and between the lateral sides.

3. A portable electronic device according to claim 2 wherein the front side extends parallel to the lateral edges.

4. A portable electronic device according to claim 3 wherein the front side forms at least a side of the opening through which the input device is located.

5. A portable electronic device according to claim 1 wherein the user input and a front side of the housing lie in a side by side arrangement.

6. A portable electronic device according to claim 1 wherein the one piece housing and the user input form a continuous surface of the portable electronic device.

7. A portable electronic device according to claim 6 further comprising a bracket wherein the user input section and the one piece housing define an interior volume and the bracket is configured to support said user input section.

8. A portable electronic device to claim 1 wherein the battery is located adjacent the engine section in a side by side arrangement.

9. A portable electronic device according to claim 1 further comprising a cut out portion wherein the cut out portion projects from the rear side of the housing.

10. A portable electronic device according to claim 9 where the camera is partially located in the cut out portion.

11. A portable electronic device according to claim 1 further comprising a door configured to support an electronic module.

12. A portable electronic device according to claim 11 wherein the electronic module is configured to interface to the engine section.

13. A portable electronic device according to claim 1 further comprising a second camera located on a front side of the portable electronic device.

14. A portable electronic device according to claim 1 wherein the user input section is located directly adjacent the battery and the engine section.

[15pre] A housing for a portable electronic device comprising:

[15a] a one piece housing forming enclosed exterior lateral sides and a rear side;

[15b] a cut out in the rear side of said housing, said cut out configured to receive at least part of a camera;

[15c] wherein the housing is configured to receive a battery and an engine section, wherein a user input is located in an opening between said

exterior lateral sides of said one piece housing of the portable electronic device, wherein the battery and engine section are configured to be housed in the housing such that the user input section is located above the engine section and the battery, and wherein the user input section is located adjacent the battery and the engine section.

[16pre] A housing for a portable electronic device according to claim 15 further comprising:

[16a] a front side extending between the lateral edges, said lateral sides and front side forming a aperture configured to receive the user input wherein the user input and the front side of the housing form a continuous front surface of the portable electronic device.

17. A housing according to claim 15 wherein the one piece housing has been extruded.

18. A housing according to claim 15 wherein the one piece housing comprises a metal.

19. A housing according to claim 15 wherein the housing has substantially at least one of an open top or bottom aperture.

20. A housing according to claim 19 wherein a antenna module is located at a aperture in the housing.

21. A housing according to claim 20 wherein the antenna module is enclosed by a antenna cover.

[22pre] A mobile phone comprising:

[22a] a one piece housing of the mobile phone forming enclosed exterior lateral sides and a rear side of the mobile phone;

[22b] a cut out in the rear side of said housing;

[22c] a camera located in said housing and extending to said cut out at said rear side;

[22d] an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

[22e] a user input section located above the engine section and a battery, wherein the user input section is located adjacent the battery and the engine section;

[22f] wherein the battery and engine section are housed in the housing and the user input is located in an opening between said exterior lateral sides of said one piece housing of the mobile phone.

23. A mobile phone according to claim 22 wherein said one piece housing has a front side extending from and between the lateral sides.

24. A mobile phone according to claim wherein the front side extends parallel to the lateral edges.

25. A mobile phone according to claim 24 wherein the front side forms at least a side of the opening through which the input device is located.

26. A mobile phone according to claim 22 wherein the user input and a front side of the housing lie in a side by side arrangement.

27. A mobile phone according to claim 22 wherein the one piece housing and the user input form a continuous surface of the mobile phone.

28. A mobile phone according to claim 27 further comprising a bracket wherein the user input section and the one piece housing define an interior volume and the bracket is configured to support said user input section.

29. A mobile phone according to claim 22 wherein the battery is located adjacent the engine section in a side by side arrangement.

30. A mobile phone according to claim 22 further comprising a cut out portion wherein the cut out portion projects from the rear side of the housing.

31. A mobile phone according to claim where the camera is partially located in the cut out portion.

32. A mobile phone according to claim 22 further comprising a second camera on a front side of the mobile phone.

33. A mobile phone according to claim further comprising a door configured to support an electronic module.

34. A mobile phone according to claim 33 wherein the electronic module is configured to interface to the engine section.

35. A mobile phone according to claim 22 wherein the user input section is located directly adjacent the battery and the engine section.

36. A mobile phone according to claim 22 wherein the transceiver is a mobile phone transceiver.

APPENDIX 4: UNDERSTANDING OF THE LAW

I have applied the following legal principles provided to me by counsel in arriving at the opinions set forth in this report.

Legal Standard for Prior Art

I am not an attorney. I have been informed by attorneys of the relevant legal principles and have applied them to arrive at the opinions set forth in this declaration.

I understand that the petitioner for inter partes review may request the cancelation of one or more claims of a patent based on grounds available under 35 U.S.C. § 102 and 35 U.S.C. § 103 using prior art that consists of patents and printed publications.

Anticipation and Prior Art

I understand that § 102 specifies when a challenged claim is invalid for lacking novelty over the prior art, and that this concept is also known as “anticipation.” I understand that a prior art reference anticipates a challenged claim, and thus renders it invalid by anticipation, if all elements of the challenged claim are disclosed in the prior art reference. I understand the disclosure in the prior art reference can be either explicit or inherent, meaning it is necessarily present or implied. I understand that the prior art reference does not have to use the same words as the challenged claim, but all of the requirements of the claim

must be disclosed so that a person of ordinary skill in the art could make and use the claimed subject-matter.

In addition, I understand that § 102 also defines what is available for use as a prior art reference to a challenged claim.

Under § 102(a), a challenged claim is anticipated if it was patented or described in a printed publication in the United States or a foreign country before the challenged claim's date of invention.

Under § 102(b), a challenged claim is anticipated if it was patented or described in a printed publication in the United States or a foreign country more than one year prior to the challenged patent's filing date.

Under § 102(e), a challenged claim is anticipated if it was described in a published patent application that was filed by another in the United States before the challenged claim's date of invention, or was described in a patent granted to another that was filed in the United States before the challenged claim's date of invention.

I understand that a challenged claim's date of invention is presumed to be the challenged patent's filing date. I also understand that the patent owner may establish an earlier invention date and "swear behind" prior art defined by § 102(a) or § 102(e) by proving (with corroborated evidence) the actual date on which the

named inventors conceived of the subject matter of the challenged claim and proving that the inventors were diligent in reducing the subject matter to practice.

I understand that the filing date of a patent is generally the filing date of the application filed in the United States that issued as the patent. However, I understand that a patent may be granted an earlier effective filing date if the patent owner properly claimed priority to an earlier patent application.

I understand that when a challenged claim covers several structures, either generically or as alternatives, the claim is deemed anticipated if any of the structures within the scope of the claim is found in the prior art reference.

I understand that when a challenged claim requires selection of an element from a list of alternatives, the prior art teaches the element if one of the alternatives is taught by the prior art.

Legal Standard for Obviousness

I understand that even if a challenged claim is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the claimed subject matter would have been obvious to a person of ordinary skill in the pertinent art at the time the alleged invention.

I understand that obviousness must be determined with respect to the challenged claim as a whole.

I understand that one cannot rely on hindsight in deciding whether a claim is obvious.

I also understand that an obviousness analysis includes the consideration of factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the challenged claim, (3) the level of ordinary skill in the pertinent art, and (4) “secondary” or “objective” evidence of non-obviousness.

Secondary or objective evidence of non-obviousness includes evidence of: (1) a long felt but unmet need in the prior art that was satisfied by the claimed invention; (2) commercial success or the lack of commercial success of the claimed invention; (3) unexpected results achieved by the claimed invention; (4) praise of the claimed invention by others skilled in the art; (5) taking of licenses under the patent by others; (6) deliberate copying of the claimed invention; and (7) contemporaneous and independent invention by others. However, I understand that there must be a relationship between any secondary evidence of non-obviousness and the claimed invention.

I understand that a challenged claim can be invalid for obviousness over a combination of prior art references if a reason existed (at the time of the alleged invention) that would have prompted a person of ordinary skill in the art to combine elements of the prior art in the manner required by the challenged claim. I understand that this requirement is also referred to as a “motivation to combine,”

“suggestion to combine,” or “reason to combine,” and that there are several rationales that meet this requirement.

I understand that the prior art references themselves may provide a motivation to combine, but other times simple common sense can link two or more prior art references. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may come from market forces.

I understand obviousness to include, for instance, scenarios where known techniques are simply applied to other devices, systems, or processes to improve them in an expected or known way. I also understand that practical and common-sense considerations should be applied in a proper obviousness analysis. For instance, familiar items may have obvious uses beyond their primary purposes.

I understand that the combination of familiar elements according to known methods is obvious when it yields predictable results. For instance, obviousness bars patentability of a predictable variation of a technique even if the technique originated in another field of endeavor. This is because design incentives and other market forces can prompt variations of it, and predictable variations are not the product of innovation, but rather ordinary skill and common sense.

I understand that a particular combination may be obvious if it was obvious to try the combination. For example, when there is a design need or market

pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. This would result in something obvious because the result is the product not of innovation but of ordinary skill and common sense. However, I understand that it may not be obvious to try a combination when it involves unpredictable technologies.

It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

It is my understanding that the Manual of Patent Examining Procedure §2143 sets forth the following as exemplary rationales that support a conclusion of obviousness:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known technique to improve similar devices (methods, or products) in the same way;

- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- 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 art;
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

A person of ordinary skill in the art looking to overcome a problem will often use the teachings of multiple publications together like pieces of a puzzle, even though the prior art does not necessarily fit perfectly together. Therefore, I understand that references for obviousness need not fit perfectly together like puzzle pieces. Instead, I understand that obviousness analysis takes into account inferences, creative steps, common sense, and practical logic and applications that a person of ordinary skill in the art would employ under the circumstances.

I understand that a claim can be obvious in light of a single reference, if the elements of the challenged claim that are not explicitly or inherently disclosed in the reference can be supplied by the common sense of one of skill in the art.

I understand that obviousness also bars the patentability of applying known or obvious design choices to the prior art. One cannot patent merely substituting one prior art element for another if the substitution can be made with predictable results. Likewise, combining prior art techniques that are interoperable with respect to one another is generally obvious and not patentable.

In order for a claim to be found invalid based upon a modification or combination of the prior art, there must be reasonable expectation that a person of ordinary skill would have successfully modified or combined the prior art to arrive at the claimed arrangement. This does not mean that it must be certain that a person of ordinary skill would have been successful – the law only requires that the person of ordinary skill in the art would have perceived a reasonable expectation of success in modifying or combining the prior art to arrive at the claimed invention.

In sum, my understanding is that obviousness invalidates claims that merely recite combinations of, or obvious variations of, prior art teachings using understanding and knowledge of one of skill in the art at the time and motivated by the general problem facing the inventor at the time. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor

at the time of the invention, can provide a reason for combining the elements of or attempting obvious variations on prior art references in the claimed manner.

Legal Standard for Claim Construction

I understand that before any invalidity analysis can be properly performed, the scope and meaning of the challenged claims must be determined by claim construction.

I understand that a patent may include two types of claims, independent claims and dependent claims. I understand that an independent claim stands alone and includes only the limitations it recites. I understand that a dependent claim depends from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to the limitations recited in the claim (or claims) from which it depends.

In comparing the challenged claims to the prior art, I have carefully considered the patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

I understand that to determine how a person of ordinary skill would have understood a claim term, one should look to sources available at the time of the alleged invention that show what a person of skill in the art would have understood disputed claim language to mean. It is my understanding that this may include what is called “intrinsic” evidence as well as “extrinsic” evidence.

I understand that, in construing a claim term, one should primarily rely on intrinsic patent evidence, which includes the words of the claims themselves, the remainder of the patent specification, and the prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient. I understand that extrinsic evidence may include principles, concepts, terms, and other resources available to those of skill in the art at the time of the invention.

I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else or something more specific. I understand that to determine whether a term has special meaning, the claims, the patent specification, and the prosecution history are particularly important, and may show that the inventor gave a term a particular definition or intentionally disclaimed, disavowed, or surrendered claim scope.

I understand that the claims of a patent define the scope of the rights conferred by the patent. I understand that because the claims point out and distinctly claim the subject matter which the inventors regard as their invention, claim construction analysis must begin with and is focused on the claim language itself. I understand that the context of the term within the claim as well as other claims of the patent can inform the meaning of a claim term. For example, because

claim terms are normally used consistently throughout the patent, how a term is used in one claim can often inform the meaning of the same term in other claims. Differences among claims or claim terms can also be a useful guide in understanding the meaning of particular claim terms.

I understand that a claim term should be construed not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the entire specification. I understand that because the specification is a primary basis for construing the claims, a correct construction must align with the specification.

I understand that the prosecution history of the patent as well as art incorporated by reference or otherwise cited during the prosecution history are also highly relevant in construing claim terms. For instance, art cited by or incorporated by reference may indicate how the inventor and others of skill in the art at the time of the invention understood certain terms and concepts. Additionally, the prosecution history may show that the inventors disclaimed or disavowed claim scope, or further explained the meaning of a claim term.

With regard to extrinsic evidence, I understand that all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may indicate how one of skill in the art used or understood the claim

terms. However, I understand that extrinsic evidence is considered to be less reliable than intrinsic evidence, and for that reason is generally given less weight than intrinsic evidence.

I understand that in general, a term or phrase found in the introductory words or preamble of the claim, should be construed as a limitation if it recites essential structure or steps, or is necessary to give meaning to the claim. For instance, I understand preamble language may limit claim scope: (i) if dependence on a preamble phrase for antecedent basis indicates a reliance on both the preamble and claim body to define the claimed invention; (ii) if reference to the preamble is necessary to understand limitations or terms in the claim body; or (iii) if the preamble recites additional structure or steps that the specification identifies as important.

On the other hand, I understand that a preamble term or phrase is not limiting where a challenged claim defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. I understand that to make this determination, one should review the entire patent to gain an understanding of what the inventors claim they invented and intended to encompass in the claims.

I understand that 35 U.S.C. § 112 ¶ 6 created an exception to the general rule of claim construction called a “means plus function” limitation. These types of

terms and limitations should be interpreted to cover only the corresponding structure described in the specification, and equivalents thereof. I also understand that a limitation is presumed to be a means plus function limitation if (a) the claim limitation uses the phrase “means for”; (b) the “means for” is modified by functional language; and (c) the phrase “means for” is not modified by sufficient structure for achieving the specified function.

I understand that a structure is considered structurally equivalent to the corresponding structure identified in the specification only if the differences between them are insubstantial. For instance, if the structure performs the same function in substantially the same way to achieve substantially the same result. I further understand that a structural equivalent must have been available at the time of the issuance of the claim.